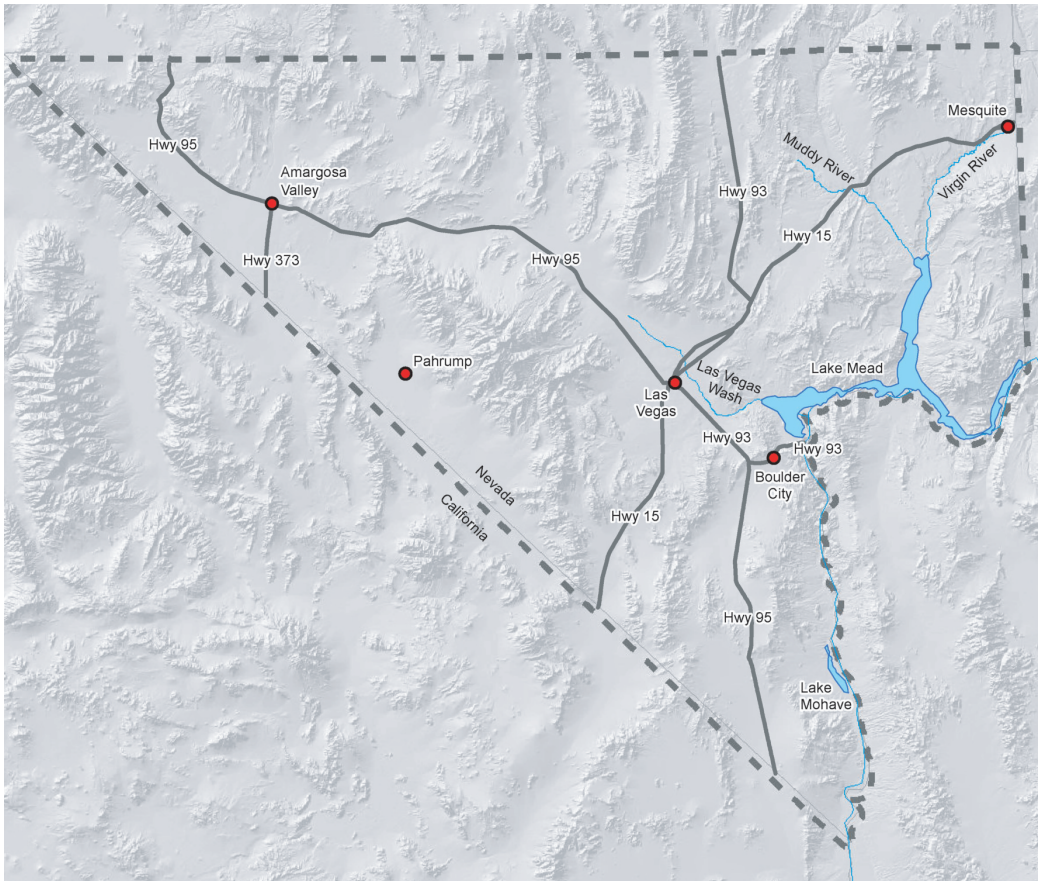
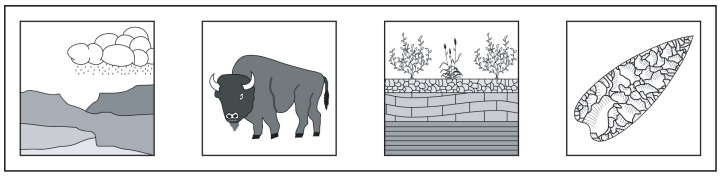
A PREHISTORIC CONTEXT FOR SOUTHERN NEVADA





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A PREHISTORIC CONTEXT FOR SOUTHERN NEVADA

Prepared for

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Nevada State Historic Preservation Office
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USDA Forest Service
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CHAPTER 1
INTRODUCTION

Heidi Roberts and Richard V.N. Ahlstrom

This year is the 30th anniversary of Margaret Lyneis' acclaimed *An Archaeological Element for the Nevada Historic Preservation Plan* (Lyneis 1982a). The document was developed to assist land managers and cultural resource custodians in evaluating the significance of prehistoric archaeological sites under the requirement of the National Historic Preservation Act and other federal laws and regulations. In the intervening 30 years, southern Nevada has been one of the nation's fastest growing population centers. This explosive urban expansion has resulted in the recording of thousands of prehistoric sites and the excavation of hundreds of these.

In 2010 the Bureau of Reclamation (Reclamation), Lower Colorado Region, obtained funding through the Southern Nevada Public Land Management Act (SNPLMA) as a Southern Nevada Agency Partnership sponsored project to synthesize these new data and update Lyneis' prehistoric context. Toward this goal, on February 25, 2011, HRA Inc., Conservation Archaeology was selected by Reclamation to incorporate the new archaeological data and update the Prehistoric Context "for Federal land managers, et al., to use for helping comply with the National Historic Preservation Act and other historic preservation laws/regulations." The aggressive project timeline called for the submission of a preliminary draft report by August 1, 2011.

To meet these schedule requirements HRA created a project team that included Gnomon Inc. (Gnomon), Western GeoArch Research (GeoArch), and the Nevada Rock Art Foundation (NRAF), as well as four highly respected present and former professors at the University of Nevada. Gnomon's familiarity with the state's archaeological site database and the rest of the team's expansive knowledge of the region's prehistoric literature made it possible to prepare a preliminary draft report five months after the contract's award. Four independent work groups, organized according to prehistoric temporal periods and the topic of rock art, worked concurrently on the literature review and report preparation tasks. Concurrently Gnomon and GeoArch conducted the site file search and compiled archaeological site and environmental data. Eric Ingbar, Michael Drews, Jeremy Hall, and Sandra Atkinson of Gnomon all participated in site file search and data compilation, and William Eckerle of GeoArch directed the efforts related to the region's past and present environment.

The *Paleoindian/Archaic Period Group* was under the direction of Dr. Barbara Roth (University of Nevada, Las Vegas), with Dr. Claude Warren (University of Nevada, Las Vegas, retired) serving as advisor. The *Puebloan Period Group* was under the direction of Dr. Richard Ahlstrom of HRA, with the aid of Dr. Margaret Lyneis (University of Nevada, Las Vegas, retired). Heidi Roberts of HRA led the *Post-Puebloan Period Group,* with the assistance of Dr. Kevin Rafferty (College of Southern Nevada), and Dr. Catherine Fowler (University of Nevada, Reno, retired) who served as advisor. Lastly, Dr. Angus Quinlan (Nevada Rock Art Foundation) led the *Rock Art Group* and was assisted by members of the Nevada Rock Art Foundation. HRA founder and owner, Heidi Roberts, performed the tasks of project management and agency coordination with the assistance of HRA's Office Manager April Sargent-Couch. Christopher Harper of HRA compiled and formatted the document.

This report contains the results of this research organized into ten chapters. Chapter 1, by Heidi Roberts and Richard Ahlstrom, contains an introduction to the project, in terms of its scope and organization, plus a discussion of the team's theoretical orientation, other methodological considerations and theoretical constraints. In Chapter 2 James Mayer, William Eckerle, Sasha Taddie, and Orion Rogers of GeoArch present a summary of the environment of Southern Nevada, both past and present. Chapter 3, by Heidi Roberts contains a review of the literature and previous research. In Chapter 4, Michael Drews, Eric Ingbar, and Jeremy Hall of Gnomon, synthesize the prehistoric site data and previous archaeological surveys. Chapter 5, by Barbara Roth is a review of the literature pertaining to the Paleoindian and Archaic periods. Richard Ahlstrom summarizes the literature pertaining to the Puebloan Period in Chapter 6 and in

Chapter 7 Heidi Roberts reviews the literature for the Post-Puebloan Period. Angus Quinlan examines Native American rock art sites and the literature pertaining to magico-religious sites in Chapter 8, and Chapter 9, by Kevin Rafferty, describes southern Nevada's intaglios, rock alignments, and trails. The remaining two chapters conclude the report with detailed research themes, data required to address research questions, and management recommendations for improving procedures and methods. The report concludes with a new understanding of the region's prehistory and suggestions for future research directions.

The volume also contains several important appendices including two by Lyneis that explore the current state of pottery research (Appendix I) and summarize her soon-to-be published investigations at the Yamashita sites (Appendix D). Claude Warren, in Appendix J, reviews the region's first archaeologists and their lasting contributions. Appendix H by Heidi Roberts contains descriptions of the Post-Puebloan sites and Suzanne Eskenazi summarizes unpublished information on the Lost City excavations in Appendix E. Other appendices summarize the radiocarbon dates (Appendix A), obsidian sourcing data (Appendix B), the NVCRIS dataset used in this document (Appendix C), the analytical site information (Appendix F), and the environmental datasets (Appendix G).

Many other individuals participated in the successful completion of this project. Reclamation archaeologists Mark Slaughter and Pat Hicks provided invaluable guidance regarding the literature search and many other aspects of the project. Mark Slaughter served as the Contracting Officer's Technical Representative and Pat Hicks and Becky Blasius-Wert attended many of the coordination meetings. Pat Hicks carefully read the first draft of the report and provided many excellent comments that guided our second draft. The Southern Nevada Agency Partnership (SNAP) team provided guidance on the overall direction of the report and management needs.

We would also like to extend our thanks to many individuals who provided guidance, reviewed the first drafts, shared data, provided copies of unpublished manuscripts, and dropped whatever they were doing to send us site forms, reports, or GIS shape files including: Kathleen Sprowl and Mark Boatwright of the Bureau of Land Management (BLM) in Las Vegas, Kelly Turner and Brian Haas of the USDA Forest Service (Forest Service), Steve Daron and Glendee Anne Osborne of the National Park Service (Park Service), Anan Raymond of U.S. Fish and Wildlife Service, Jeff Wedding and David Smee of the Harry Reid Center (HRC), Tom Burke of the BLM State Office, Sue Rigby of the BLM in Tonopah, Amy Gilreath of the Far Western Anthropological Group, Melanie Scott and Camille Phillips of the Desert Research Institute (DRI), Karen Harry of the University of Nevada, Las Vegas (UNLV), Anne DuBarton of Newfields International LLC, Keith Myrher of Nellis Air Force Base, and Don Sada of DRI. To all of these individuals we owe a debt of gratitude. Lastly, we would like to thank David Smee for creating and drawing the excellent art for the back cover of this report.

THE PROJECT AREA AND CHRONOLOGICAL FRAMEWORK

The project area is defined by Reclamation "as those lands in southern Nevada, south of 37 degrees latitude" (Figure 1.1). This area of Nevada consists of all of Clark County, the southern tip of Nye County, just south of Beatty, and the southern edge of Lincoln County. The project area includes lands administered by the BLM (Las Vegas Field Office), the southern edge of the Nellis Air Force Range, the Lake Mead National Recreation Area that is managed by the National Park Service, three National Wildlife Refuges (Ash Meadows, Moapa, and Desert), Humboldt-Toiyabe National Forest, and other state and local government agency lands (Figure 1.2).

To achieve finer resolution in our understanding of the project area, we have divided southern Nevada into four geographic regions and its prehistory into three major periods. The spatial units include the Western, Southern, Central, and Eastern regions (Figure 1.1). They are used as a heuristic tool for addressing spatial variation in archaeological evidence across southern Nevada. Discussions of that evidence relating to the Puebloan (Chapter 6) and Post-Puebloan (Chapter 7) periods are organized in terms of the four regions. This procedure is not followed in the case of the Paleoindian and Early Archaic periods (Chapter 5), which have produced too little evidence of spatial variation to warrant its use.

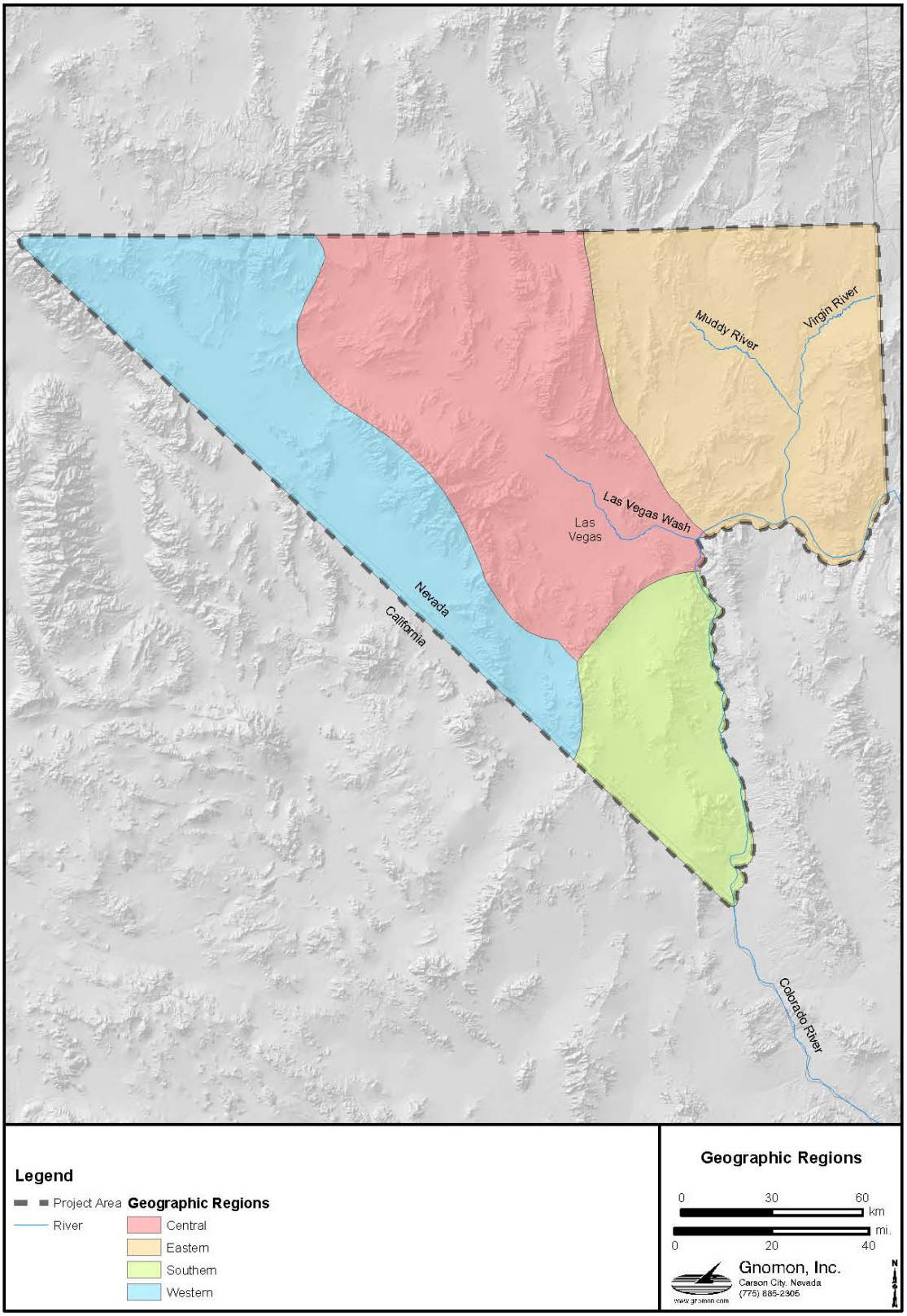


Figure 1.1. The project area and geographic regions.

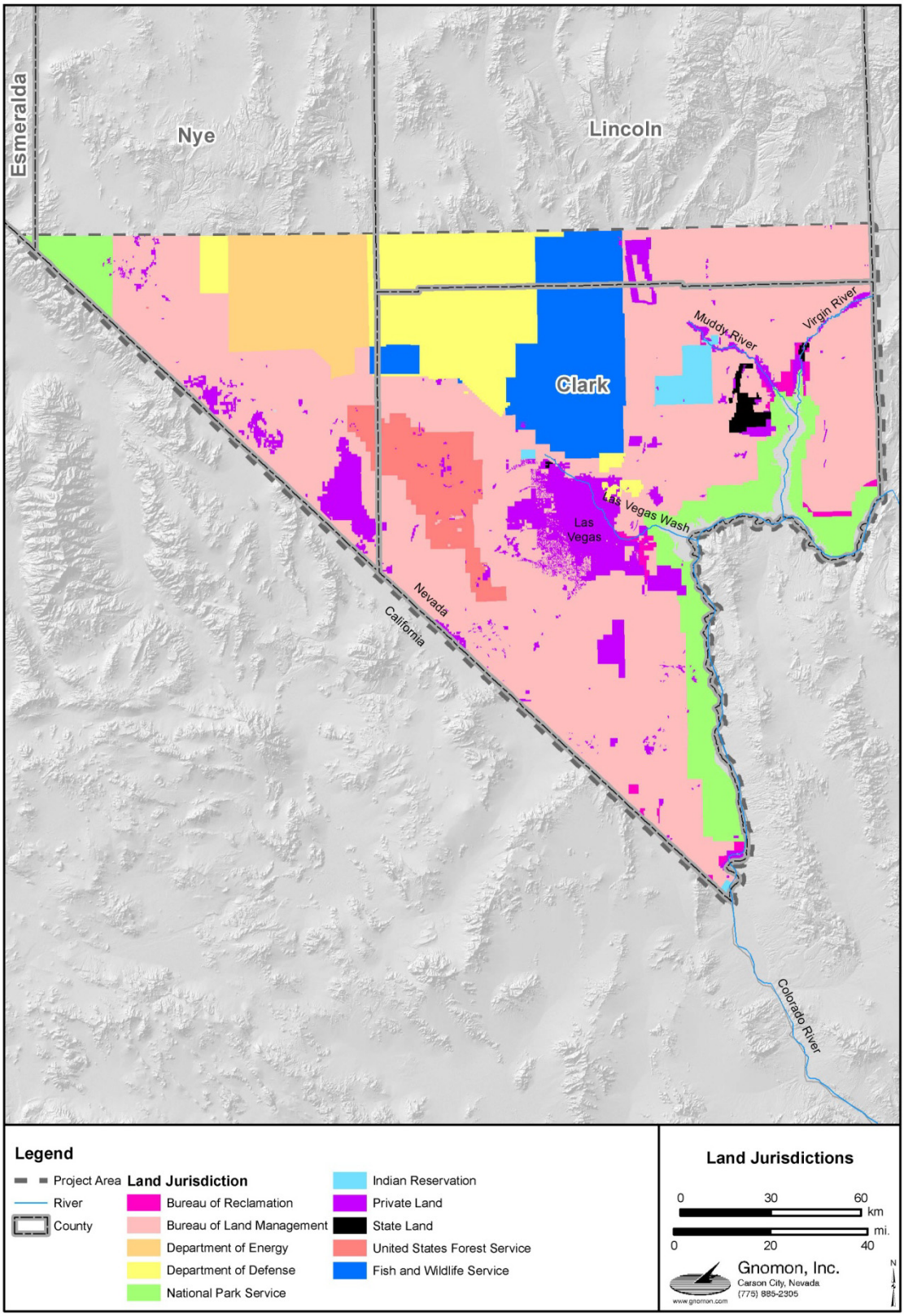


Figure 1.2. Land ownership in the project area.

The four geographic regions are defined with reference to hydrological basins, ethnographic boundaries, and broad-scale patterns in archaeological cultures. The focus on basins means that the boundaries between regions tend to follow the spines of mountain ranges and, where mountains are not present, the divides between adjacent basins. The Western Region parallels the southwestern border of Nevada. It includes the mountains, hills, and mesas located around and to the east of Beatty, and it extends eastward to the spine of the Spring Mountains and southeastward to the crest of the McCullough Range. Major basins that lie within or overlap the Western Region are the Amargosa Desert (including Ash Meadows), the Pahrump Valley, and the Ivanpah Valley.

The Central Region is bounded on the west by the spine of the Spring Mountains and, to the northwest and southeast of that range, by less elevated divides between basin areas. The eastern boundary is provided by the crest of the Sheep and Las Vegas Ranges and, to the south of those mountains, by a divide between basins. It has a similar boundary along its southeastern edge. The region's northern boundary is provided by the 37 degrees north latitude line. The region's southern half consists of a basin, the Las Vegas Valley, and its northern half of north-south-trending mountains (including the Spotted, Pintwater, and Desert Ranges) and the intervening and adjacent basins (including the Frenchman Flat and Jackass Flats basins and the Indian Springs, Three Lakes, and Desert Valleys).

The Southern Region occupies Nevada's triangular southern tip. It is bounded on the northwest by the spine of the McCullough Range, on the southwest by the Nevada-California border, and on the east by the Colorado River, which also serves as Nevada's border with Arizona. Major basins in the Southern Region include the Eldorado Valley and the northern end of the Piute Valley. Also worth mentioning in this context are the canyons and narrow valleys that together form the Lower Colorado River Valley, which runs along the Southern Region's eastern edge.

Finally there is the Eastern Region, which is bounded on the west by the spine of the Sheep and Las Vegas Ranges, on the southwest by a divide between basins, and on the south by the Colorado River. The eastern boundary consists of the Nevada-Arizona border, which, from north to south, crosses the Virgin River Valley, passes through the Virgin River Mountains and runs on the eastern side of the uplands of the Gold Butte area. The region's northern boundary follows the 37 degree north latitude line. From east to west, it crosses the north side of the Mormon Mountains, Meadow Valley, the Meadow Valley Mountains, and the Kane Springs and Coyote Springs Valleys. Mountains located within the Eastern Region include the Arrow Canyon Range, Muddy Mountains, and Black Mountains. Most of the region's major basins consist of river or stream valleys, including the Virgin River Valley, Moapa Valley (containing the Muddy River), and previously mentioned Meadow, Kane Springs, and Coyote Springs Valleys. An additional basin (in effect a southwestward extension of the Upper Moapa Valley) consists of the valley containing California Wash and the adjacent Dry Lake Valley. Also worth mentioning is the Colorado River Valley, consisting of a series of canyons and valleys that, together with the southernmost stretch of the Virgin River Valley, are today flooded by the waters of Lake Mead.

Our discussions of archaeological evidence from southern Nevada are organized in terms of three major temporal units, the Paleoindian and Archaic periods (Chapter 5), the Puebloan period (Chapter 6), and the Post-Puebloan period (Chapter 7). Unlike the four geographic regions discussed above, these periods were not created for use in this document, but are based on chronological units that are commonly applied to the prehistory of southern Nevada and its environs. The periods themselves are more standard than their names: for example, some researchers eschew the label Paleoarchaic, our Puebloan period overlaps substantially with what has previously been termed the Saratoga Springs phase, and the Post-Puebloan period has also been referred to as the Late Prehistoric period. Our hope is that colleagues who might disagree with our choice of labels will at least recognize the periods themselves. Although the periods have considerable validity with respect to change over time in human adaptations and technologies, their use should not obscure the fact that much temporal and spatial variability exists within them as well. Details of that variability are discussed in the appropriate chapters below. Here we can recognize the major temporal subunits into which the periods are divided for the purposes of those discussions (Table 1.1).

Table 1.1. Chronological Framework of the Southern Nevada Prehistoric Context

Major Period	Date Range	Chapter	Sub-Period			Date Range	
Post-Puebloan	AD 1300–1776	7					AD 1300-1776
Puebloan	AD 200–1300	6	Pueblo III				AD 1200-1300
			Pueblo II	Late			AD 1150-1200
				Middle			AD 1050-1150
				Early			AD 1000-1050
			Pueblo I				AD 800-1000
			Basket-maker III				AD 500-800
			Late Basket-maker II				AD 200-500
Paleo-indian and Archaic	11,150 B.C.-AD 200	5		Late Archaic	Terminal L. A.	200 B.C.–AD 200	2050 B.C.-AD 200
				Middle Archaic			5550-2050 B.C.
			Paleo-archaic	Early Archaic			9050–5550 B.C.
				Paleo-indian			11,150-10,850 B.C.

In order to identify and interpret patterning in the distribution of southern Nevada's archaeological record in relation to one another and to significant features of the natural environment, we have assigned the occupations of as many sites as possible to one or, in a number of cases, more than one of the three major periods. The vast majority of known sites in southern Nevada have been recorded on survey (Chapter 4), but not subjected to subsurface testing or excavation. In these cases, the only criteria available for dating the sites are based on the occurrence of "temporally diagnostic" artifacts. These are categories of artifacts that were produced and used entirely or, as is more often the case with archaeological data, primarily during one or another of the three periods. The objects in question consist of stone projectile points and pieces of broken ceramic vessels, which can survive for centuries and even millennia in surface artifact assemblages. The artifacts that were used to assign sites to the Paleoindian and Archaic, Puebloan, and Post-Puebloan periods are discussed in the appropriate chapters.

Some southern Nevada sites have been subjected to subsurface investigation in the form of limited testing or more substantial excavation. These investigations can provide two kinds of chronological evidence. First, excavations can add to the size and diversity of a site's assemblage of temporally diagnostic artifacts. Second, they can produce organic remains that are suitable for

radiocarbon dating. As described in Appendix A, radiocarbon dates were used to assign the sites to archaeological periods based on the relationship between the means or midpoints of the individual two-sigma calibrated date ranges from a site and the date ranges of the periods listed in Table 1.1. The temporal distribution of the 380 radiocarbon dates from archaeological sites in the southern Nevada region that were compiled for this study are presented in Figure A.1.

OUR APPROACH: THE MEANING OF IT ALL

Most of the excavated archaeological sites discussed in this document represent a brief point in time, essentially a snapshot of prehistory—what can be thought as a vignette of prehistoric life. Archaeological theory and ethnographic analogy enable archaeologists to infer aspects of cultural behavior and history from this kind of vignette, but certain types of cultural information (such as language) are beyond the reach of archaeological techniques. If we use the analogy of a motion picture to understand how archaeologists reconstruct prehistory, then each excavated site component would represent only a few frames of this movie. In fact, if we compiled all that we have learned from archaeological sites about one time period, for example the Late Archaic Period in southern Nevada, we could not produce a complete movie of how people lived during that time. Lithic scatters, which make up about 90 percent of the archaeological record, would only show us a couple of scenes and a few activities.

Employing ethnographic analogy and archaeological theory, we can infer that individual lithic scatters or ancient campsites represent brief stop-overs on the seasonal round of a family or small group. We know from projectile points and bifaces that prehistoric people hunted large animals and processed the carcasses for food. The added presence of ground stone tools tells us that plants were also processed. If fire-cracked rock is present at the site, we can infer that animals and plants were cooked in pits or rocks were heated to heat liquid in baskets. Sometimes, when these sites are excavated, archaeologists encounter intact hearths, roasting pits, or the remains of habitation structures. From these features it may be possible to determine what season the camp was occupied and, from the camp refuse (i.e. bones and burnt seeds), it also possible to learn what specific plants and animals were cooked.

Perishable goods recovered from dry cave sites found throughout the Great Basin and Southwest can tell us what clothes people wore, what baskets and cordage they made, and how their stone tools were hafted to make spears and other implements. Analyzed coprolites (dry feces) and processed soil samples can reveal what people ate when they lived at these sites and potentially what seasons they spent there. Using modern technology we can now extract human DNA from chewed agave quids, which are spit out after the edible flesh is extracted. Artifacts such as split twig figurines crafted by prehistoric peoples into the shapes of hunted animals and found across portions of the southern Great Basin, the Colorado Plateau, and the eastern edge of the Mojave Desert, suggest regional connections, or some type of affinal link between the cave's occupants.

Thus, more frames in the motion picture of Archaic lifeways can be filled in, but the evidence is limited to the periods and seasons when the excavated sites were occupied. The challenge most archaeologists face is linking together these multiple habitation areas. How does one link a Late Archaic fall pine nut camp in the mountains to the spring agave roast camp, and the summer mesquite pod harvest in the valley bottom? In these circumstances archaeologists can, and frequently do, develop models of seasonal rounds based on ethnographic analogy, the availability and location of food sources, and concepts of human behavioral ecology. The validity of such models are, however, dependent on the quality and relevance of the data on which they are based. For example, are our climatic reconstructions of sufficient accuracy to tell us what plant resources would have been available to the Archaic people if the climate was slightly wetter or drier than today?

Tracing the seasonal round of mobile foraging groups in prehistory is one of the major challenges facing Great Basin archaeologists. In the past, archaeologists reconstructed Archaic and Post-Puebloan lifeways using three models: Julian Steward's (1938) culture ecology model, Lewis Binford's (1980) hunter-gatherer settlement systems model and optimal-foraging theory, and Jesse Jennings' (1957) Desert Archaic model, which extends Steward's model back into the Archaic period. We agree with McGuire

and Hildebrandt (2005:695) that "while contemporary scholars may rightly argue that the archaeological record is much more dynamic than either Steward or Jennings might have guessed, they rarely stray far from the cause-and-effects of environment and subsistence adaptation that are the hallmarks of Great Basin archaeology."

Unfortunately, Steward's model was based on Southern Paiute, Shoshone, and other tribes living in the Great Basin in the late 1800s. These groups had long since been forced out of their hunter-gatherer lifeways and into an industrialized economy. Even more important in the context of southern Nevada is the fact that Steward's model dismisses the importance of farming by Southern Paiute people, ignoring a major component of their economy. The main difficulty in constructing a model of the hunter-gather seasonal migration during different periods results from a lack of well-dated and excavated sites. A secondary issue relates to the thousands of surface artifact scatters that lack temporally and ethnically diagnostic artifacts. How do these sites fit into the seasonal migration? Furthermore, how do we define what would be considered a home territory for a single band? Although ethnographic analogy with modern tribes can prove useful, environmental studies indicate that resource availability changed dramatically following the introduction of cattle, horses, and sheep and during wetter or drier periods.

If 10 to 20 percent of the frames in our film are based on sites in the region and the remaining 80 to 90 percent of our movie is fabricated using a combination of theory, inference, and data from sites in other parts of the world, have we then created a true picture of the region's Archaic lifeways? How can we expect to understand culture change when our reconstructions of culture history contain such gaping holes? We would argue that a culture history that relies too heavily on data from adjacent regions, or on ethnographic analogy, creates a false sense of what we do know.

Until the 1970s, the goal of most Great Basin and Southwestern archaeologists was to develop regional culture histories. Rockshelters with deep stratified deposits served as the Great Basin's Rosetta Stones. In the Southwest, where the Pueblo cultures flourished, prehistoric cultures were defined primarily on the basis of ceramic types and architectural styles. In the early 1900s a group of New Archaeologists—Nels Nelson, Leslie Spier, A. L. Kroeber, Earl Morris and A. V. Kidder used stratigraphy and seriation to systematically establish chronologies (D. Fowler 2010:281). They avoided the methods of Edgar Lee Hewett, Byron Cummings, and Jesse Walter Fewkes who believed that "the historic present is an all-the-same continuation of the past, and the American past was relatively brief." (D. Fowler 2010:281). Instead, the New Archaeologists asserted that linkages between present and past cultures must be proven.

Stratigraphy and pottery or projectile point seriation methods enabled the New Archaeologists to create "archaeological cultures" by grouping sites with stylistic similarities in material culture, technology, architecture, and subsistence strategies (Fowler 2010). The invention of dendrochronology and radiocarbon dating, and their widespread use in the Southwest by the 1950s provided the temporal control needed to calibrate chronologies across broad culture areas. This all changed after 1970, when the Baby Boomers came of age, claimed culture process as their focus, and began the quest for the holy grail of understanding culture change. The Baby Boomers presumed that the broad outlines of prehistory were understood and regional culture histories were also well developed. Although these *Newer Archaeologists* acknowledged that gaps in culture histories existed, the gaps were not considered a significant impediment to processual studies. By the 1980s, the Newer Archaeologists came to dominate the regulatory job market and to influence the research directions and methods that were being applied to archaeology throughout the western United States.

Matthew Johnson (2004:22-27) summarized the key themes of this Newer Archaeology as an emphasis on cultural evolution, culture process, and systems thinking. Culture was viewed as adaptive (cultural ecology) and variable, and the scientific approach was considered superior to the inductive methods of culture historians. Lastly, there was a general trend to become more explicit about one's biases. By the late 1980s, Great Basin researchers were exploring ethnoarchaeology, optimal foraging theory, and cultural-evolution models.

The philosophies of these Newer Archaeologists continue to dominate Great Basin research today. In fact, McGuire and Hildebrandt (2005:686) recently noted that "much current research within the

Great Basin is directed at ever-finer-grained models of species and habitat productivity, diet breadth, patch or prey choice, and adaptation." When Ian Hodder and the Post-Processualists became dissatisfied with the themes of *Newer Archaeology* later in the decade, Great Basin archaeologists hardly took notice (McGuire and Hildebrandt (2005). Although Great Basin models suffered from many of the problems of "equifinality" that Hodder recognized there was little effort to redirect research. The inability of models to prove or test ideas can be seen in the literature today, particularly in those developed to explore the migration of Numic groups into the region (Madsen and Rhode 1994; Sutton and Rhode 1994). Despite years of debate and model development, no consensus has been reached regarding the validity (Madsen and Rhode 1994; Roberts and Ahlstrom 2006) and mechanisms (Bettinger and Baumhoff 1982; Aikens and Witherspoon 1986) of the Numic Spread model.

OUR THEORETICAL ORIENTATION: AN ETHNOLOGY OF THE PAST

The theoretical orientation of this report is an updated version of the culture historical paradigm. In 1985 David Madsen presented a paper on this topic called "A Culture History Manifesto: Towards an Ethnology of the Past" (Madsen 1985). Madsen pointed out that although ethnological and ethnohistorical data can help us understand the archaeological phenomena, the bulk of what archaeologists do is culture history, and these culture histories are currently inadequate for testing models of human behavior. Madsen felt that archaeologists needed to develop specific culture histories that are constructed by a "gradual accumulation of disparate bits and pieces of information…[however,] the real problem is that the construction of specific culture history is a lot of work and the rewards are few" (Madsen 1985).

Following Madsen, our goal here is to reconstruct culture histories in order to develop an ethnology of the past, "that is, the identification of specific groups, reliable estimates of group size and composition, the particular resource base available to those groups, the technological items used to manipulate the resource base, and the focus of subsistence within the options available" (Madsen 1985:13). Southern Nevada is an excellent place to study subsistence strategies as they relate to micro-regional resource bases because the area is a political boundary that straddles several culturally and environmentally diverse areas. While southern Nevada is typically included in the Great Basin culture area, its biotic environment is most like that of the Mojave Desert, and it is linked hydrologically to the Colorado River system (see Chapter 2 for definitions). As part of the Mojave Desert, the study area possesses several economically significant plant and animal species that do not extend northward into the Great Basin proper. During ethnographic times, the project area was occupied by diverse groups that included the Southern Paiute, Timbisha Shoshone, Chemehuevi, and Mojave groups, and it was a stopping off place, on important trade and travel corridors connecting the West Coast shell trade to the Southwest.

To meet the goal of reconstructing culture histories, our report will refine regional chronologies and interpret prehistoric lifeways using archaeological data from hundreds of excavated archaeological sites and thousands of recorded sites. We will also develop research questions and outline data needs to direct future research and identify data gaps to focus that research.

CHAPTER 2
PRESENT AND PAST ENVIRONMENTS OF SOUTHERN NEVADA

James Mayer, William Eckerle, Sasha Taddie, and Orion Rogers

MODERN SETTING

Physiography

Southern Nevada (Figure 2.1) is situated in the Basin and Range physiographic province (Fenneman 1931), a large, arid area of west-central North America that is distinguished from surrounding provinces by "relatively evenly spaced, subparallel mountain ranges and intervening alluviated basins formed by high-angle extensional faulting" (Dohrenwend 1987:303) (See Appendix G for digital shapefile data). The mountain ranges and adjacent basin are often north-south trending, and the area has been described as "being composed of many short, abrupt ranges or ridges, looking upon the map like an army of caterpillars crawling northward" (Dutton 1886:116). The Basin and Range province extends from southernmost Idaho and Oregon through western Utah, most of Nevada, northeastern and southeastern California, western and southern Arizona, southwest New Mexico, and northern Mexico. The province is bound on the north by the Columbia Plateau, on the northwest and southwest by the Cascade Range and the Sierra Nevada, respectively, and on the east by the Middle Rocky Mountains and Colorado Plateau (Fenneman 1931).

The Basin and Range Province is subdivided into five physiographic sections (Fenneman 1931): the Great Basin, the Mojave-Sonoran Desert, the Salton Trough, the Mexican Highlands, and the Sacramento Mountains. The study area falls within the southern Great Basin, northernmost Mojave-Sonoran Desert, and a small segment of the Mexican Highlands along the Colorado River (Figure 2.2). The Great Basin is the largest subprovince and includes the area of the Basin and Range north of the Garlock Fault zone. This area includes the Bonneville Basin in western Utah and the Lahontan Basin in northwest Nevada. Most of the Great Basin is internally drained, and over 100 of the isolated closed basins contained pluvial lakes during the latest Pleistocene (Benson 2004; Morrison 1965, 1991). Principle streams in the Great Basin include the Bear and Sevier Rivers draining the Wasatch Mountains along the eastern border; the Humboldt River draining much of northern Nevada; the Carson, Owens, Truckee and Walker Rivers draining the eastern Sierra Nevada; and the Amargosa and White Rivers draining the southern Great Basin.

Three physiographically distinct areas comprise the Mojave-Sonoran Desert section (Dohrenwend 1987:305): the Mojave Desert, the lower Colorado River valley, and the Sonoran Desert. The Mojave Desert is primarily internally drained, with the most prominent stream being the Mojave River. Drainage within the Sonoran Desert is substantially more integrated, largely due to incision of the Colorado River system, and notable streams include the Bill Williams, Gila, and Salt Rivers. Relative to the Great Basin, the topography of the Mojave-Sonoran Desert is subdued, although the lowered base level along the Colorado River has deeply and extensively incised broad pediments.

Geology

The geologic history of the Basin and Range is relatively complex and includes several plate tectonic episodes occurring during the past several hundred million years (Fiero 2009). The earliest phases of tectonism occurred during the late Precambrian through early Mesozoic eras, and were associated with subduction along the western margin of the North American continent. Multiple episodes of complex deformation occurred during the early Mesozoic, resulting in mountain building during the Nevadan orogeny. Subduction of the ancient Farallon Plate continued throughout the Mesozoic and formed large magma plumes that combined to form the Sierra Nevada batholith.

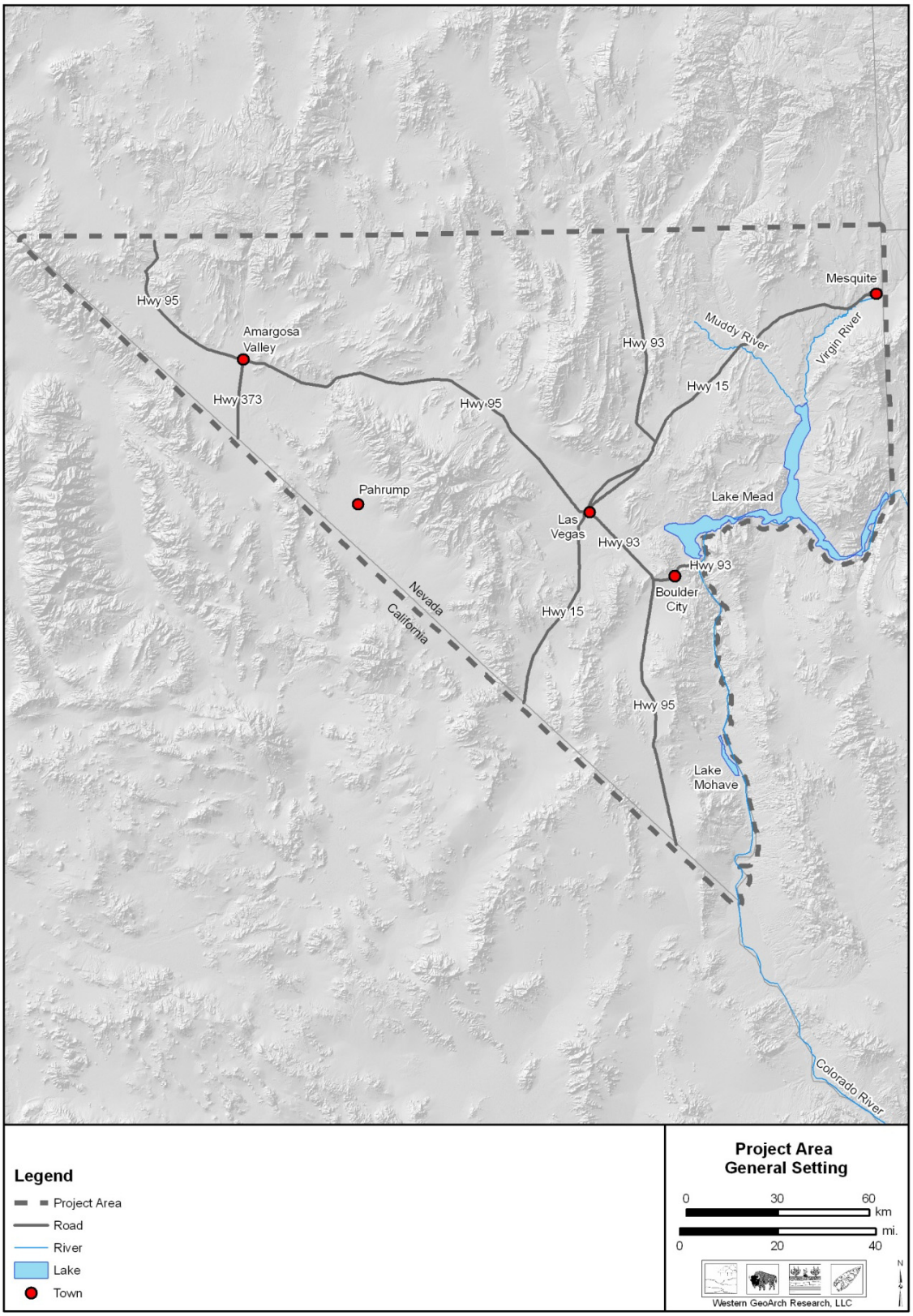


Figure 2.1. Project area and general setting in southern Nevada.

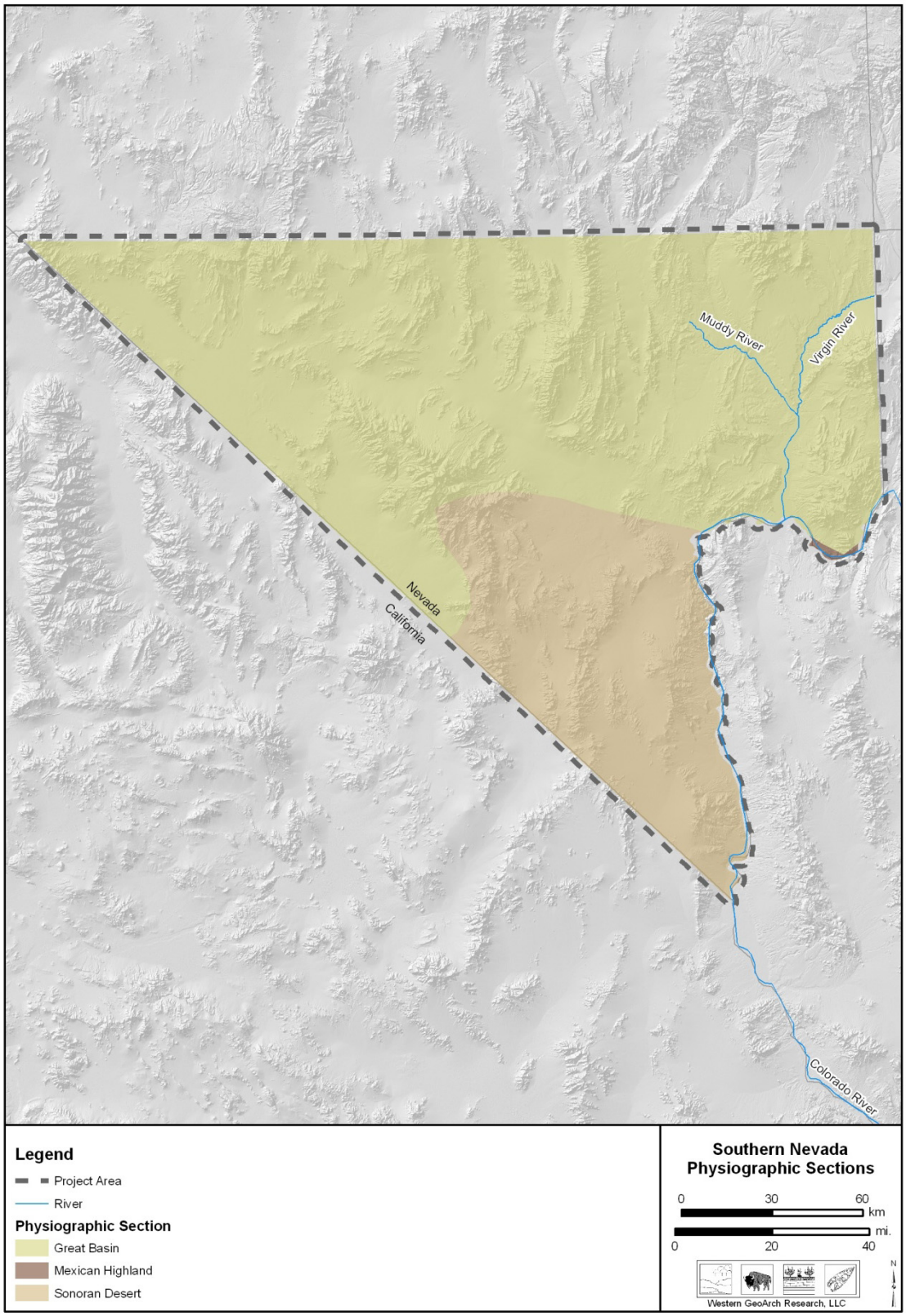


Figure 2.2. Physiographic sections in southern Nevada.

At least two phases of extensional deformation occurred during the Cenozoic era, and are responsible for much of the Basin and Range topography existing today. Relative movement along basin-mountain bounding faults produced topographic relief. The earliest phase of faulting approximately 40 to 35 million years ago (Ma) was characterized by low-angle detachment faulting coincident with the North American plate overriding the East Pacific Rise. Basin and Range extension beginning around 17 Ma caused thinning of the upper crust, resulting in brittle and ductile fracture. Extension created an inferred detachment fault (Rowland 1987) and resulted in normal faulting where uplifted blocks (horsts) of Paleozoic and Mesozoic rocks are separated by downthrown basins (grabens) (Castor et al. 2000). Central Nevada, which falls within the interior of the Basin and Range, has been largely stable since about 17 Ma, whereas the eastern and western margins remain active today. This Horst-Graben topography is archaeologically important because it forms the general pattern of the landscape upon which Native peoples lived and upon which archaeological sites were formed.

Igneous activity accompanied Cenozoic tensional extension (Ludington et al. 1996). Intrusive igneous rocks occur in the Newberry Mountains of extreme southern Nevada. Extrusive volcanic rocks occur in the south as well as the north portions of the project area with a large east-west swath that is free of Cenozoic igneous rocks. Rhyolite-andesite-basalt occurs in both the southern and northern areas of the project area. Volcanic rocks in the southern area contain significant areas of andesite. Hydrothermal solution-derived cryptocrystalline rocks, suitable for chipped stone raw material are associated with igneous rocks.

Pre-Tertiary rocks underlie the basins and crop out in adjacent ranges and consist of distinct lithological assemblages (Figure 2.3; Longwell et al. 1965; Ludington et al. 1996). Structurally, they are part of the North American plate and adjacent marine shelf (Silberling 1991). Some of the rocks are archaeologically significant in that they bear chipped stone raw material. Extreme southern Nevada, south of Boulder City, is underlain by a Precambrian crystalline assemblage consisting largely of metasedimentary rocks that crop out in uplands. Quartzite may also occur locally in this area. Much younger Mesozoic plutonic rocks are also present. North of Boulder City, the project area is dominated by Upper and Lower Paleozoic carbonate assemblages that overlie the Precambrian crystalline assemblage along the "Great Unconformity," an erosional surface separating 1.7 billion year old rocks from 500 million year old rocks. Limestone and dolomite underlie Tertiary basin fill and comprise much of the adjacent mountain areas. Chert and chalcedony occur within the carbonate assembled area. Interspersed within the Paleozoic carbonate rocks are scattered areas of the Mesozoic carbonate and Mesozoic clastic assemblages. Sandstone, shale, and mudstone also occur within the Mesozoic rock assemblage. With the exception of limestone, these other rock types are generally poor in chipped stone raw material. These Mesozoic rocks were thrust eastward over the Paleozoic carbonate assemblage as a result of late Mesozoic compression during the Sevier Orogeny. Some smaller areas of basalt clastic assemblage occur, especially in the north and west. Basalt raw materials occur in this area.

Typical Landforms of the Project Area

Landforms provide the trophic setting in which prehistoric human groups subsisted. In addition, landform evolution over time has a great impact on the preservation or destruction of prehistoric archaeological sites. These topics are explored in more detail below.

Landforms of the project area are typical of the Basin and Range. Both internally drained intermontane basins, termed bolsons, as well as externally drained basins, called semi-bolsons occur in southern Nevada (Figure 2.4). Basins are isolated by uplifted mountain ranges. Prominent topographic features of southern Nevada are shown in Figure 2.1.

Similar landforms occur in both bolsons and semi-bolsons, and are presented in Table 2.1in two categories: piedmont slopes and basin floors (after Peterson 1981). In a normal transect from bounding mountain front, to piedmont slope, and finally to basin floor, the landforms reflect a reduction in both depositional and erosional energy. Thus, in a general way, the landforms that are likely to preserve buried archaeological zones occur farther from the bounding mountain front.

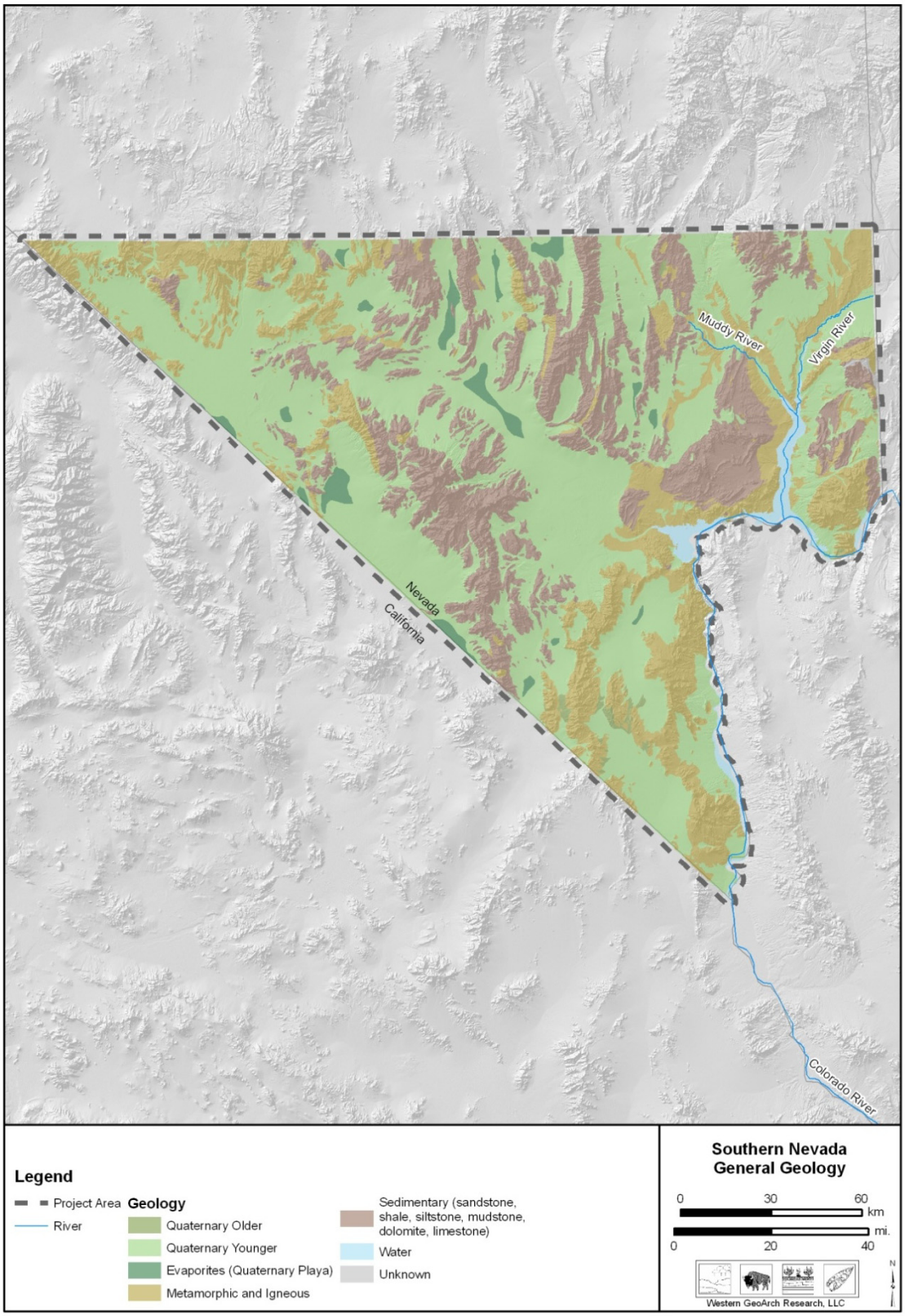
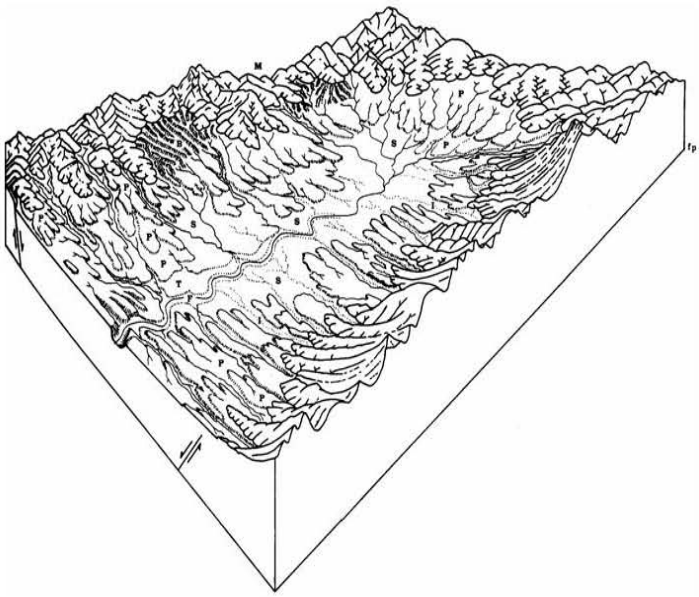


Figure 2.3. General geology of southern Nevada.



"A semi-bolson that displays the effects of several cycles of dissection and deposition. The major landforms are: ballenas (B), fan skirts (S), an axial stream terrace (T), and an axial stream floodplain (F). Alluvial fans are not distinguished from fan piedmonts. Component landforms of inset fans (I) are between fan remnants. The basin is bounded on two sides by mountains (M)."

Figure 2.4. Landforms of a typical semi-bolson (Peterson 1981).

In a down-slope direction, major landform types of the piedmont slope include mountain-valley fans, rock pediments, ballena, alluvial fans, fan piedmonts, pediments, and fan skirts (Figure 2.4; Table 2.1; Peterson 1981). Most of these landforms are erosional surfaces or are composed of high-energy alluvial deposits and thus generally have low potential to preserve buried archaeological occupation zones unless they are contained in surficial veneers of low-angle slopewash or eolian sand.

Finer-grained deposits generally increase toward basin floors due to a reduction in the energy of various depositional regimes as the landscape flattens. Major landforms found in this setting include alluvial flats, alluvial plains, sand sheets, beach plains, lake plains, and playas (Figure 2.4; Table 2.1; Peterson 1981).

Soils

Soil development varies substantially in the project area, and results from climate, vegetation, topography, and parent material interacting over time (Jenny 1941). The geographic distribution of soil orders in southern Nevada shows patterns similar to the area's ecological zones. Soil orders are discussed here. Great Groups will be presented with the various ecological zones in which they occur.

Aridisols, Entisols, and Mollisols comprise the dominant soils orders in the study area, occurring alone or in various combinations (Figure 2.5). Aridisols form in arid or semiarid climates and typically have low organic matter content. Because of the dry soil environment, Aridisols are often characterized by subsoil concentrations of calcium carbonate, gypsum, and/or sodium. In southern Nevada, Aridisols are found in every topographic setting in the study area, but tend to dominate surfaces on alluvial piedmonts and basin floors. Entisols are soils showing little or no profile development, with surface A horizons being the only visible sign of horizon development. Like Aridisols, Entisols are found in almost every landscape setting in southern Nevada, but dominate in areas characterized by recent erosion and/or

Table 2.1. Definitions of Landforms Associated with Piedmont Slopes and Basin Floors.

Category / Landform	Definition
Piedmont Slope	
Mountain-Valley Fan	Forms where alluvial fill of a piedmont slope extends into a valley bottom; typically composed of several smaller fans emanating from side gullies and meeting along the axial stream channel; surface is often dissectected by erosion affecting lower piedmont slope.
Rock Pediment	An erosion surface of relatively low relief cut across bedrock and formed along uppermost piedmont slope along mountain front; commonly mantled by pedisediment, a thin alluvial veneer over bedrock.
Ballena	Round-topped ridges formed on ancient alluvial fan remnants; typically occur as ridges semiparallel to perpendicular to the valley margin along upper piedmont slopes where dissection is the oldest.
Alluvial Fan	A semiconical landform composed of variously sorted and stratified alluvium, with or without debris flow deposits; fan apex is at point source of alluvium debouching from mountain valley into an intermontane basin; texture of fan alluvium typically is coarsest at fan apex and fines downslope; texture and lithology is ultimately controlled by bedrock provenance; fan size is positively correlated with drainage basin area above the fan; fan surfaces are commonly incised by fanhead trenches and on fan drainageways.
Fan Piedmont	Extensive landform created by coalescence of mountain-front alluvial fans; most common landform occurring along the piedmont slope; the fan piedmont is usually composed of numerous triangular or elongated diamond- shaped alluvial fan mantles and fans of multiple age; the fan piedmont may extend from the mountain front to the fan skirt, or to the basin floor where fan skirts are absent.
Pediment	The relatively gently sloping erosion surface at the foot of a receded steep backslope; erosional footslope may be cut on either unconsolidated alluvium or bedrock.
Fan Skirt	A belt of gently sloping, laterally coalescing small alluvial fans that issue from gullies cut into fans and/or extensions of inset fans of the dissected fan piedmont; the surface is typically smooth compared to incised fan surfaces; the fan skirt typically merges with basin floor, and may extend for only a few hundred yards downslope from a dissected fan piedmont or may be a mile or more long; gravel content is typically low.
Basin Floor	
Alluvial flat	A nearly level, graded alluvial surface between the piedmont slope and playa of a bolson or the axial-stream floodplain of a semi-bolson; may be composed of both recent (Holocene) and relict (Pleistocene) graded deposits from sheet floods and/or braided ephemeral streams; Pleistocene relict alluvial flats are analogues to fan remnants of piedmont slopes and Holocene alluvial flats are direct analogues of fan aprons and fan skirts.
Alluvial plain	A landform present on some basin floors and representing the relict floodplain of a major Pleistocene stream or low gradient fan-delta built in a basin; composed of relatively well sorted and stratified alluvium containing sand and gravel of foreign lithology.
Sand sheet	Laterally continuous accumulations of windblown sand-sized particles; sand sheets may be several feet thick with smooth to undulating surfaces; extensive sand sheets occur downwind from pluvial lake shorelines, and may extend across alluvial flats, onto piedmont slopes and lower mountains; discrete eolian dunes may also be present and may coalesce with sand sheets; downwind from playas, sheets and dunes may be composed of sand-sized aggregates of silt and clay.
Beach plain	Created by recession of pluvial lakes over broad former alluvial flats; landforms comprising beach plains are sand and gravel textured barrier bars and/or offshore bars and intervening lagoons; upper-most bars are plugged and/or capped by eolian silt showing pedogenic modification.
Lake plain	Common landform where bolson floors are not occupied by a playa; built of nearly level, fine textured, stratified bottom sediments deposited in a pluvial lake; one or more lake plains may be present as terraces, marking different lake levels; may merge with offshore bars or alluvial flats; relative to playas, lake plains are vegetated and slowly drained.
Playa	Ephemerally flooded areas of a basin floor that are barren of vegetation and veneered with non-gravelly fine textured sediment; usually, but not always, coincident with pluvial lake beds; verneers of Holocene alluvial muds typically overlay pluvial lake clays, deltaic sands, and/or beach gravels; when dry, playas may serve as significant source areas of eolian sediments.

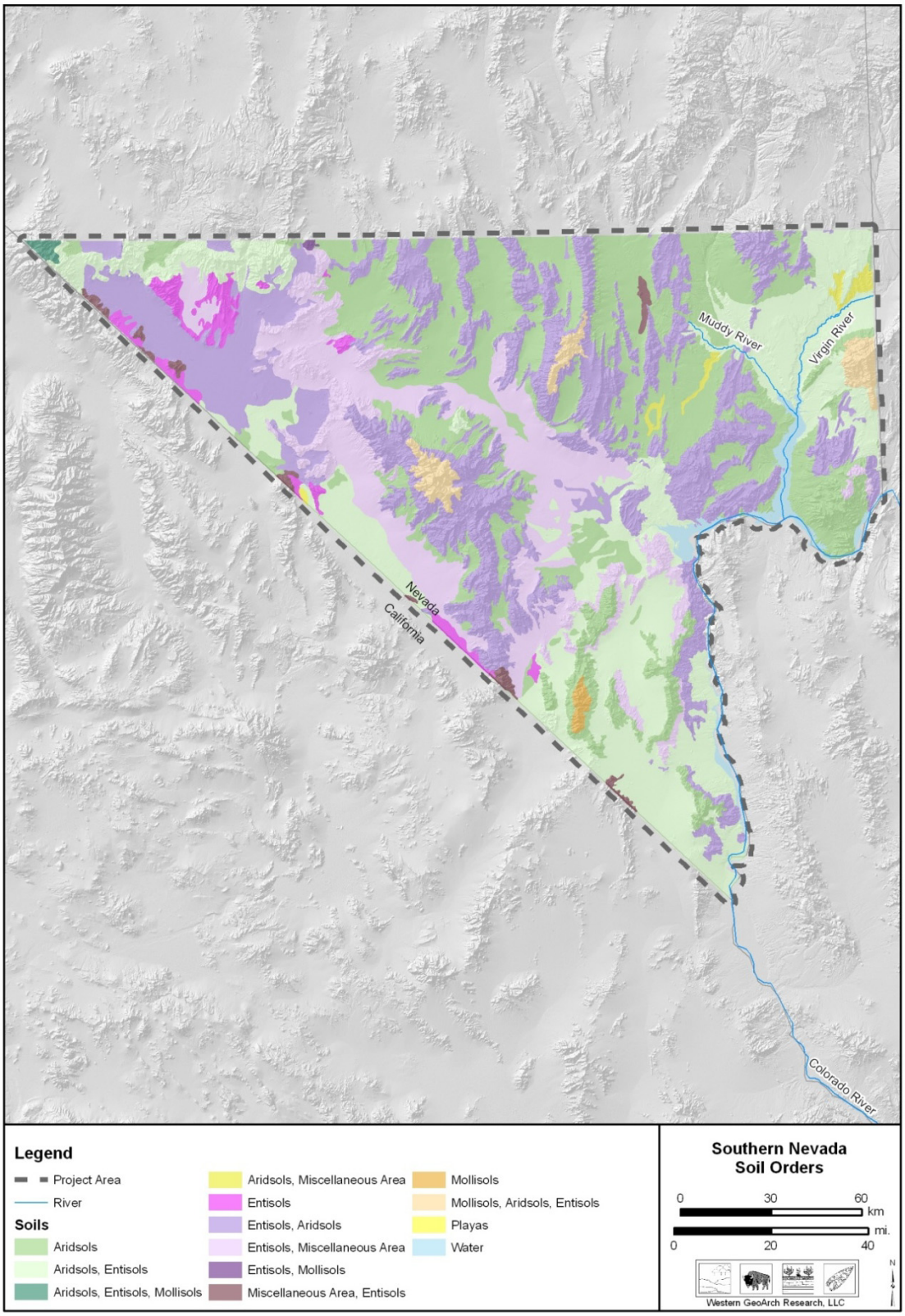


Figure 2.5. Soil orders of southern Nevada.

deposition such as young alluvial fans, eolian dunes, and hillslopes. Mollisols form in semiarid to semihumid settings, usually under grassland, and display relatively thick and dark mollic epipedons with relatively high concentrations of organic matter. In southern Nevada, Mollisols are dominant in foothill and montane settings, but also occur locally on alluvial piedmonts in proximity to springs. In general though, A horizons in the basins show less development relative to those in the mountains. Greater precipitation in the mountains results in higher organic matter content and associated darkening, as well as increased thickness. Alfisols (soils in semiarid to humid settings usually under forest cover) and Inceptisols (soils with some B horizon development, but not Bt) are also present in the study area in montane settings, but their relatively rare occurrence makes it impractical to show them at the mapping scale of Figure 2.5.

Climate

Southern Nevada has a subtropical arid climate (Köppen-Geiger climate classification *BWh;* Peel et al. 2007) with short, mild winters and hot, relatively dry summers. Regional aridity is caused largely by topographic barriers that prevent moist air masses from penetrating into the Basin and Range Province. The Sierra Nevada and southern Cascade Range block winter precipitation from the west, creating a rain shadow that affects the northern Basin and Range. Within the Basin and Range, higher mountain ranges result in more localized rain shadows. Likewise, the Rocky Mountains block summer moisture derived from the Gulf of Mexico. Topography also causes local orographic affects, with higher altitudes receiving higher amounts of moisture. Thus, large differences in annual precipitation between high peaks and adjacent basin floors are common. Finally, the interior, continental setting results in large diurnal and seasonal temperature changes.

During the period of record (1961–1990) at the Las Vegas WSO Airport weather station (264436) situated at 641 m (2610 ft.) above mean sea level (amsl), the average maximum January temperature was 13.8 °C (56.8 °F) and the average maximum July temperature was 40.1 °C (104.1 °F). Minimum temperatures for January and July were 1.1 °C (34.0 °F) and 24.6 °C (76.3 °F), respectively (Western Regional Climate Center 2011). Average annual precipitation during the period of record was 10.57 cm (4.16 in.).

Elevation moderates temperature and precipitation. For example, Pahrump, Nevada is situated at 836 m (2750 ft.) amsl, slightly higher than Las Vegas. Summer high temperatures are slightly lower while annual precipitation is slightly higher. During the period of record (1961–1990) at Pahrump, the average maximum January temperature was 14.3 °C (57.7 °F) and the average maximum July temperature was 38.4 °C (101.1 °F). Minimum temperatures for January and July were -2.9 °C (26.8 °F) and 19.3 °C (66.8 °F), respectively (Western Regional Climate Center 2011). Average annual precipitation during the period of record was 12.0 cm (4.72 in.). Seasonal variability in temperature and precipitation in Las Vegas and Pahrump are nearly identical (Figure 2.6).

Precipitation patterns in both areas are bimodal, with peaks during both warm months and cool months separated by intervals of low rainfall. Las Vegas and Pahrump receive approximately 70 percent and 73 percent of their annual precipitation, respectively, between November and May. Cold season precipitation in the region occurs during storms originating over the Pacific and delivered to the continental interior by the westerlies. The remainder of annual precipitation falling between June and September occurs as convective thunder storms when moist air masses penetrate inland from the Gulf of California.

Hydrography and Paleohydrography

Reliable surface water is a commodity in southern Nevada and no doubt affected decisions made by prehistoric groups throughout the region. Today, surface water occurs as perennial streams, ephemeral washes, seeps and springs, and playas (Figure 2.7). Two perennial streams occur in the study area, the Muddy and Virgin Rivers. The Virgin River heads in the high country of southwestern Utah, flowing generally southwest into Nevada, where it flows into the Colorado at Lake Mead. The Muddy River is

just over 50 km (32 mi.) long, originating at several springs in the Moapa Valley northeast of Las Vegas. The Muddy joins the Virgin at the top of the Overton arm of Lake Mead. Plant and animal resources in the riparian habitat of both of these rivers likely made important contributions to prehistoric economies. The importance of these rivers to prehistoric populations is attested to by the numbers and types of sites recorded in the lower Moapa and Virgin River Valleys prior to construction of the Hoover (Boulder) Dam (Sterner and Ezzo 1996). Little is known about the late Quaternary alluvial stratigraphy of either stream in southern Nevada, and thus their paleohydrologies remain relatively unstudied. Paleoflood deposits have been studied along the Virgin River Gorge in southern Utah and northern Arizona, and the chronology was "determined by the ages of layers rich in human artifacts that are interbedded with the flood deposits" (Enzel et al. 1994:291). The results indicate that floods comparable to, or greater than, a flood generated by a catastrophic dam failure in 1987, have occurred during the last 1,000 years. It is likely that these floods affected the lower Virgin River in Nevada as well.

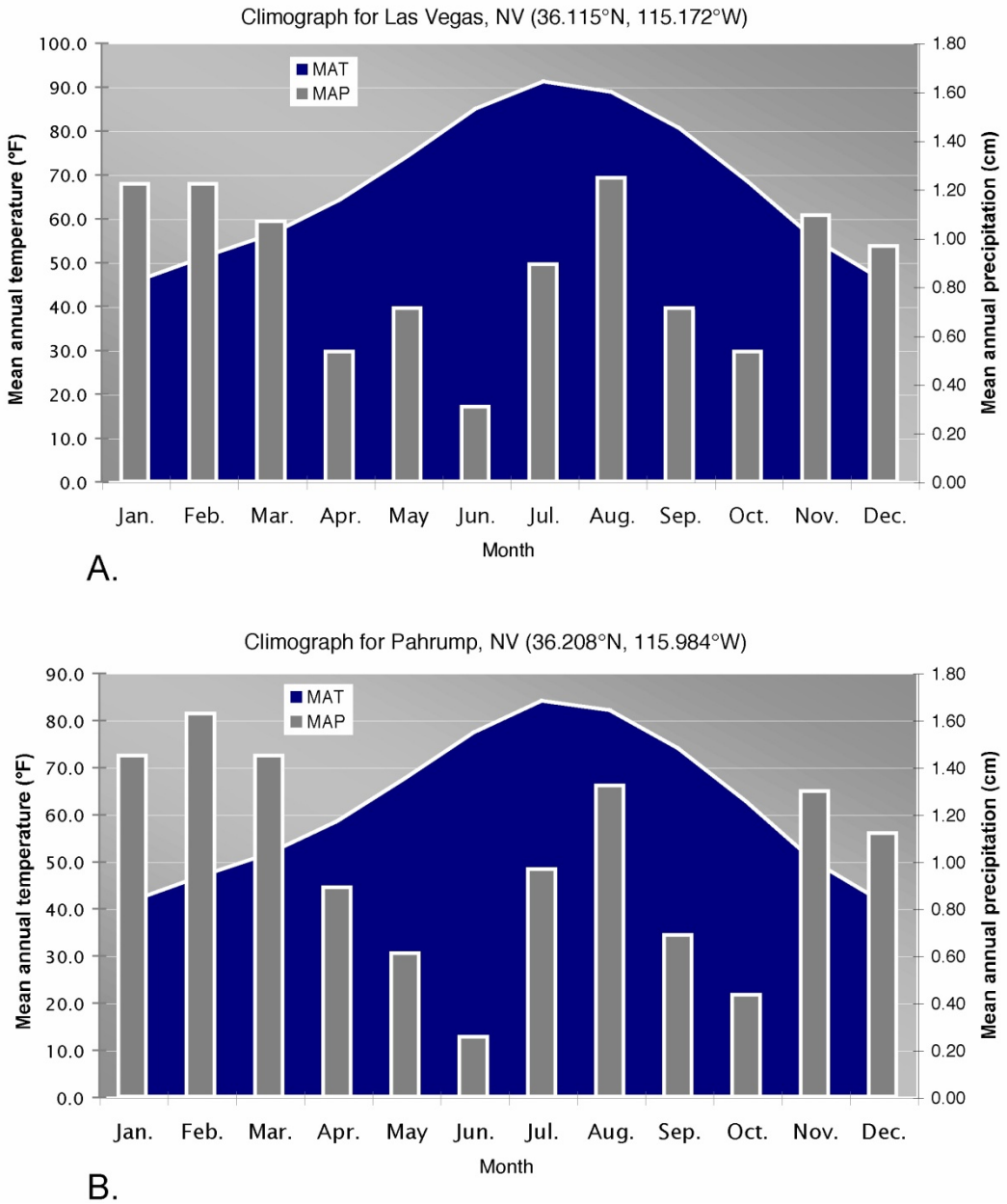


Figure 2.6. Climographs of Las Vegas and Pahrump, Nevada.

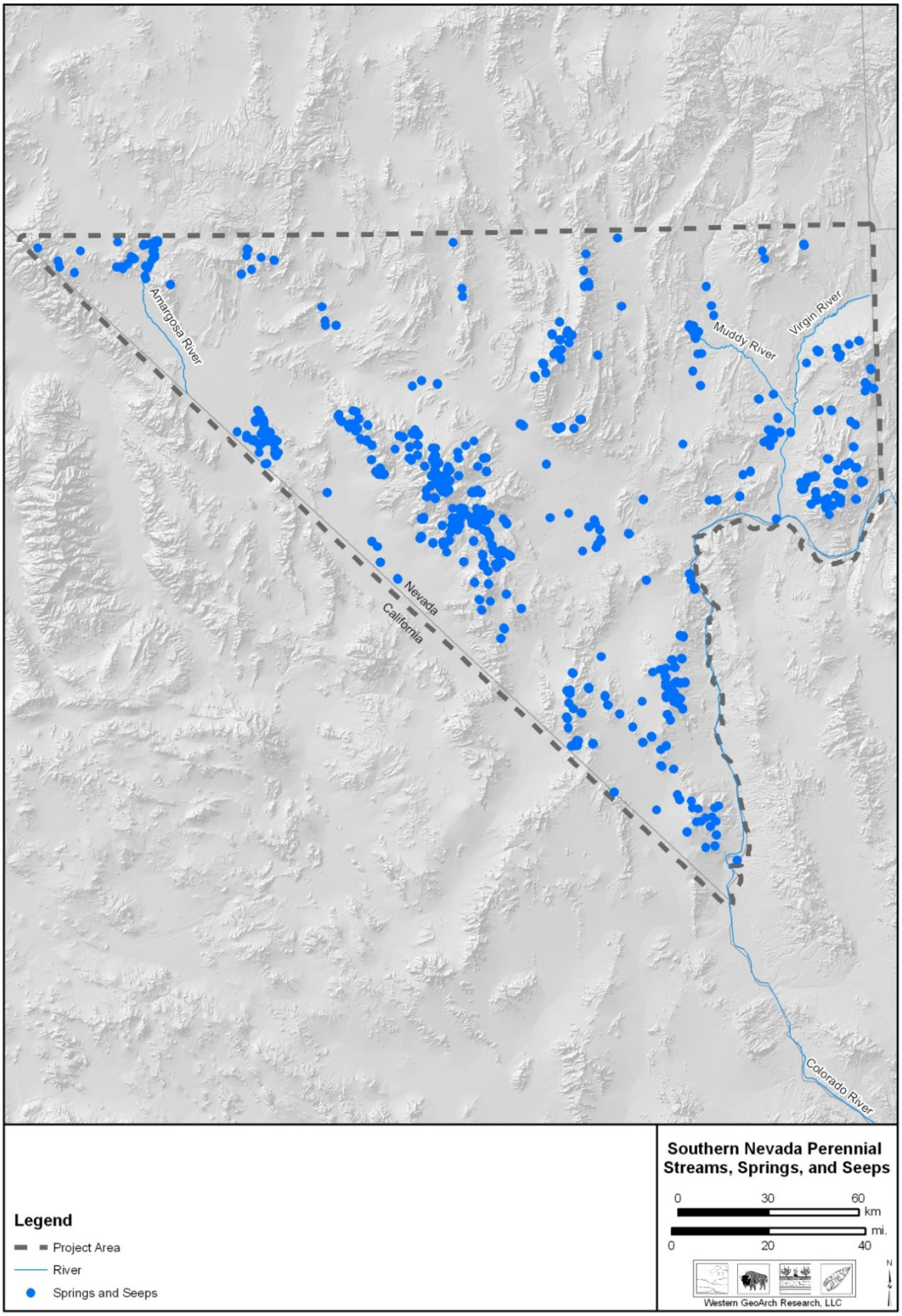


Figure 2.7. Modern distribution of perennial streams, springs, and seeps of southern Nevada.

Two major ephemeral streams are found in southern Nevada: Las Vegas Wash and the Amargosa River. The Amargosa River heads on the south side of Pahute Mesa and flows through the Amargosa and Mojave Deserts before terminating in Death Valley. The Amargosa is intermittent throughout most of its course and typically flows only during flash floods. Las Vegas Wash is tributary to the Colorado River, and the lower segment of the wash has undergone substantial hydrologic changes due to urbanization and increased surface water runoff. Lower Las Vegas Wash was ephemeral prior to population growth of Las Vegas, but by 1955 flow was perennial largely due to the introduction of wastewater (Buckingham et al. 2004) and resulted in the transformation of the dry, ephemeral wash to a wetland. Increased baseflow and flood peaks are directly responsible for channel incision and widening since the 1970s.

Springs are relatively common features in southern Nevada (Figure 2.7), and many occur where faults disrupt local aquifers. These areas were extremely important to prehistoric groups, and have been the foci of activity since initial occupation of southern Nevada (Haynes 1967). Historic settlement of the region also focused on these areas, and allowed for farming and livestock production in areas otherwise surrounded by dry desert. Historic mining of local aquifers has resulted in progressively less spring discharge, and many springs have historically ceased flowing (Rafferty 1984a).

Radiocarbon dates of relatively fine-grained alluvial deposits indicate that spring-fed wetlands existed in several valleys in southern Nevada during the latest Pleistocene (Haynes 1967; Quade 1986; Quade et al. 1995, 1998). The most extensive deposits date between 30,000 and 15,000 B.P. (Haynes 1967; Quade 1986), suggesting relatively high rates of groundwater recharge coincident with the Lake Lahontan high stand during the last glacial maximum. Black mats consisting of dark organic-rich A or O soil horizons formed as a result of vegetation growth and decomposition around springs and seeps. They are important late Quaternary stratigraphic markers in the Great Basin (Haynes 1967, 2008; Quade et al. 1998). Buried and in situ Early Paleoindian sites are often associated with black mats or similar deposits in the western United States, and black mats chronostratigraphically coincide with late Quaternary megafaunal extinctions (Haynes 2008). Following an apparent decrease in spring discharge, radiocarbon-dated black mats and spring fed channels indicate that local aquifers rebounded in the Great Basin during the Younger Dryas (11,000-10,000 B.P.) (Haynes 2008; Quade et al. 1998). The onset and termination of spring discharge was gradual, indicating a lag in the response of groundwater recharge to climate change. Regardless, human groups in southern Nevada likely had more geographic options for water sources during the latest Pleistocene and early Holocene relative to the rest of the Holocene.

Black mats are more or less absent from the stratigraphic record in southern Nevada between 6000 and 3000 B.P. (Quade et al. 1998), indicating that regional drying during the Altithermal affected local water tables. At Ash Meadows, peat interbedded with eolian sand was forming between 5000 and 3000 B.P. (Mehringer and Warren 1976), when regional spring discharge was apparently diminished. Mehringer and Warren (1976) suggest that the formations of wetlands and peat deposition at Ash Meadows may result from a local complex response of arroyo filling and/or dune dams, and may not directly reflect climate change. Radiocarbon ages on black mats in southern Nevada indicate that at least some springs were active during the late Holocene (Haynes 1967; Quade et al. 1998), although their numbers were no doubt greatly reduced since the earliest Holocene. Later prehistoric groups would thus have had fewer options for reliable water, and would have focused on active springs and perennial streams such as the Virgin and Muddy Rivers.

Pluvial lakes Lahontan and Bonneville were situated hundreds of kilometers northwest and northeast of the study area, respectively, but smaller basins in southern Nevada apparently contained pluvial lakes and/or wetlands during the late Pleistocene (Dickerson 2006; Morrison 1991). Dickerson (2006) presents radiocarbon ages from carbonate paleoshoreline and paleospring features in four playa basins in the northern part of the Nevada Test and Training Range that correspond reasonably well with the Seehoo lacustral period (~10,000-30,000 B.P.) in the Lahontan Basin (Morrison 1991). It is worth noting that only one of the nine radiocarbon ages from the Nevada Test and Training Range corresponds to the ~15,000 B.P. highstand documented for Lake Lahontan (Benson et al. 1995). All of the playa basins examined by Dickerson (2006) hold water at least periodically at present, and archaeological evidence indicates that people utilized playa margins prehistorically.

Prehistoric water sources could theoretically be modeled and mapped by dating sediments stratigraphically associated with gleyed (Aquic) soils, however this data is not systematically developed and constitutes a data gap. In addition, some prehistoric spring areas are either eroded or deeply buried and unavailable for study.

In regards to prehistoric economy, an obvious limiting factor in southern Nevada is the paucity of settings that are suitable for maize farming. Recent archaeological work indicates, however, that agriculture was practiced in the region, at least locally (Roberts and Ahlstrom 2010). Adams et al. (2006) recently summarized important environmental parameters for maize agriculture. Two of the more important temperature characteristics are frost-free days and cumulative growing degree days (CGDD). In a comparison of growth traits from sprouting to maturity in maize from various areas of the Southwest, Adams et al. (2006) observed a mean of frost-free days of 128 with a range of 111–144, and a CGDD mean of 2342, with a range of 2193–2479. According to the National Corn Handbook (NCH), the growth range limits for modern corn are between 41 °F and 95 °F, with an optimal growth range between 62 °F and 91 °F (Neild and Newman 1987). In regards to moisture, the NCH mentions "corn is generally not grown in areas receiving less than 25 inches (60 cm) of annual precipitation." Thus, at least throughout the Holocene, temperature was probably not a limiting factor for growing maize in the valleys of southern Nevada, but moisture most certainly was. It seems reasonable that seeps and springs were isolated areas with adequate moisture for localized corn agriculture, and thus the geographic extent of locations with the potential for maize agricultural was relatively limited.

We draw heavily on Adams et al. (2006) for temperature and precipitation suitable for maize horticulture. Adams et al. (2006) considered cumulative growth degree days (CGDD) to be an important measure for evaluating harvest success. We found spatial data summarizing average annual CGDD to be lacking for the project area, so we relied on the length of the frost-free season along with average temperatures as measures of suitable temperature regime instead.

Figure 2.8 illustrates the areas conducive to maize horticulture under present day climate. In addition to areas with a suitable frost-free season, harvest success occurs in areas that receive ≥25 inches of precipitation, on floodplains adjacent to perennial streams, or around springs and seeps. Oftentimes dark humic soils (Mollisols) form around present-day or now extinct springs and indicate locations that have a history of adequate soil water. Areas mapped as "high potential" have suitable climate and soil moisture status and correspond to areas mapped as unconsolidated geological deposits with little bedrock at the ground surface. Areas mapped as "moderate potential" have the required climate and soil moisture status, but are mapped as bedrock and might have smaller areas with an adequate tillable soil veneer. All remaining areas on the map are low potential.

The details of the maize horticulture spatial model, including data sources and the data intersect and overlay steps used to construct the model in the GIS are as follows:

1. Areas of high prehistoric horticultural potential include:
    a. Areas within a 200-m buffered zone along the Colorado River and Kingman Wash sections that fall within the Lake Mead shoreline (Roth and Dewald 1999), or;
    b. The resulting set of the intersection between i. and ii.:
        i. The resulting set of (1)–(2) (areas with geological substrates deep enough to cultivate excluding areas of igneous and sedimentary bedrock as well as areas of evaporate/salty deposits):
            (1) Areas of Quaternary Younger (Prior-Magee et al. 2007), or;
            (2) Areas of Quaternary Older (Prior-Magee et al. 2007).
        ii. The resulting set of the intersection between (1) and (2):
            (1) The resulting set of (a)–(d):
                (a) Areas receiving ≥25" (60 cm) of annual precipitation (PRISM Climate Group 2006a), or;
            (2) Areas within a 100m buffered zone surrounding springs, seeps, or perennial streams (USGS 2006; Roth and Dewald 1999; Lyon and Ahlstrom 2006), or;

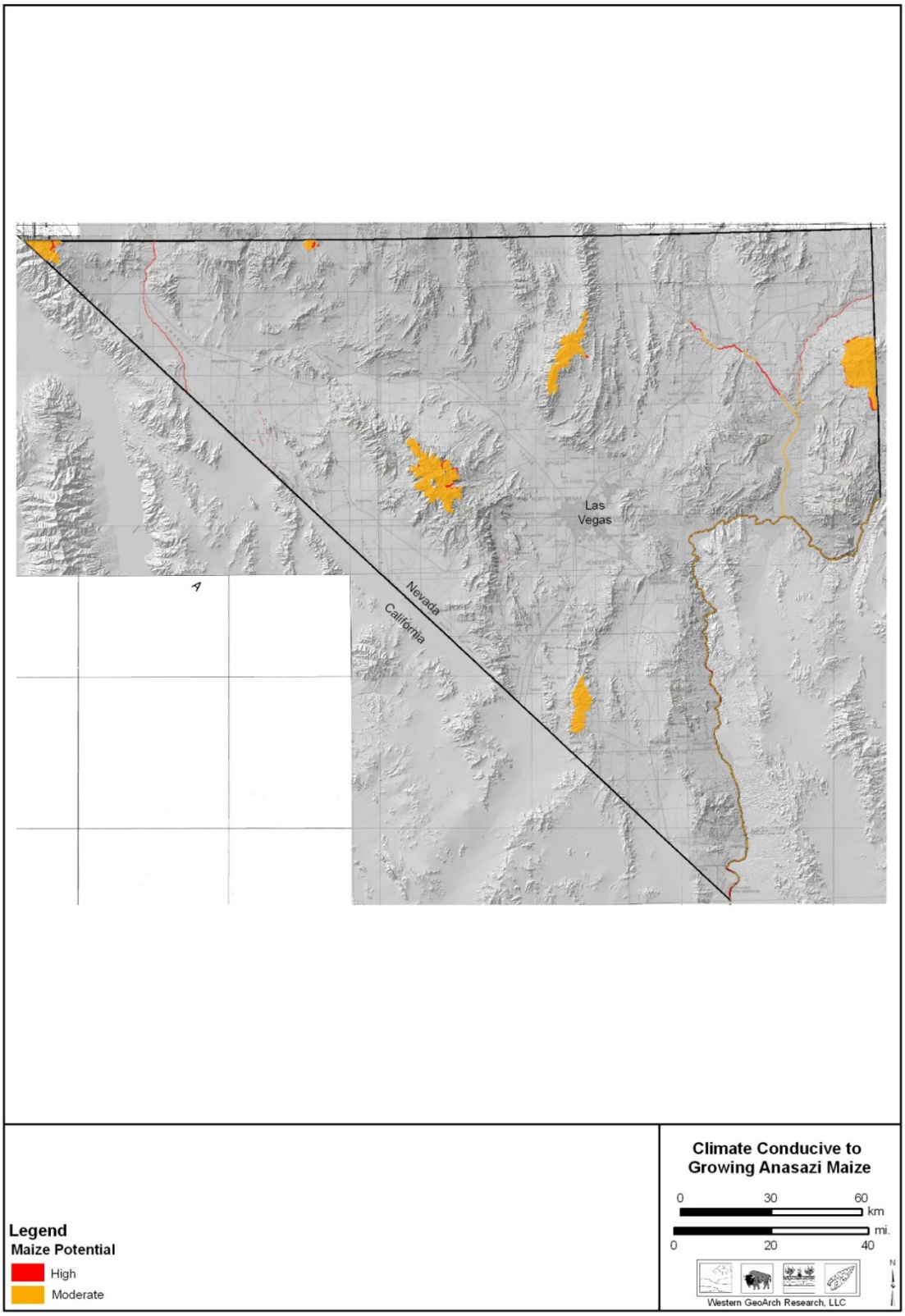


Figure 2.8. Modern areas in southern Nevada conducive to growing Anasazi maize.

(a) Areas within a 200m buffered zone along the Colorado River, Muddy River, and Kingman Wash (Roth and Dewald 1999), or
(b) Areas that contain Mollisol soils (Soil Survey Staff 2006).
(3) The resulting set of (a)–(b):
(a) Areas that have an annual mean frost free period >111 days (NCDC 2002), and;
(b) Areas that have at least 3 consecutive months with mean minimum temperatures above 0 degrees Centigrade (PRISM Climate Group 2006b).

2. Areas of moderate prehistoric horticulture potential include the resulting set of intersection between a. and b.:
   a. Lack Quaternary deposits (Prior-Magee et al. 2007).
   b. The resulting set of the intersection between i. and ii.:
      i. The resulting set of (1)–(2):
         (1) Areas within a 100m buffered zone of perennial streams (Roth and Dewald 1999), or;
         (2) Areas within a 200m buffered zone along the Colorado River, Muddy River, and Kingman Wash (Roth and Dewald 1999).
      ii. The resulting set of (1)–(2):
         (1) Areas that have an annual mean frost free period >111 days (NCDC 2002), and;
         (2) Areas that have at least 3 consecutive months with mean minimum temperatures above 0 degrees Centigrade (PRISM Climate Group 2006b).

Theoretically, it is possible to model the prehistoric climate factors involved in growing season length and moisture availability through a combination of (a) proxy climate data sources (changing timberlines and vegetation community changes reflected in packrat middens, changes in spring activity, etc.) as well as (b) using a climate model to predict quantitative changes in prehistoric temperature and precipitation. For instance, during periods of greater warmth, upper treeline might have risen, growing season could have lengthened, Pacific storms might have decreased, monsoonal precipitation might have increased, and water tables fluctuated—all with some predictable effect on the mapped extent of the agricultural areas when compared to the map of "modern/historic" agricultural areas. It should thus be possible to model and map the extent of prehistoric agricultural areas under warmer/drier-than-present and wetter/cooler-than-present conditions and assign hypothesized date ranges to when warmer/drier, like-present day, cooler/wetter conditions prevailed during prehistory.

Ecoregions

This section presents summaries of ecoregions found in southern Nevada (Figure 2.9). Cultural ecology is concerned with studying culture and human behavior within an ecological setting, and ecoregions provide a logical basis for looking at human-landscape interactions. Ecoregions (ecological regions) are defined as "areas within which there is spatial coincidence of geographical phenomena associated with the quality, health, and integrity of ecosystems" (Omernik 2004:34). Such phenomena include climate, geology, physiography, soils, and vegetation occurring in geographically defined areas that are larger than an ecosystem but smaller than an ecozone. Biogeographic patterns in southern Nevada (and throughout the Great Basin) result from interactions between climate (temperature and moisture) and topography. The relatively high degree of relief associated with isolated mountain ranges results in altitude essentially serving the same function as latitude in regards to species range and distribution, creating variability in spatial conjunctions of resources over relatively short distances. Current biogeographic patterns in the Basin and Range are of course not static. For example, the current pattern of forested mountain ranges isolated between basins with desert scrub communities is a Holocene phenomenon. In southern Nevada, the forest biotas currently isolated to the Sheep and Spring Ranges have northern affinities (Bradley and Deacon 1967:210). During cool and moist glacial climates,

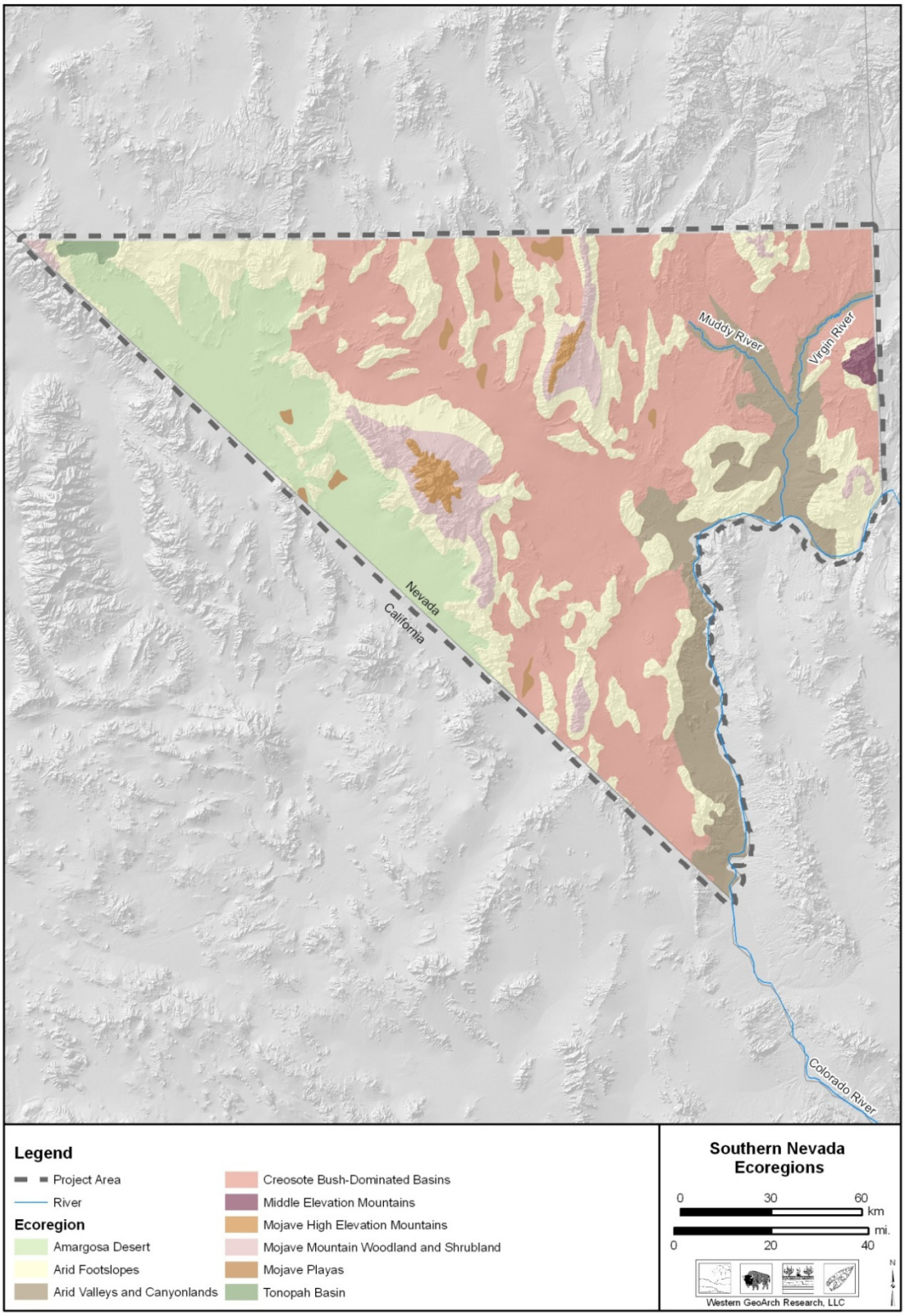


Figure 2.9. Ecoregions of southern Nevada.

woodland and forest communities expanded their range to lower elevations. During the transition to postglacial Holocene climate, shrub communities replaced forests and woodland at lower elevations, resulting in the current distribution of biogeographic "sky islands" (Heald 1967) isolated by desert valleys.

Nine ecoregions are found in southern Nevada (Figure 2.9). Their characteristics are summarized here, relying strongly on Bryce et al. (2003). These ecoregions coincide with several of the biotic communities defined by Bradley and Deacon (1967). Correlations presented here are based on elevation ranges and key plant species.

AMARGOSA DESERT

The Amargosa Desert ecoregion occurs along the western border of southern Nevada and coincides with the Blackbrush community of Bradley and Deacon (1967). The landscape is nearly level with internally drained valleys. It has little topography and contains playas, floodplains, sand sheets, terraces, sand dunes, scattered hills, and lower alluvial fans.

Surficial geology in the valleys consists largely of Quaternary alluvium with some Quaternary playa, marsh, and alluvial flat deposits. Bedrock geology in the scattered hills consists of ash-flow tuffs, rhyolitic flows, tuffaceous sedimentary rocks, dolomite, and limestone. Shale, quartzite, phyllitic siltstone, and conglomerate are also present throughout this ecoregion.

Elevations range from 607 to 1280 m (2000–4200 ft.) amsl with some isolated hills reaching 1829 m (6000 ft.). Local relief is generally less than 61 m (200 ft.) with a maximum of 305 m (1000 ft.). Temperature and moisture regimes are thermic and aridic, respectively. Amargosa Deserts receive 8 to 18 cm (3–7 in.) of annual precipitation with 180 to 300 frost-free days. Average January and July low temperatures are -3.3 °C (26 °F) and 18 °C (64 °F), respectively. Mean January and July high temperatures are 16 °C (60 °F) and 40 °C (104 °F), respectively.

Soils reflect the dominantly arid moisture regime. Torriorthents are Entisols that form under an aridic moisture regime and are shallow soils typically occurring on steep slopes or areas of recent deposition. Aridisols are also very common in these deserts and form on surfaces that have been stabilized for greater periods of time. Haplocalcids and Haplodurids are Aridisols that exhibit a well developed calcic horizon and a subsurface horizon indurated with silica, respectively.

Desert vegetation is dominated by creosote bush, Indian ricegrass, wolfberry, white bursage, shadscale, and scattered Joshua trees and other yuccas. The Ash Meadows area is unique, with many native plants including Amargosa niterwort, Ash Meadows gumplant, Ash Meadows ivesia, Ash Meadows blazing star, and Ash Meadows milkvetch.

ARID FOOTSLOPES

The Arid Footslopes ecoregion is intermediate between the Creosote Bush-Dominated ecoregion and the Mojave Mountain Woodland and Shrubland ecoregion, and has characteristics of both the Blackbrush and Creosote Bush communities of Bradley and Deacon (1967). The landscape is primarily composed of hills, alluvial fans, low mountains, basalt flows, washes, and springs. Depositional units in the Arid Footslopes consist largely of Quaternary colluvium and alluvium with occurrences of limestone, siltstone, carbonates, sandstone, shale, schist, gneiss, and granitics. Sedimentary rock outcrops also occur.

Elevations typically range from 853 to 1890 m (2800–6200 ft.) amsl with a maximum of 2195 m (7200 ft.). Local relief varies from 61 to 610 m (200–2000 ft.). Temperature and moisture regimes are thermic and aridic bordering on ustic, respectively. This ecoregion receives 10 to 20 cm (4–8 in.) of annual precipitation with 180 to 260 frost-free days. Average January and July low temperatures are -7 °C (20 °F) and 14 °C (58 °F), respectively. Mean January and July high temperatures are 12 °C (54 °F) and 38 °C (100 °F), respectively.

Soils reflect the dominantly arid moisture regime. Torriorthents are Entisols forming under an aridic moisture regime and are shallow soils typically occurring on steep slopes or areas of recent deposition. Aridisol Great Groups Argidurids, Haplocalcids, and Haplargids are also very common in the arid footslopes on surfaces that have been stabilized for greater periods of time. Argidurids are

characterized by the subsurface accumulation of illuvial clay and a horizon cemented by silica. Haplocalcids exhibit a well developed calcic horizon and Haplargids are characterized by an accumulation of translocated clay. Desert vegetation is dominated by white bursage, creosote bush, annual fescue, spiny menodora, blackbrush, Nevada ephedra, winterfat, big galleta, Indian ricegrass, and Joshua tree and other yuccas. Mojavean forbs, shrubs, and succulents are also present. Rocky areas contain additional cacti species.

ARID VALLEYS AND CANYONLANDS

The Arid Valleys and Canyonlands ecoregion is found in southeastern Nevada and occupies lowlands adjacent to Lakes Mead and Mojave and along the Muddy and Virgin Rivers. The landscape is primarily composed of benchlands, arid canyons, terraces, alluvial fans, and floodplains in the Colorado River corridor. Erosion in upland areas has a high potential. Concentrations of calcium carbonate and other dissolved solids in streams are high. Depositional units in the Arid Valleys and Canyonlands consist largely of Quaternary colluvium with occasional occurrence of siltstone, limestone, dolomite, conglomerate, gneiss, schist, granitic rocks, and quartzite.

Elevations typically range from 152 to 610 m (500–2000 ft.) amsl with a maximum of 1036 m (3400 ft.), and local relief varies from 30 to 701 m (100–2300 ft.). This ecoregion receives 5 to 18 cm (2–7 in.) of annual precipitation with 200 to 350 frost-free days. Average January and July low temperatures are -2 °C (28 °F) and 20 °C (68 °F), respectively. Mean January and July high temperatures are 16 °C (60 °F) and 43 °C (110 °F), respectively. Soil temperature and moisture regimes are hyperthermic to thermic and aridic, respectively.

Soils reflect the dominantly dry moisture regime, and include Aridisols and Entisols. Torriorthents are Entisols forming under an aridic moisture regime and are shallow soils typically occurring on steep slopes or areas of recent deposition. Aridisols are found on surfaces that have been relatively stable for probably thousands of years. Aridisol Great Groups common in the Arid Valleys and Canyonlands include Haplocalcids, Haplogypsids, and Haplodurids. Due to the relatively dry soil environment, these soils have subsurface accumulations of calcium carbonate, gypsum, and silica, respectively.

The vegetation in the Arid Valleys and Canyonlands ecoregion is dominated by creosote bush. Other common vegetation includes white bursage, white brittlebush, mesquite, palo verde, and occasional Sonoran species such as ocotillo. Below 1,000 feet elevation there is no white bursage. Along larger rivers, native riparian plants such as willow and Frémont cottonwood are being replaced by introduced tamarisk.

CREOSOTE BUSH-DOMINATED BASINS

The Creosote Bush-Dominated Basins ecoregion is aerially extensive in southern Nevada, and coincides with the Creosote Bush community of Bradley and Deacon (1967). The landscape is primarily composed of floodplains, alluvial fans, valleys containing stream terraces, mesas, buttes, isolated hills, and eroded washes. Perennial or ephemeral, low- to medium-gradient warm rivers and streams comprise most drainages.

Substrates are composed of fine sediments, sands, or cobbles. Surface waters have high concentrations of calcium carbonate and total dissolved solids and are alkaline. Thunderstorms can result in flash flooding, and reliable surface water is scarce. Depositional units in the Creosote Bush-Dominated Basins consist largely of Quaternary alluvium, as well as Quaternary playa, marsh, and alluvial flat deposits. There are also scattered hills composed of andesite, intrusive rocks, tuffaceous sedimentary rocks, shale, limestone, dolomite, gneiss, schist, and quartzite.

Elevations typically range from 549 to 1371 m (1800–4500 ft.) amsl with a maximum of 1890 m (6200 ft.), and local relief varies from 30 to 122 m (100–400 ft. and up to 1200 ft. in mountains). This ecoregion receives 8 to 18 cm (3–9 in.) of annual precipitation with 170 to 280 frost-free days. Average January and July low temperatures are -6 °C (20 °F) and 15 °C (60 °F), respectively. Mean January and July high temperatures are 13 °C (56 °F) and 39 °C (102 °F), respectively.

Soil temperature and moisture regimes are thermic to hyperthermic, and aridic, respectively. Soils reflect the dominantly arid moisture regime and include Aridisols and Entisols. Torriorthents are Entisols that form under an aridic moisture regime and are shallow soils typically occurring on steep slopes or areas of recent deposition. Aridisols are typically found on surfaces that have been relatively stable for probably thousands of years. Aridisol Great Groups common in the Creosote Bush-Dominated Basins include Haplocalcids and Petrocalcids. Due to the relatively dry climate, these soils have subsurface accumulations of calcium carbonate in the form of calcic (noncemented) and petrocalcic (cemented) horizons, respectively.

Vegetation is dominated by sparse creosote bush, cacti, white bursage, yucca, big galleta, ephedra, and Indian ricegrass. Acacia and mesquite increase toward the south and east. Some areas are completely barren of vegetation. In the transition to the Arid Footslopes, blackbrush is common on stony limestone soils. Riparian native plants include coyote willow, desert willow, and mesquite. Tamarisk, an introduced plant, is rapidly overtaking many of the native plants.

MIDDLE ELEVATION MOUNTAINS

The Middle Elevation Mountains ecoregion is limited to an area associated with Virgin Peak Ridge in the east-central part of the study area. This ecoregion coincides in part with the Juniper-Pinyon community of Bradley and Deacon (1967). The landscape is primarily composed of rugged and dissected middle elevation mountains, mesas, steep ridges, buttes, and canyons.

Surface geology in the Middle Elevation Mountains consists largely of Precambrian gneiss, schist, and Quaternary colluvium, with occurrences of limestone, dolomite, sandstone, quartzite, and shale to the south.

Elevations typically range from 1219 to 2458 m (4000–8066 ft.) amsl, and local relief varies from 183 to 914 m (600–3000 ft.). This ecoregion receives 20 to 46 cm (8–18 in.) of annual precipitation with 90 to 180 frost-free days. Average January and July low temperatures are -3 °C (27 °F) and 19 °C (67 °F), respectively. Mean January and July high temperatures are 9 °C (47 °F) and 32 °C (89 °F), respectively.

Soil temperature and moisture regimes are mesic to frigid and aridic to almost ustic, respectively. The soils reflect the relatively dry moisture regime, and soil orders in the ecoregion include Aridisols, Entisols, Inceptisols, and Mollisols. Aridisols are found on surfaces that have been relatively stable for probably thousands of years. Haplargids are Aridisols characterized by the accumulation of translocated clay and are common in the Middle Elevation Mountains. Torriorthents are Entisols that form under an aridic moisture regime and are shallow soils occurring on steep slopes or areas of recent deposition. Eutrocryepts are Inceptisols with relatively high base saturation forming mostly in Pleistocene or Holocene alluvium or colluvium in cold (cryic) settings. Haplustolls are Mollisols with some subsurface accumulations of carbonates and/or gypsum and form in semiarid grassland settings on late Pleistocene and Holocene surfaces.

Vegetation in Middle Elevations Mountains is dominated by chaparral and pinyon-juniper woodland. Mountain brush is found above and below isolated, small stands of Rocky Mountain Douglas fir and Rocky Mountain white fir at elevations between about 5750 and 8000 feet. Rocky Mountain juniper, singleleaf pinyon, Gambel oak, littleleaf mountain-mahogany, curlleaf mountain-mahogany, Utah serviceberry, canyon maple, ceanothus, manzanita, and grasses are found at elevations between about 5000 and 5750 feet elevation. Desert scrub oak, singleleaf pinyon, Utah juniper, and shrublands are found below about 5000 feet. Wyoming big sagebrush is a common understory plant on gneiss and schist, but black sagebrush dominates understories in limestone settings.

MOJAVE HIGH ELEVATION MOUNTAINS

In southern Nevada, the Mojave High Elevation Mountains ecoregion is found only in the Sheep and Spring Ranges; it coincides with the Fir-Pine and Bristlecone Pine communities of Bradley and Deacon (1967). The landscape is primarily composed of isolated, high elevation, unglaciated, rugged mountains. Some perennial streams occur, but dry washes dominate even at high elevations. Surface

runoff is primarily from snowmelt. Depositional units in the Mojave high elevation mountains consist largely of Quaternary colluvium with occurrences of limestone, dolomite, and shale.

Elevations typically range from 2286 to 3633 m (7500–11,918 ft.) amsl, and local relief varies from 244 to 1188 m (800–3900 ft.). This ecoregion receives 40 to 64 cm (16–25 in.) of annual precipitation with 50 to 100 frost-free days. Average January and July low temperatures are -5 °C (24 °F) and 13 °C (55 °F), respectively. Mean January and July high temperatures are 5 °C (41 °F) and 26 °C (78 °F), respectively. Soil temperature regimes are Cryic to Frigid. Soil moisture is mostly Aridic, but locally borders on Ustic and Xeric.

The soils reflect the variable moisture regime. Dominant soil orders in the Mojave High Elevation Mountains ecoregion are Entisols, Inceptisols, and Mollisols. Cryorthents are Entisols typically lacking horizon development due to erosion on steep slopes; they form in cold (cryic) settings. Eutrocryepts are Inceptisols with relatively high base saturation that form mostly in late Pleistocene or Holocene alluvium or colluvium in cold (cryic) settings. Haplustolls are Mollisols with some subsurface accumulations of carbonates and/or gypsum; they form in semiarid grassland settings on late Pleistocene and Holocene surfaces. Calciustolls are Mollisols with substantial subsurface accumulations of calcium carbonate and/or gypsum in the form of calcic (noncemented) or petrocalcic (cemented) horizons.

Vegetation in the Mojave High Mountains ecoregion is dominated by Great Basin pine forest composed of curlleaf mountain-mahogany, mountain big sagebrush, and both white fir and ponderosa pine forests. At the highest elevations stands of limber pine and a few bristlecone pines are found. Small aspen groves are isolated on north and east-facing slopes and in hollows. Geographic and climatic isolation is pronounced, allowing new plant species to evolve and relict populations to persist.

MOJAVE MOUNTAIN WOODLAND AND SHRUBLAND

The Mojave Mountain Woodland and Shrubland ecoregion is intermediate to the Arid Footslopes and Mojave High Elevation Mountains ecoregions, and is associated with higher ranges such as the Sheep and Spring Ranges. This ecoregion coincides with the Juniper-Pinyon community of Bradley and Deacon (1967). The landscape is primarily composed of mid-elevation mountain slopes, hills, and ridges segmented by washes, ephemeral streams, and springs. Storm events result in high sediment yields. Reliable surface water is scarce to nonexistent and there are no perennial streams. Depositional units in the Mojave Mountain Woodland and Shrubland consist of Quaternary colluvium with occurrences of siltstone, limestone, dolomite, conglomerate, gneiss, schist, granitic rocks, and quartzite.

Elevations typically range from 183 to 2438 m (600–8000 ft.) amsl, and local relief varies from 122 to 610 m (400–2000 ft.). This ecoregion receives 25.4 to 41 cm (10-16 in.) of annual precipitation with 90 to 150 frost-free days. Average January and July low temperatures are -4 °C (26 °F) and 17 °C (62 °F), respectively. Mean January and July high temperatures are 8 °C (46 °F) and 30 °C (86 °F), respectively.

Soil temperature and moisture regimes are Mesic to Frigid and Ustic to Aridic, bordering on Xeric. The soils reflect the dry moisture regime, and soil orders in the ecoregion include Aridisols, Entisols, and Mollisols. Aridisols are found on surfaces that have been relatively stable for probably thousands of years. Haplargids are Aridisols characterized by the accumulation of translocated clay and are common in the Mojave Mountain Woodland. Haplocalcids, Aridisols with subsurface calcic soil horizons, are also relatively common. Ustorthents are shallow Entisols typically occurring on steep slopes with limited soil moisture. Haplustolls are Mollisols with some subsurface accumulations of carbonates and/or gypsum due to limited soil moisture; they form in semiarid grassland settings on late Pleistocene and Holocene surfaces.

Vegetation is dominated by Juniper-pinyon woodland. Common species include singleleaf pinyon, juniper, Gambel oak, curlleaf mountain-mahogany, cliffrose, Wyoming big sagebrush, black sagebrush, serviceberry, snowberry, manzanita, ceanothus, silktassel, and Apache plume. At elevations above 7500 feet Utah juniper is replaced by Rocky Mountain juniper. At the highest elevations mountain brush such as cliffrose grows on soils derived from carbonate rocks. Ponderosa pine, black cottonwood,

Gambel oak, willow, serviceberry, snowberry, and manzanita can be found in relatively cool and moist microenvironments in canyon settings.

MOJAVE PLAYAS

The Mojave Playas ecoregion landscape is primarily composed of nearly level, broad low terraces, alluvial flats, muddy lake plains, sand sheets, and sand dunes. This ecoregion probably coincides in part with both the Creosote Bush and Saltbrush communities of Bradley and Deacon (1967). Intermittent saline lakes occur, episodically filling to support a large invertebrate fauna. Depositional units in the Mojave Playas consist mostly of Quaternary playa, marsh, eolian and alluvial deposits.

Elevations typically range from 594 to 1036 m (1950–3400 ft.) amsl, and local relief varies from 0 to 15 m (0–50 ft.). This ecoregion receives 10 to 18 cm (4–7 in.) of annual precipitation with 170 to 300 frost-free days. Average January and July low temperatures are -7 °C (20 °F) and 16 °C (60 °F), respectively. Mean January and July high temperatures are 16 °C (60 °F) and 39 °C (102 °F), respectively.

Soil temperature and moisture regimes are Thermic and Aridic, respectively. The soils reflect the dry moisture regime, and soil orders common in the Mojave Playas ecoregion include Aridisols and Entisols. Haplocalcids are Aridisols showing calcic subsurface horizon development. Torripsamments are also Entisols forming under an aridic moisture regime, but are typically limited to areas of unconsolidated sand, usually eolian dunes and sand sheets.

Although there is some creosote bush, vegetation is mostly absent. Extremely salt-tolerant plants, as well as cold-intolerant trees and woody legumes such as velvet ash and mesquite, are sometimes found where there is sufficient moisture.

TONOPAH BASIN

The Tonopah Basin ecoregion is relatively widespread in south-central Nevada, but is isolated to the very northwest part of the study area. The Tonopah Basin ecoregion has commonalities with both the Blackbrush and Saltbrush communities of Bradley and Deacon (1967). The landscape is primarily composed of almost flat broad rolling valleys that contain scattered hills, alluvial fans, lake planes, sand dunes, bajadas, and hot springs. Surface water forms in springs and during foothill precipitation but is usually scarce. Ephemeral washes also occur. Depositional units found in the hills of the Tonopah Basin consist primarily of andesite, rhyolite, basalt, silicic ash-flow tuffs, tuffaceous sedimentary rock, volcaniclastics, volcanic rocks, shales, siltstone, limestone, dolomite, and quartzite. Depositional units found in the valleys of the Tonopah Basin consist primarily of Quaternary alluvial and lacustrine deposits that formed in Pleistocene pluvial lakes and marshes.

Elevations typically range from 1219 to 2134 m (4000–7000 ft.) amsl. Local relief varies from 15 to 549 m (50–1800 ft.). Temperature and moisture regimes are Mesic and Aridic bordering on xeric. This ecoregion receives 7.62 to 22.86 cm (3–9 in.) of annual precipitation with 100 to 170 frost-free days. Average January and July low temperatures are -9 °C (16 °F) and 13 °C (56 °F), respectively. Mean January and July high temperatures are 11 °C (52 °F) and 36 °C (96 °F), respectively.

The soils reflect the moisture regime, with Entisols and Aridisols being dominant. Torriorthents are Entisols that form under an aridic moisture regime and are shallow soils typically occurring on steep slopes. Torripsamments are also Entisols; these form under an aridic moisture regime, but are typically limited to areas of unconsolidated sand, usually eolian dunes and sand sheets. Aridisols are found on surfaces that have been relatively stable for probably several hundreds to thousands of years. Great Groups common in the Tonopah Basin include Haplargids, Haplocambids, Haplocalcids, Argidurids, and Natridurids. Haplargids, Haplocambids, and Haplocalcids have argillic, cambic, and calcic subsoil B horizons, respectively. Argidurids have subsurface accumulations of illuvial clay as well as weakly cemented to indurated nodules cemented by silica (durinodes). Natridurids also contain durinodes, but are also characterized by a natric subsurface horizon, which have the properties of an argillic horizon as well as columnar structure and high levels of exchangeable sodium.

Vegetation is dominated by saltbush and greasewood. There are also sparse stands of shadscale, bud sagebrush, spiny hopsage, spiny menodora, Nevada ephedra, seepweed, fourwing saltbush, littleleaf horsebrush, Douglas rabbitbrush, winterfat, inland saltgrass, and alkali sacaton. Shrub understory consists of warm season grasses including galleta and Indian ricegrass. In the western two-thirds of the Tonopah Basin ecoregion, communities of Bailey greasewood and Shockley wolfberry are widespread and often co-dominate on lower alluvial slopes. In the east and south of this ecoregion, warm desert species including blackbrush, Joshua tree, banana yucca, and cholla cactus are common. Saline bottoms are dominated by black greasewood.

Economic Flora

Wild plants were vital elements in the diets of prehistoric groups in southern Nevada. The distribution of these resources was an important factor in determining settlement patterns, so it is worth examining the present-day geographic patterns of several of the key plants exploited by humans (Figure 2.10). The identification of economic plants is guided by the list of plant foods presented in Roberts and Ahlstrom (2010). We map four plant resources: agave, mesquite, wolfberry, and piñon pine within the extent of Clark County as included in the Clark County and Las Vegas Area SSURGO datasets. Plant distributions are derived from NRCS SSURGO soils map unit data. NRCS ecological site descriptions derived from NRCS "range sites" and USFS "habitat sites" are assigned to each NRCS soil map unit. Incorporation of the range site/habitat type concepts as part of plant distribution modeling allows the inference that these distributions reflect pre-grazing/pre-timbering conditions under a climate similar to the historic era (Daubenmire 1952; Dyksterhuis 1949, 1958). The use of range and forest plant inventory data to map archaeologically important plant species has been utilized for more than 22 years (Eckerle et al. 2000; 1990; Raven and Elston 1989; Zeanah 1996, 2000). NRCS ecological site descriptions include a plant list. The four economic/food plant species of interest were tabulated for each ecological site. Plant species distribution for each species was mapped by plotting the distribution of each ecological site containing a particular species.

The Clark County NRCS (SSURGO) economic plant distributions can be generalized to show plant distribution for the entire project area by correlating the map unit distributions to the ecoregions in which they occur (Table 2.2). Within Clark County economic plant species occur in several ecoregions (Figure 2.9):

1. The Amargosa Desert, Arid Footslopes, Arid Valleys and Canyonlands and Creosote Bush-Dominated Basins contain all four plant resources of interest—agave, honey and screwbean mesquite, piñon pine, and wolfberry— although not necessarily within the same community,
2. The Middle Elevation Mountains, Mojave Playas, Mojave High Elevation Mountains, and Mojave Mountain Woodland and Shrubland contain agave, piñon pine, and wolfberry but lack significant areas of mesquite.
3. The Mojave Playas ecoregion contains honey mesquite as well as wolfberry.
4. The NRCS mapping indicates that wolfberry is widespread and occurs as a significant part of some vegetation communities in all ecoregions except the Tonopah Basin.

Similar to the agricultural areas, prehistoric distribution of plant resources can be addressed through a combination of proxy data and predictive climate models (Eckerle et al. 2000; Eckerle and Taddie 2002). In particular, climate must be understood in a manner that reflects potential impacts of the distribution of edible wild plants, and establishing moisture available to plants during the growing cycle (i.e. moisture index) adequately addresses this issue. Modeled effective precipitation serves as a baseline for understanding the response of plant communities because climate change causes predictable responses in biogeography by modifying suitable habitat. Ecosystem response to changes in effective precipitation can be visualized spatially by using ecological site information associated with SSURGO data. Ecological site productivity and species composition track elevation and precipitation gradients, thus allowing the development of "wetter-than" and "drier-than" analogies.

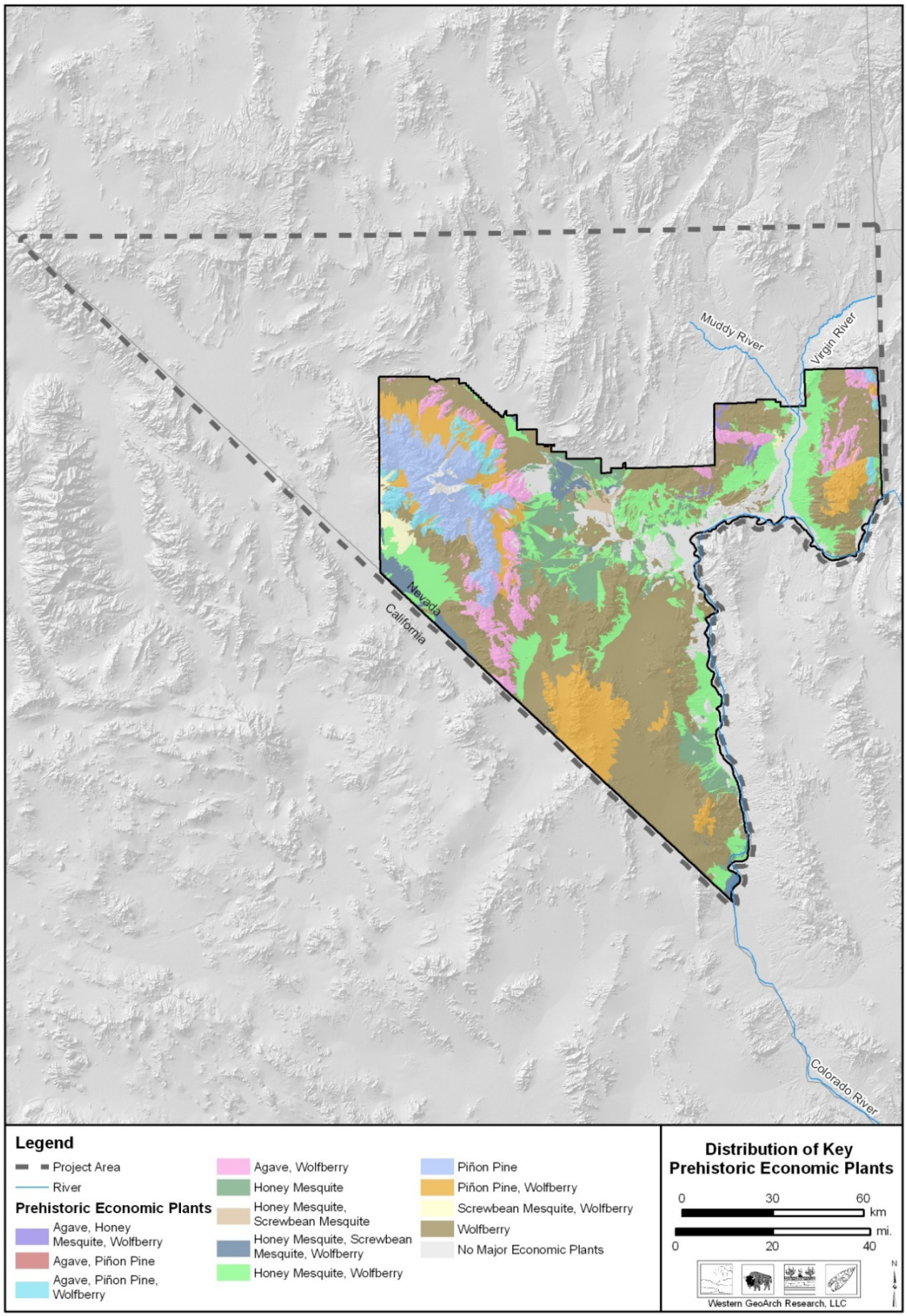


Figure 2.10. Modern distribution of key economic plants.

Table 2.2. Selected Economic Food Plants by Level IV Ecoregion.

Level IV Ecoregion Name	Agave	Honey Mesquite	Screwbean Mesquite	Piñon Pine	Wolfberry
Amargosa Desert	Present	Present	Present	Present	Present
Arid Footslopes	Present	Present	Present	Present	Present
Arid Valleys and Canyonlands	Present	Present	Present	Present	Present
Creosote Bush-Dominated Basins	Present	Present	Present	Present	Present
Middle Elevation Mountains	Present			Present	Present
Mojave High Elevation Mountains	Present			Present	Present
Mojave Mountain Woodland and Shrubland	Present			Present	Present
Mojave Playas		Present			Present
Tonopah Basin					

Fauna

Various species of large and small mammals important to Native Americans are present in southern Nevada. In recent times, mule deer and desert bighorn sheep are probably the most important large game. Both species occur today in uplands. Bighorn sheep are found in upper elevations of the Arid Footslopes ecoregion, while both mule deer and bighorn sheep are present in the Mojave Mountain Woodland and Shrubland ecoregion, and occasionally range into the Mojave High Elevation Mountains ecoregion. Several extinct large mammals including camel, horse, and mammoth were recovered from latest Pleistocene unit E_1 (~15,000-11,000 B.P.) at Tule Springs (Mawby 1967). Antliocaprid remains were also relatively common in unit E_1, however it is not clear if they derive from living pronghorn or extinct "four-horned" pronghorn (Mawby 1967). At present, the primary game animals at lower elevations in southern Nevada are jackrabbit and the desert cottontail rabbit, though several small rodents and small to medium carnivores are present in various ecological zones (Bradley and Deacon 1967). As summarized by Lyneis (1982a), desert riparian zones, including mesquite groves, are home to many small mammals and reptiles, making these zones particularly rich in food resources.

PALEOENVIRONMENTAL BACKGROUND

A review of paleoenvironmental data from post-glacial sites in the southern Great Basin and regions abroad provides a framework for evaluating stratigraphy and soils in the project area. Although climatic and ecological parameters influenced prehistoric human subsistence, adaptive systems remained flexible.

Paleoenvironmental analysis reconstructs environmental conditions, and consequently is an important component of research where a cultural or behavioral ecology approach is emphasized (Butzer 1982; Smith and Winterhalder 1992). Paleoenvironmental change in any part of western North America is intricately tied to global climate change (Thompson et al. 1993). Modeling Late Pleistocene and Holocene climate change as a response to global changes in atmospheric circulation has become possible in the last 20 years.

In the following section we discuss astronomical theory and mechanisms of climate change, along with a paleoclimatic model (a global circulation model, or GCM) designed to retrodict paleoenvironmental conditions. GCM retrodictions are incorporated with regional and local paleoenvironmental reconstructions of the Late Pleistocene and Holocene epochs. A paleoenvironmental correlation chart illustrates general trends in the paleoenvironmental history of the southern Great Basin (Figure 2.11). Dates are given as conventional radiocarbon ages (^{14}C B.P.) unless otherwise specified.

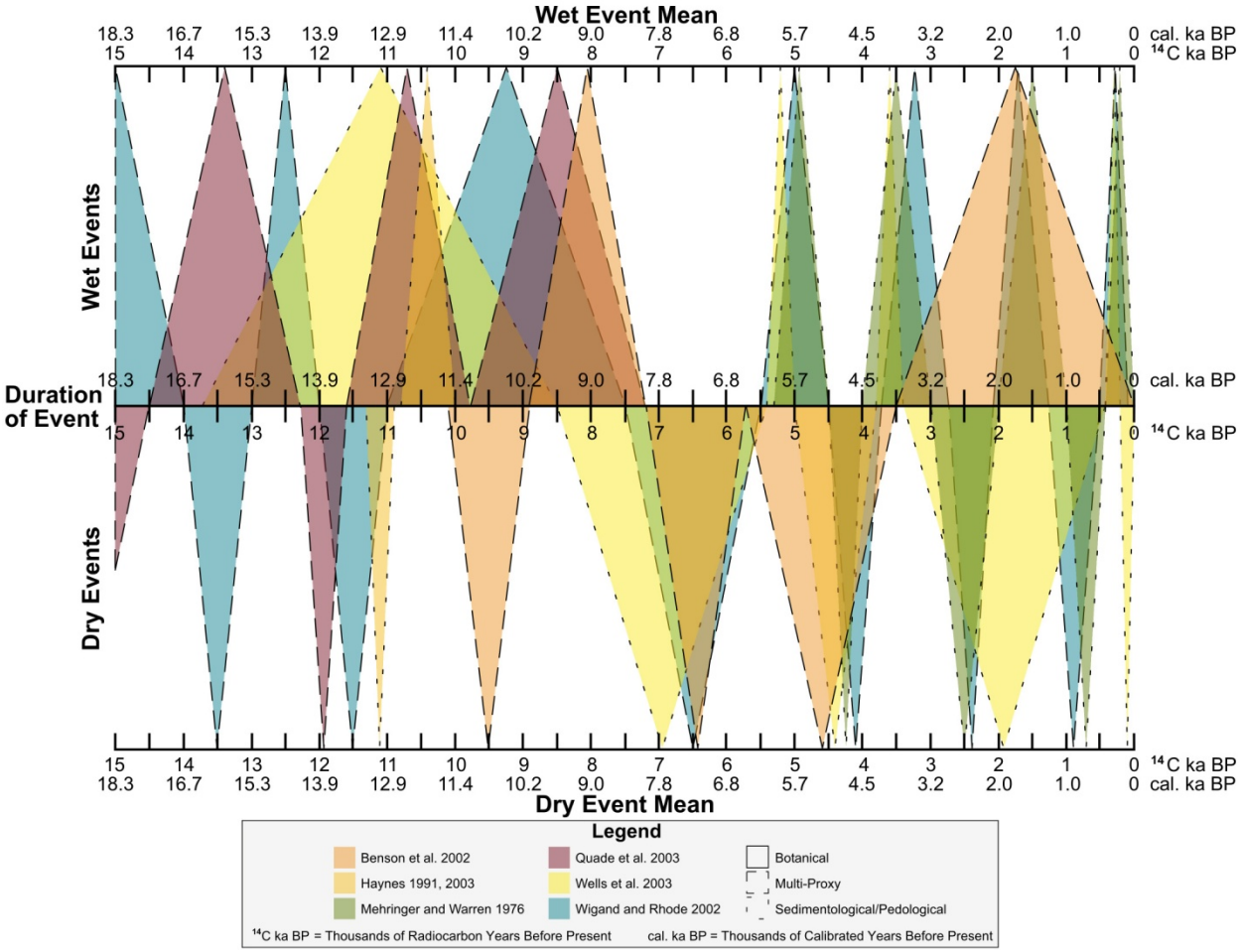


Figure 2.11. Correlation of paleoclimate records from Southern Nevada and surrounding areas.

Astronomical Theory of Climate Change

Cyclical alterations in the geometry of Earth's orbital parameters (i.e., orbital eccentricity, axial obliquity, and equinox precession) are known to be a major cause of climate change (Imbrie and Imbrie 1980). Changes in orbital geometry cause variations in the amount and timing of solar insolation Earth receives, which in turn forces atmospheric circulation to behave in a predictable manner. GCMs retrodict paleoclimates over the last 21,000 years (COHMAP Members 1988; Kutzbach et al. 1998). The models retrodict the position of the jet stream, positions of cyclone and anticyclone activity, strength of the summer monsoon over western North America, annual surface temperature, and annual precipitation for the last 21,000 years. Considerable efforts have gone towards validating model conditions using a global database of terrestrial and marine paleoenvironmental proxy records (COHMAP Members 1988; Kutzbach et al. 1998; Thompson et al. 1993). Initial results suggest a close agreement between some of the modeled conditions and the paleoenvironmental record. Bryson (1994) offers an alternative paleoclimatic model that utilizes earth-sun geometry and effects of volcanic aerosols to predict changes in insolation, as well as resultant temperature and precipitation change.

Mechanisms of Climate Change

Studies that utilize historical events to test hypothetical problems determine four major causes of global climate change: (1) atmospheric composition, (2) global tectonics, (3) astronomical forcing, and (4) industrial activity (Thompson and Turk 1997). Atmospheric climate change results from a change in

the carbon cycle and carbon dioxide concentration. In general, the atmosphere cools when carbon dioxide is removed from the system. Conversely, the atmosphere warms when carbon dioxide is released. Tectonic changes in the configuration of the continents alter continental climate, ocean currents, wind currents, and circulation patterns. Solar radiation alteration and meteorite impacts are two additional mechanisms affecting atmospheric climate change. Finally, the historical input of greenhouse gases and other industrial pollutants into Earth's atmosphere is a known cause of global warming and/or cooling (Thompson and Turk 1997).

General Circulation Model

Validation of GCMs with paleoenvironmental data requires considerable effort and is still in its infancy. As a result, it is necessary to focus on regional paleoenvironmental data and the relationship with general circulation model predictions. As previously discussed, the GCM predicts the position of the jet stream, strength of the summer monsoon, positions of cyclonic and anti-cyclonic activity, annual surface temperature, and annual precipitation over the course of the last 21,000 years (COHMAP Members 1988; Kutzbach et al. 1998). GCM predictions are available at 3000-year intervals for 21,000, 18,000, 12,000, 9000, and 6000 years ago (COHMAP Members 1988). The following discussion divides the regional paleoenvironmental history into temporal periods of somewhat similar climate which are not intended to be identical to the 3000-year time intervals at which the GCM predictions are presented in COHMAP.

Regional Paleoenvironmental History

LAST GLACIAL MAXIMUM (22,000–16,000 ^{14}C B.P.)

The general circulation model for the last glacial maximum (LGM, Oxygen Isotope Stage 2) shows that the jet stream was split around a zone of permanent high pressure over the Laurentide ice sheet with the southern arm depressed far below its present position. This high pressure cell may have produced easterly winds, as opposed to the present day westerlies. Seasonality was reduced and summer temperatures decreased. The climate in the Great Basin and American Southwest would have been colder and drier than present (COHMAP Members 1988).

Several large Great Basin pluvial lakes (Bonneville, Lahontan, and Russel [Mono Lake]) were gradually increasing in size prior to and during the LGM (Benson et al. 1990, 2011; Benson 2004), and numerous smaller pluvial lakes (i.e., China, Searles, Panamint, Mojave, Manly, and Manix) formed throughout the southwest Great Basin (Anderson and Wells 2003; Dohrenwend et al. 1991; Morrison 1991; Smith 1979; Wells et al. 2003). Antevs (1948) hypothesized that storms tracking along the polar jet-stream resulted in increased precipitation and expansion of Lake Lahontan. This idea has been invoked to explain the rise and fall of other Great Basin lakes (Benson and Thompson 1987; Negrini et al. 2000; Oviatt 1997; Palacios-Fest et al. 1993). Fossil wetland deposits recognized in American Southwest deserts indicate regionally high-water tables during the LGM due to higher rates of recharge (Haynes 1967, 2007; Mahan et al. 2007; Pigati et al. 2004, 2009; Quade 1986; Quade and Pratt 1989; Quade et al. 1995, 1998, 2003). Ostracod and stable isotope data from southern Nevada (Quade et al. 2003) indicate that the majority of precipitation during the LGM was delivered during the winter season. High groundwater conditions are also indicated in the record from Devils Hole (Winograd et al. 1992; Winograd et al. 2006). Bouldery debris flows formed incipient alluvial fans prior to this time; however, pluvial lake shorelines truncate the oldest fan deposits at many basin margins (Harvey and Wells 2003). Glaciers expanded in the Sierra Nevada Mountains (i.e., the Tioga 2 and 3 stades; Phillips et al. 1996) and dune fields in the southern Great Basin began accumulating due to increased fluvial sediment loads available for transport and deposition in eolian landforms (Lancaster and Tchakerian 2003).

Most terrestrial geomorphic records indicate increased moisture during the LGM, but the predominance of limber pine fossils in low-elevation (ca. 1600 m) woodrat middens reflects a cold, dry, continental climate (Wigand and Rhode 2002). These conditions are verified by the absence of white fir, which is typically interpreted as an indicator of increased moisture (Wigand and Rhode 2002).

Palynological data from sediment cores indicate that sagebrush steppe was more widespread than at present in the Ruby Valley in northeast Nevada during the late Pleistocene (Thompson 1992). Fauna from Pintwater Cave in southern Nevada indicate that xeric and cool-mesic adapted species occurred in the southwestern Great Basin and Mojave Desert during the LGM (Hockett 2000). Now extinct Rancholabrean fauna were also present including saber-tooth cat, ground sloth, glyptodont, bison, musk ox, mammoth, horse, camel, and short-faced bear (Grayson 1982; Nelson and Madsen 1980).

DEGLACIATION THROUGH LATEST PLEISTOCENE (16,000–10,000 ^{14}C B.P.)

According to the GCM, shortly after 17,000 ^{14}C B.P. changes in Earth's orbital geometry and axial tilt initiated a warming trend with increased seasonality (COHMAP Members 1988; Kutzbach et al. 1998). By 12,000 ^{14}C B.P., the jet stream was no longer split around a Laurentide ice sheet that was substantially reduced in size, and westerly winds prevailed. Increased summer insolation resulted in warmer summer temperatures, although conditions were still cooler than present. Seasonality was very pronounced due to correlations between equinox precession and orbital eccentricity. A Pacific subtropical high was present at this time but was too weak to provide much moisture to the area. Likewise, the summer monsoon was not yet well developed. As a result, dry conditions are thought to have occurred in the US Southwest at 12,000 ^{14}C B.P. (COHMAP Members 1988; Kutzbach et al. 1998) more or less coincident with the Bølling-Allerød interval.

From 16,000 to 11,500 ^{14}C B.P., regional paleoenvironmental reconstructions are in agreement with global circulation model predictions. Post-LGM high stands occurred in major Great Basin pluvial lake systems (Lakes Lahontan, Searles, and Russell) at about 15,000 ^{14}C B.P. (Anderson and Wells 2003; Benson et al. 1990; Dohrenwend et al. 1991; Morrison 1991). Lake Bonneville underwent rapid lowering due to catastrophic flooding out of the basin at around 17,000 ^{14}C B.P., but would have otherwise likely been in phase with other large lakes (Benson 2004). Lake Mojave experienced three millennia of intermittent lakes from approximately 16,700 to 13,700 ^{14}C B.P., followed by the Lake Mojave II high stand from 13,700 to 11,400 ^{14}C B.P. (Wells et al. 2003). While elevated lake levels in the northern Great Basin were due in part to proximity to the jet stream, which would have produced cool, frontal storms (Benson and Thompson 1987), high lake levels in the southern Great Basin were probably due to increased runoff from surrounding watersheds (Wells et al. 2003). Lake levels were intermittently reduced between about 16,700 and 13,700 ^{14}C B.P., resulting in increased sediment availability and a second major period of regional dune building (Lancaster and Tchakerian 2003). Deposition of boulder debris flow likely continued on alluvial fans, although Lake Mojave II shorelines truncated fan deposits of this age (Harvey and Wells 2003). The Lake Mojave II high stand (ca. 13,700 to 11,400 ^{14}C B.P.) corresponds with the formation of spring deposits in the Las Vegas Valley, Indian Springs Valley, and Amargosa Desert (Haynes 1967; Quade 1986; Quade et al. 1995, 1998, 2003). As discussed by Quade (1986), however, wetlands were substantially reduced in size relative to the well-integrated systems in valley bottoms prior to about 15,000 ^{14}C B.P. There is also evidence from southern Nevada (Quade et al. 1998) and southeastern Arizona (Pigati et al. 2009) for a brief drop in water table at around 12,000 ^{14}C B.P. during the Bølling-Allerød warm interval.

Plant macrofossils and pollen from sites in the southwest Great Basin support interpretations of millennial-scale temperature and precipitation fluctuations (Wigand and Rhode 2002), although the records do not necessarily agree in regards to the timing or magnitude of events. The periods from around 16,000 to 14,000 ^{14}C B.P. and 13,000 to 12,000 ^{14}C B.P. were effectively cooler and wetter, while the period from 14,000 to 13,000 ^{14}C B.P. was cooler but drier. Limber pine is absent from woodrat middens during wet intervals, while white fir dominates macrofossil records (Wigand and Rhode 2002). Utah juniper is also a reliable indicator species, which, along with white fir evidences wetter Late Pleistocene conditions (Forester et al. 1999; Wells and Berger 1967; Wigand and Rhode 2002). In the northern Chihuahuan desert in the southern Basin and Range, plant macrofossils from packrat (woodrat) middens indicate that piñon pine expanded its range downslope during mesic conditions prior to 12000 ^{14}C B.P. (Holmgren et al. 2003, 2006).

A millennium of severe drought may have occurred throughout the American west between 12,000 and 11,000 ^{14}C B.P. (Haynes 1991), coinciding with the Bølling-Allerød warm interval. Spring deposits in the Basin and Range indicate regionally drier conditions from 12,300 to 11,600 ^{14}C B.P. (Pigati et al. 2009; Quade et al. 1998, 2003). Plant macrofossils from woodrat middens indicate warmer conditions from 12,000 to 11,500 ^{14}C B.P. (Wigand and Rhode 2002). In the southwestern Great Basin, mixed-juniper woodland replaced limber pine stands at low elevations before giving way to desert scrub (Spaulding 1977, 1981; Wigand and Rhode 2002), probably in response to increasing aridity. This drought coincides with the expansion of Clovis peoples (Meltzer 2004) and the extinction of 33 genera of large-bodied (>40 kg) North American mammals (Grayson 1982, 1991; Wicander and Monroe 1989).

Stabilization or minor rebounds in lake levels are evident in records from the northern Great Basin between 11,500 and 10,000 ^{14}C B.P. coinciding with the Younger Dryas climatic event (Benson et al. 1990). Benson and Thompson (1987) suggest that the return to a cool, moist climate was a function of jet stream realignments over the Great Basin. Intermittent lakes formed in Lake Mojave, which increased the sediment supply for adjacent dune fields (Lancaster and Tchakerian 2003; Wells et al. 2003). Deposition of bouldery debris flows on alluvial fans indicates that extreme storm events may have been a common climatic feature of the Pleistocene-Holocene transition in the southwestern Great Basin (McDonald et al. 2003). Harvey and Wells (2003) recognize a distinct period of alluvial fan building from 11,400 to 10,000 ^{14}C B.P., indicating that extreme storms may have been common during the Younger Dryas. At the Sunshine Locality in Long Valley in east-central Nevada, alluvial aggradation between 11,300 and 9800 ^{14}C B.P. occurred during a period of perennial streamflow that was preceded and followed by relative drying (Huckleberry et al. 2001). Evidence of Younger Dryas climate change is absent from the Devils Hole stable isotope record (Winograd et al. 2006).

Increased spring discharge in southern Nevada following the Bølling-Allerød interval resulted in the formation of distinct relatively organic-rich black mats in spring contexts (Quade et al. 1998). While black mats occur in the entire stratigraphic record over the last ~12,000 years, they are most common during the Younger Dryas. Recently Haynes (2007) has argued that units correlative to the black mats are present throughout the western United States, implying that the effects of the Younger Dryas were both continental and unidirectional (i.e., increased moisture, though see Holliday [2000] and Meltzer and Holliday [2010] for different perspectives). During the Pleistocene-Holocene transition, paleoenvironmental reconstructions indicate a strengthened monsoon and increased regional summer precipitation throughout the Sonoran and Mojave Deserts between 11,600 and 9800 ^{14}C B.P. (Spaulding and Graumlich 1986).

Subsequent to deglaciation, vegetation communities resembling present woodlands at higher elevations expanded their range downslope while desert scrub different than modern drought-tolerant communities grew on basin floors in the southeastern Great Basin (Spaulding 1990). Woodland species were displaced upslope and arrived at current sites by 11,700 ^{14}C B.P. Although piñon pine was present in low-elevation woodlands, juniper was much more prevalent (Wigand and Rhode 2002). Juniper disappeared from woodrat middens near the Nevada Test Site by 10,000 ^{14}C B.P. (Wigand and Rhode 2002), but desert species did not return to valley floors until 9600 ^{14}C B.P. This migrational lag between the two communities was probably due to the latitudinal displacement of warm desert species to the south (Spaulding 1990). The Pintwater Cave fauna from the northern Mohave Desert indicate that a shift from primarily winter precipitation to summer convectional storms (monsoonal flow) occurred between 11,000 and 10,100 ^{14}C B.P. (Hockett 2000).

EARLY AND MIDDLE HOLOCENE (10,000–4000 ^{14}C B.P.)

The GCM predicts that by 9000 ^{14}C B.P., post-glacial summer insolation was at a maximum, seasonality was pronounced, and summer temperatures were generally 2 to 4 °C higher than present. Climate is modeled as being warmer and drier than modern conditions. By 6000 ^{14}C B.P., summer temperatures were still 2 to 4 °C higher but began to decline in response to decreased summer insolation. Even so, climate was warmer and drier than present, and the American Southwest and Great Basin were subject to stronger westerly flow (COHMAP Members 1988).

Early Holocene (10,000–7500 ^{14}C B.P.)

Regional paleoenvironmental reconstructions indicate warmer temperatures and more effective moisture during an amplified summer monsoon due to a thermal maximum in the Early Holocene (Birnie 1995b; Dean et al. 1985; Hall 1990; Wigand and Rhode 2002). These conditions generally agree with the COHMAP model prediction of warmer summer temperatures but differ from model predictions of dry climate. Widespread evidence for an Early Holocene pluvial event is found at Adobe Lake, CA; Eleana Range, NV; Searles Lake, CA; Mojave Lake, CA; Cowboy Cave, UT; Bechan Cave, UT; Black Mesa, AZ; Eastern Grand Canyon, AZ; San Augustine Plain, NM; Estancia Plain, NM; San Andreas Mountains, NM; and, Blackwater Draw, NM (Davis and Sellers 1994). Of these twelve sites, most show increased moisture around 10,000-8000 ^{14}C B.P. (Davis and Sellers 1994). Intermittent lakes persisted in the Lake Mojave basin until approximately 8500 ^{14}C B.P. (Wells et al. 2003). Stable isotope records from Owens Lake indicate a general trend towards drier conditions from around 10,100 to 8900 ^{14}C B.P. with a pulse of moisture around 9200 ^{14}C B.P.; lake levels were otherwise high from 8900 to 7200 ^{14}C B.P., signaling a moist Early Holocene (Benson et al. 2002). Fluctuating lake levels in the Mojave Desert continued the sediment supply for Early Holocene eolian dunes adjacent to pluvial lake basins (Lancaster and Tchakerian 2003; Wells et al. 2003). Eolian playa deflation also increased deposition of fine-grained dust on many landforms, enhancing the rates of Early Holocene soil formation (Peterson et al. 1995; Reheis et al. 1995). Reduced sediment transportation energy regimes on alluvial fans resulted in a transition from deposition of high-energy bouldery debris flows to low-energy sheetwash or channel incision on fan surfaces (Harvey and Wells 2003; McDonald et al. 2003).

Plant macrofossils from woodrat middens indicate that maximum precipitation occurred in the summer as monsoonal flow (Davis and Sellers 1994; Spaulding and Graumlich 1986; Wigand and Rhode 2002). Precipitation also originated from Pacific westerlies over the Transverse Ranges (Wigand 2007). Juniper populations fluctuated in response to moisture conditions, and juniper twigs and seeds disappear from most woodrat middens by 9000 ^{14}C B.P. (Wigand and Rhode 2002). Fruits from hackberry, an indicator species of summer seasonal rainfall, are common in Early Holocene alluvial deposits, dry rockshelter sediments, and woodrat middens (Jahren et al. 2001). The δ^{18}O values of hackberry endocarp carbonate of Early Holocene samples from Pintwater Cave in southern Nevada suggest more monsoonal moisture and/or warmer temperatures (Jahren et al. 2001). The Early Holocene fauna from Pintwater Cave is dominated by mesic-adapted species (Hockett 2000), supporting interpretations of an intensified summer monsoon in the northern Mojave Desert.

Typical Holocene vegetation was present by 9000 ^{14}C B.P., although not in the associations seen in present-day plant communities (Mehringer 1985). In particular, piñon pine was just migrating north out of the Mojave Desert and expanding throughout the Great Basin (Madsen and Rhode 1990; Wells 1983). Woodrat midden evidence suggests that treelines were lower from 9000-10,000 ^{14}C B.P. (Wells and Berger 1967).

Middle Holocene (7500–5500 ^{14}C B.P.)

During the Middle Holocene, temperatures were greater and effective moisture was less than during either the Early or Late Holocene (Birnie 1995b). Global circulation model predictions are in agreement with regional paleoenvironmental reconstructions for this time period (COHMAP Members 1988). Most pluvial lake basins in the southern Great Basin were transformed into playas with no standing water or shallow, saline lakes (Anderson and Wells 2003; Benson et al. 1990; Dohrenwend et al. 1991; Morrison 1991; Wells et al. 2003).

High amplitude oscillations in records from Owens and Pyramid Lakes between 7200 and 5700 ^{14}C B.P. indicate low lake levels in both basins (Benson et al. 2002), the latter occurring due to reduced outflow from Lake Tahoe. Pollen and algae microfossils from a Pyramid Lake sediment core indicate the driest period of the Holocene occurred between 6750 and 5500 ^{14}C B.P. (Mensing et al. 2004). Black mats are rare or absent in the stratigraphic record in southern Nevada between 6300-2500 ^{14}C B.P., indicating a decrease in spring discharge (Quade et al. 1998; Quade et al. 2003). Plant macrofossil and pollen records

are rare during the two millennia from 7500 to 5500 ^{14}C B.P. due to playa lake desiccation and woodrat range contraction (Wigand and Rhode 2002). A well-dated sequence of small mammal remains from Homestead Cave in northwest Utah shows a decrease in species richness during the Middle Holocene, probably in response to more xeric conditions in the northeastern Great Basin (Grayson 2000). Dendrochronological records of bristlecone pine from the eastern slope of the White Mountains indicate that between 5700 and 3750 ^{14}C B.P. lower treeline was approximately 200 m higher than present, corresponding to summer temperatures about 2 °C above modern norms (LaMarche 1973). This is confirmed by stable isotope values from bristlecone pines in the White Mountains indicating peak aridity in the westernmost Great Basin at around 6000 ^{14}C B.P. (Feng and Epstein 1994). Radiocarbon ages on archaeological textiles from the western Great Basin are rare between 6500 and 4000 ^{14}C B.P. (Benson et al. 2002), possibly indicating humans utilized the region less frequently during the Middle Holocene. Existing palynological evidence indicates that shadscale and sagebrush communities were at their greatest extent and expanded at the expense of grasses and conifers (Mehringer 1985).

Throughout the southern Great Basin and the American Southwest, increased eolian activity occurred during the Middle Holocene, creating or reactivating many regional dune fields (Ahlbrandt et al. 1983; Birnie 1995a; Hack 1941; Karlstrom 1988; Lancaster and Tchakerian 2003; Reheis et al. 2005; Smith and McFaul 1997; Wells et al. 1990; see excellent reviews in Busacca et al. 2004 and Muhs and Zárate 2001). Mehringer and Warren (1976) recognized this time as a major disconformity underlying Late Holocene marsh and dune deposits in Ash Meadows in the Amargosa Desert.

LATE HOLOCENE (5500 ^{14}C B.P.–PRESENT)

The extreme drought-like conditions that characterized Middle Holocene climate throughout western North America came to an abrupt end circa 5500 ^{14}C, although transitional arid-to-mesic conditions continued until the beginning of the Neoglacial circa 4000 ^{14}C B.P. (Mehringer 1996; Wigand and Rhode 2002). Likewise, the transition to relatively moist conditions occurs at different times in different records, probably due to geographic variation in the timing of the climatic transition as well as lag times unique to the various parts of the geo-hydrologic system. For example, Lake Tahoe increased in size as early as ~4000 ^{14}C B.P., as indicated by ^{14}C ages from submerged tree stumps (Lindstrom 1990). However, black mats do not reappear in the late Quaternary stratigraphic record in southern Nevada until ~3000 ^{14}C B.P. (Quade et al. 1998). This discrepancy likely reflects cooler and/or moister conditions occurring earlier at higher elevations as well as the lag time in groundwater response to climate change. Nevertheless, by 3000 ^{14}C B.P. nearly all proxy environmental records in the Great Basin reflect the change from dry Middle Holocene to relatively mesic Late Holocene conditions.

Late Holocene climate was characterized by greater effective moisture relative to the Middle Holocene (Davis and Elston 1972). Nearly all Great Basin pluvial lake levels were higher in response to increased moisture between 4000 and 2000 ^{14}C B.P. (Benson et al. 1990; Broughton et al. 2000; Currey 1991; Oviatt 1988). Several periods of glacial activity occurred in the cirques of Great Basin mountain ranges during the last 4000 years with a major event around 3500 and 1800 ^{14}C B.P. (Burke and Birkeland 1983; Davis 1988). Fossil pollen from Lower Pahranagat Lake sediment cores evidence increased moisture approximately 3700 to 2700 ^{14}C B.P. (Wigand and Rhode 2002). The Middle Holocene expansion of sagebrush and saltbush communities reversed after 4000 ^{14}C B.P. (Mehringer 1985). Plant macrofossils from woodrat middens evidence open woodland in the Mineral Mountains between 3370 and 2800 ^{14}C B.P. and expanded woodland in Holt Canyon between 3800 and 2900 ^{14}C B.P. (Spaulding et al. 1994). Oxygen isotope values from Owens Lake indicate that the period from 5700 to 3500 ^{14}C B.P. was one of drought when the lake was largely desiccated (Benson et al. 2002). Oxygen isotopes from Owens and Pyramid Lakes indicate that wet Neoglacial conditions resulted in lake growth after about3000 ^{14}C B.P. to the present, though recurrent and persistent centennial-scale droughts occurred over the past few thousand years (Benson et al. 2002; Mensing et al. 2004). Lake Mojave held a shallow and saline but perennial lake (Wells et al. 2003), and Mojave Desert dune fields stabilized (Clarke and Rendell 1998; Lancaster and Tchakerian 2003). Plant macrofossils from woodrat middens also indicate the shift to more mesic species around 5500 ^{14}C B.P. (Spaulding 1991; Wigand et al. 1995;

Wigand and Rhode 2002). The White Mountains bristlecone pine record indicates downslope expansion of treeline between 3700 and 3250 ^{14}C B.P. (LaMarche 1973) in response to cooler and/or moister conditions, and stable isotope values from White Mountain bristlecone pines indicate a cooling trend between 6000 and 2100 ^{14}C B.P. (Feng and Epstein 1994). Regional springs were rejuvenated at 5500 ^{14}C B.P., resulting in formation of peat above the Middle Holocene disconformity at Carson Slough in Ash Meadows (Mehringer and Warren 1976). The bottom of a core from Lower Pahranagat Lake also contains peat, reflecting the transition to moister conditions (Wigand 1997; Wigand and Rhode 2002).

Although Late Holocene environmental conditions have been generally moister than the extreme aridity of the Middle Holocene, recent studies indicate that Late Holocene climate has been characterized by decadal- to millennial-scale variability (Alley et al. 2003; Bond et al. 1997; Mayewski et al. 2004; Taylor 1999). Regional variability is evident in the timing, tempo, and magnitude of Late Holocene climate change, but the key mechanisms influencing climate in the Southwest include the North American Monsoon, El Niño-Southern Climate Oscillation (ENSO), and the Pacific Decadal Oscillation (PDO) (Enfield et al. 2001; Mantua et al. 1997; McCabe et al. 2004; Moy et al. 2002). Rapid climate changes during the Holocene are probably linked, in part, to external factors such as solar variability and volcanic aerosols (Mayewski et al. 2004; Zielinski et al. 1994), but complex teleconnections and internal feedbacks make it difficult to define direct links.

In light of modern global climate change, episodic moisture fluctuations and/or extreme storm events are often the focus of Late Holocene climate studies (Ely et al. 1993; Wigand and Rhode 2002). These changing trends in environmental conditions signal a dominant winter-wet moisture regime. Records of extreme floods are absent throughout the American Southwest, supporting interpretations of a dominant winter moisture regime resulting in reduced summer flooding (Ely et al. 1993), although historically high magnitude floods have occurred during winter storms. Moister climatic conditions formed intermittent lakes in playa basins and increased sediment load in the Amargosa and Mojave Rivers (Enzel and Wells 1997; Mehringer and Warren 1976; Wells et al. 2003). In eolian settings that are dominated by sediment-supply, many regional dune fields were active during moister conditions as a consequence of increased alluvial sediment supply (Enzel and Wells 1997; Lancaster and Tchakerian 2003; Mehringer and Warren 1976). Spring-fed peats grew and were buried by dunes in Ash Meadows from 4000 to 3000 ^{14}C B.P., although local dunes deflated between 3000 and 2000 ^{14}C B.P. (Mehringer and Warren 1976).

Most regional paleoenvironmental records indicate distinct fluctuations in moisture over the last 2000 ^{14}C B.P. Many playa lakes dried periodically and glacial ice retreated from high-elevation cirques (Benson et al. 1990; Burke and Birkeland 1983; Currey 1991; Davis 1988; Oviatt 1988). Saltbush and greasewood expanded at the expense of grasslands and juniper woodlands (Wigand and Rhode 2002) during the latest Holocene. Woodrat midden data from Holt Canyon indicate cool, dry conditions between 2210 and 1410 ^{14}C B.P. followed by three centuries of cool, moist conditions from 1140 to 850 ^{14}C B.P. (Spaulding et al. 1994). Pollen data from Lower Pahranagat Lake evidence centennial-scale increases in effective moisture at 1500, 900, 700, and 500 ^{14}C B.P. with a peak in juniper pollen at 300 ^{14}C B.P. that coincided with the Little Ice Age (Wigand and Rhode 2002). Stable isotopes from White Mountains bristlecone pines evidence a warming trend between 2100 and 400 ^{14}C B.P. with cooler Little Ice Age conditions around 400 to 100 ^{14}C B.P. (Feng and Epstein 1994). Dendroclimatic records from the White Mountains (Leavitt 1994) and southern Sierra Nevada (Graumlich 1993) indicate an anomalously wet interval between 1000 and 900 ^{14}C B.P. Several lakes throughout the Great Basin apparently record highstands centered on 1000 ^{14}C B.P. (Adams 2003; Benson et al. 2002; Broughton et al. 2000; Stine 1994); however, two extended century-scale periods of severe drought occurred in the Sierra Nevada shortly before about 1000 and 700 ^{14}C B.P. (Stine 1994). Evidence for the Little Ice Age lasting from 350 to150 ^{14}C B.P. is widespread throughout the southern Great Basin and includes a final increase in Mojave desert lake levels (Wells et al. 2003), reactivation of alpine cirque glaciers (Burke and Birkeland 1983; Davis 1988), increased spring discharge and wetlands development at Ash Meadows (Mehringer and Warren 1976), and lowering of upper treeline boundaries throughout numerous mountain ranges (Graumlich 1993).

Short-term Late Holocene climate change resulted in reorganization and development of many modern plant community associations. For example, since 580 ^{14}C B.P. in the Mineral Mountains sagebrush, rabbitbrush, and bitterbrush have become dominant while juniper is rare and piñon is locally extinct (Spaulding et al. 1994). Extreme environmental degradation occurred at Holt Canyon from 850 ^{14}C B.P. to present (Spaulding et al. 1994). Following the Little Ice Age in the southern Great Basin (ca. 150 ^{14}C B.P. to present) pine began to dominate woodlands at the expense of juniper, saltbush and sagebrush expanded dramatically along with creosote bush and burrobush, and plant species surrounding marshes reflect a shift to more saline conditions (Wigand and Rhode 2002). Historic climatic trends show significant variability with periodic extreme weather events delivering winter snows and summertime flash floods. Currently, strong El Niño years produce generally moister winters across the southern Great Basin and American Southwest (Moy et al. 2002).

QUATERNARY GEOLOGY AND GEOMORPHOLOGY

Because of the significance of Quaternary geology to the archaeological record, we give special attention to it here. Landforms in the Basin and Range Province result from geomorphic and sedimentological processes operating over a variety of temporal and spatial scales. These processes have been particularly sensitive to climate change during the Quaternary period (see discussion by Dohrenwend 1987). This is not surprising, considering the relatively low amount of precipitation, moderate amount of relief, and sparse vegetation. Active and relict landforms in the study area reflect changes in the relative importance of geomorphic processes through time. These landforms contain important late Quaternary morphostratigraphic and lithostratigraphic records in the study area. We are particularly interested in landform-sediment components forming over the last 15,000 years.

As shown on the Nevada State geology map (Stewart and Carlson 1978; Crafford 2007), Quaternary deposits include Pleistocene and Holocene age sediments, which fill the basins with thick sequences of sedimentary debris. The Southwest Regional GAP land type project produced a digital geology map (Prior-Magee et al. 2007) that illustrates the distribution of early vs. late Quaternary deposits, mostly characterized as basin fill (see Figure 2.3). Neither map provides detail on sediments that might bury and preserve archaeological sites. These sediments would be of an appropriate age and suitable energy regime to bury and preserve spatial associations between cultural features and artifacts, (i.e., contextual integrity). The age of the suitable deposits would be most recent Pleistocene through Holocene age (15,000 B.P.–present). Those deposits should have low to moderate depositional energy.

The low to moderate energy most recent Pleistocene-age deposits are not mapped for the entire project area. But maps of Clark County surficial deposits (House et al. 2010) provide some detail on potential archaeological site-bearing surface deposits. Although much too fine-grained to illustrate in this chapter, examination of the Clark County surficial geology map shows 13 units that have potential for buried archaeological zones (Table 2.3). All but two of these units occur in the basin floor (Figure 2.12). Because of the redundancy in geomorphic settings in the study area, it is reasonable to assume that the sediment-landform relationships interpreted for Clark County are valid for much of the study area. Possible future availability of detailed county-wide surficial geology maps for Lincoln and Nye counties will make it possible to create a map of the distribution of potential areas where the surface sediment is the right age and of suitable depositional energy to bury and preserve archaeological zones.

Surficial Processes and Late Quaternary Depositional Environments

Alluvial and eolian processes are the primary surface processes forming late Quaternary geologic units in the study area, with lacustrine (playa) and colluvial processes playing secondary roles. These are, of course, the same processes responsible for creating the geologic context of archaeological sites, (i.e., the geoarchaeological context). These same processes dictate whether or not a site is destroyed or ultimately is preserved in the stratigraphic record. Thus, it is worth a brief review of some of the main surface processes that have operated in southern Nevada over the past 15,000 years.

Table 2.3. Summary of Surficial Geologic Units in Clark County with Potential to Contain Buried Archaeological Zones.

Surface unit[1]	Explanation	Age	Depositional environment	Landform / Setting	Potential
Ary	Young alluvial river deposits	Holocene	Alluvial	Terrace, floodplain	High
Ari	Intermediate alluvial river deposits	Late Pleistocene	Alluvial	Terrace	Moderate
Avy	Young alluvial valley deposits	Holocene	Alluvial	Fan skirt	High
Avi	Intermediate alluvial valley deposits	Late Pleistocene	Alluvial	Fan piedmont, fan skirt, terrace	Moderate
Hc	Hillslope colluvium deposits	Holocene to middle Pleistocene	Colluvial	Bounding mountains, fan piedmont	Low
Hu	Undivided hillslope deposits	Holocene to middle Pleistocene	Colluvial	Bounding mountains, fan piedmont	Low
Ey	Young eolian deposits	Holocene	Eolian	Alluvial flat, fan skirt, fan piedmont	High
Esy	Young eolian sheet deposits	Holocene	Eolian	Alluvial flat, fan skirt, fan piedmont	High
Edy	Young eolian dune deposits	Holocene	Eolian	Alluvial flat, fan skirt, fan piedmont	High
Pfy	Playa fringe deposits	Holocene to late Pleistocene	Lacustrine	Playa, alluvial flat	High
Py	Playa deposits	Holocene	Lacustrine	Playa	Moderate
Sy	Young spring deposits	Holocene	Alluvial	Fan piedmont, fan skirt	High
So	Old spring deposits	late to middle Pleistocene	Alluvial	Fan piedmont	Moderate
Su	Undivided spring deposits	Holocene to middle Pleistocene	Alluvial	Fan piedmont, fan skirt	High

[1]Surface units, explanation, and age based on House et al. (2010)

[2]Landform based on Peterson (1981)

Alluvial Settings

Alluvial deposits have their origin through flowing water in non-marine settings, and represent the most widespread type of deposits with archaeological significance in southern Nevada. Very broadly, alluvial deposits in the study area are derived through channelized flow, overbank flooding, and unchannelized sheetflow. This is true for both axial stream settings alluvial fans. In active alluvial environments, deposits tend to become finer away from channels and downslope on fans. Thus, contemporaneous deposits show horizontal changes in particle size that vary in a predictable manner in what are referred to as lithofacies relationships. The lithofacies concept is extremely useful for understanding the geometric relationships and depositional environments in the stratigraphic record.

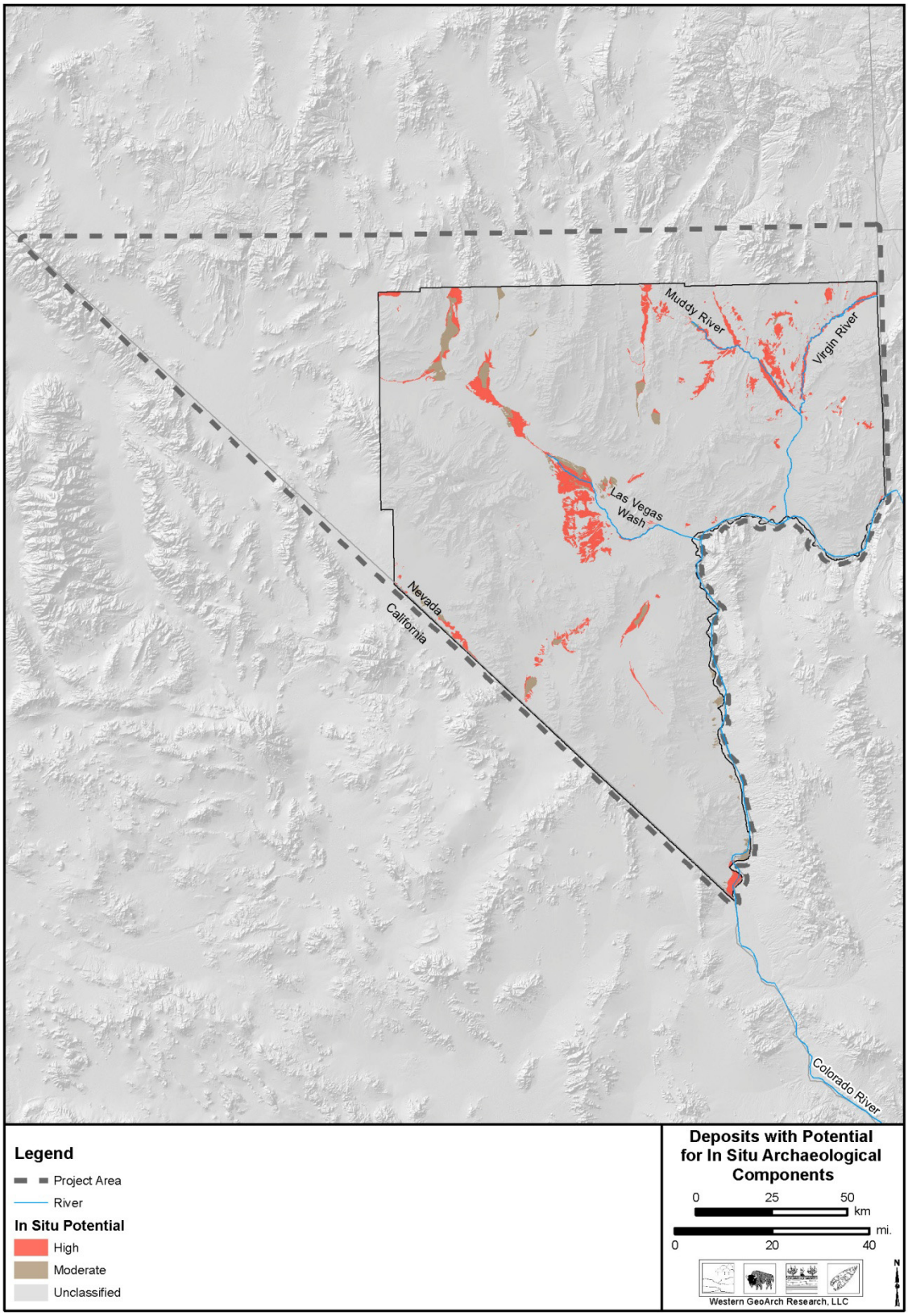


Figure 2.12. Latest Quaternary and Holocene deposits with potential for in situ archaeological components.

Alluvial Fans

Surface mapping indicates that alluvial fan deposition has been ongoing in basin settings in southern Nevada throughout the Quaternary. Older fan surfaces have been isolated through uplift and basin denudation. Depositional processes involved with alluvial fan deposition in the Basin and Range Province are sensitive to climate change (Bull 1991). The most recent relative widespread change in fan deposition apparently occurred during the Pleistocene-Holocene transition.

For example, late Pleistocene alluvial fans in the Basin and Range Province generally are composed of finer-grained deposits relative to Holocene fans (Mayer and Bull 1981). Relatively moist conditions during the late Pleistocene resulted in slopes being relatively stable and dominated by weathering, (i.e., transport limited). The transition to the Holocene brought relatively drier conditions as well as precipitation in the form of convective monsoon rainfall, both of which resulted in substantial hillslope instability and higher potential for transport of larger clasts (Bull 1991). The middle and late Holocene has been characterized by incision of distal fan surfaces and progradation of coarse-grained fan alluvium into valleys.

Proximal fan settings are dominated by channelized flow in braided channel networks. These areas are characterized by relatively high gradients, and thus the energy regime is also quite high. Most channels are active only during periods of relatively high runoff, and competence is often high enough to transport cobbles (64–256 mm) and periodically boulders (>256 mm). Debris flows are common forms of deposition in fan channels. The resulting relatively coarse-grained fan deposits are called fanglomerates, and have low potential for buried and in situ archaeological components because of the high energy depositional environment.

As gradient decreases down-fan, depositional energy also decreases. Relative to proximal fan settings, finer-grained deposits typically dominate distal fans. Alluvial deposition in distal fan settings is dominated by unconfined surface (sheet) flow emanating from distributary channels upslope. Fan channels may be present, and overbank flooding on the fan as well as along the axial stream may also contribute sediments. Trace amounts of coarse fragments may occur within sheetwash deposits, and lenses of relatively coarse channel deposits may also occur in stratigraphic sections. In general, distal fan deposits are composed primarily of sand and finer grains. Because of the periodic deposition occurring in this low to moderate energy environment, distal fans are excellent settings for archaeological site burial and preservation.

Channel and Floodplain Settings

Main channel and floodplain deposition is relatively common along the valley axis of semi-bolsons. Typically, modern ephemeral washes in southern Nevada are comprised of broad braided channel systems, with bars and swales made up of relatively coarse bedload alluvium. Bars become active during periods of high discharge and so at least periodically these settings are characterized by high depositional energy. Braided channel settings are thus not conducive to site preservation. Sites occurring in channel margin areas stand a much better chance for burial. When flow overtops the channel during flooding, overbank sediments are laid down in valley bottoms in what are called vertical accretion deposits on levees and floodplains. Energy dissipates away from channel, and as a result overbank deposits generally become finer away from main channel.

The Muddy and Virgin rivers are perennial streams, but overbank processes still play a primary role in deposition and is the primary mode of valley floor aggradation. Archaeological sites originally associated with valley bottoms in ephemeral and perennial stream settings stand a good chance for burial and incorporation into the stratigraphic record.

Eolian Settings

Eolian deposits are wind-blown accumulations of sand and silt. Dunes and sand sheets are the most common eolian landforms in southern Nevada. The downwind transport of sand (0.0625 to 2 mm) by saltation and surface creep leads to the formation of a variety of bed forms including ripples and

dunes. During high velocity wind storms, bed forms called granule ripples composed of coarse sand to granule size clasts (0.5 to 4 mm) have been known to form (Reineck and Singh 1980). Dune migration begins at the point when windward-face erosion, wind eddy sand trapping, slope overloading, and avalanches combine to cause repeated slip-face avalanches in a downwind direction. Transported sand can also be trapped in sheets behind more permanent obstructions, creating sand shadows that do not migrate. Sand sheets form due to the same processes as dunes, but occur where grain size is too large or wind velocities are too low for dunes to form. Eolian sand deposits have the potential to bury and preserve archaeological occupation zones.

Sheet-like eolian mantles on various landforms are too small for mapping at the scale of House et al. (2010), but are locally important to the burial of archaeological components. Sand sheets often occur in interdune settings where they merge with dunes and sometimes are interbedded with local alluvium, interdune playa, and slopewash. Extensive loess deposits are not mapped in southern Nevada, but Haynes (1967) considered the trapping of silt and clay by vegetation a primary mechanism in formation of spring mounds in the Tule Springs area.

Eolian deflation results in the formation of lag deposits, coarse-grained residue consisting of particles that are too large to be transported by wind, such as very coarse sand to boulder size clasts (1 to >256 mm). When wind regimes increase to a point where bed load transport (i.e., saltation and surface creep) is a prominent process, deflation of finer material occurs. The result is a thin, centimeter thick, deflation zone known as a serir deposit. Serirs consist of coarse sand and granules overlying other substrates including finer sands. Regionally correlatable serir deposits, called paraconformities, have been identified in the geologic record (Kocurek 1981).

Colluvial Settings

Colluvial processes involve gravity operating on slopes, and include creep, slumps, slides, flows, and falls. In Clark County, only a few areas of colluvium are mapped by House et al. (2010), and most are cofined to mountain fronts. None are mapped in basins. While colluvial deposits may occur locally, none have been described in geoarchaeological contexts. Moreover, colluvial processes typically are not conducive preservations of component integrity due to the high energy depositional energy regimes and resultant destruction of context and association.

Footslope and Toeslope Settings

Footslope settings occur between alluvial floodplain or terrace settings in the valley bottom and steeper slopes dominated by colluvial deposition. Footslope settings are dominated by co-alluvial processes (Mayer et al. 2010) including slopewash, rill, and small intermittent stream deposits including debris flows. Like alluvial fans, footslope deposition becomes finer downslope. Burial of archaeological zones is possible and preservation is often dependent on the energy of the depositional medium; slopewash provides good to moderate preservation, while intermittent channel and debris flow units are less likely to preserve behavioral context and association.

Lacustrine (Playa) Settings

Lacustrine processes involve standing water affected by wind-initiated wave action. Large late Pleistocene pluvial lakes were located north of the study area, and extensive conspicuous lacustrine shorelines are absent from the project area. However, playa and marginal playa deposits similar in scale to those studied by Dickerson (2006) on Nellis Air Force Base do occur in large basin floor settings such as in the El Dorado, Indian Springs, Ivanpah, and upper Las Vegas valleys.

Deposition in playa settings consists of relatively fine-grained clastics and chemical precipitates. Clastic particles may settle out of floodwaters, but may also be eolian (loess) additions that are trapped during periods of standing water. Along playa margins, vegetation serves as an important mechanism for trapping dust. Archaeological sites situated along playa margins may be buried under stratified fine-grained lacustrine deposits or under eolian deposits on leeward margins.

Spring and Seep Settings

By definition, spring settings occur around active or extinct springs and/or areas where the water table is high. Many springs in the project area are fault-controlled (Haynes 1967). Wetland vegetation communities around springs often form dense canopy covers that provide ideal locations for the trapping of loess (eolian dust). Over time, a mound of loess forms around the spring-seep. Black mats are relatively organic-rich deposits associated with springs in the Basin and Range Province (Haynes 1967, 2008; Quade et al. 1998); they may form through the subaqueous deposition of algae or decomposition of vegetation (both leaves and stems above and roots below ground) that forms organic-rich A and O horizons. In some cases degassing of carbon dioxide from supersaturated, carbonate-rich groundwater leads to the deposition of calcium carbonate at the spring orifice and spring tufa is formed. Water at the springs attracts humans and low depositional energy forming the spring mound provides a good setting for burial and preservation. Likewise, spring deposits may interfinger with relatively fine-grained deposits that are mapped generally as valley fills and are derived through various processes, but alluvial deposition related to spring discharge certainly plays an important role.

BACKGROUND TO SITE FORMATION PROCESSES

A discussion of pertinent aspects of site formation and destruction processes is presented here. The following categories (after Gifford 1978) are summarized: occupation trampling, post-occupational (preburial) dispersal, burial dispersal, and post-burial dispersal. Geoarchaeological contextual integrity is an assessment of the likelihood that artifacts are recovered near the location they were lost, discarded, or abandoned (behavioral context). As presented here, an assessment of high geoarchaeological context is an inference that the recovered cultural material is in near-behavioral context and is not vertically mixed with other cultural material that might be significantly younger or older. Moderate geoarchaeological context is reserved for cultural levels that might have relatively minor horizontal displacement and vertical mixing. An assessment of poor geoarchaeological context is used where there is evidence for significant post-occupational horizontal movement or where there is the potential for the mixing of occupation debris, which could have been deposited over a long time span.

Occupation Trampling

The magnitude of occupation trampling (treadage and scuffage) varies as a result of the texture of the substrate and the intensity of occupation traffic (Eckerle et al. 2011a; Schiffer 1987). Moisture content is also a factor (Deal 1985) in that the physical properties of sediment change when moist with some sediments becoming more plastic and deformable. Experimental studies indicate that an occupation "churn zone" is formed in loose substrates. Well-sorted sands produce the thickest trample zones, which range from 5 to 16 cm in thickness (Table 2.4) (Gifford-Gonzalez et al. 1985; Stockton 1973). Loamy sand will develop a 3- to 8-cm trample zone (Villa and Courtin 1983), whereas loams produce almost no churn zone (Gifford-Gonzalez et al. 1985). Clayey sediments, likewise, require extremely high levels of traffic or saturation to a mud state to produce any churn zone (Eckerle unpublished field observations). Pedestrian traffic on cobble or larger size clasts will not produce a trample zone at all (Hughes and Lampert 1977).

Table 2.4. Churn Zone Thickness and Predicted Archaeological Implications

Soil Texture	Common Depositional Environment	Churn Zone (cm)	Horizontal Scuffing	Ease of Cleaning	Identify Activities	Identify Domestic Areas
Sand	Eolian dunes, well sorted fluvial sands	5–16	Low	Low	High	Low
Loamy sand	Some slope deposits and alluvium	3–8	Moderate	Moderate	Moderate	Moderate
Sandy loam and finer	Overbank deposits, lacustrine deposits, and most slope deposits	<5	High	High	Low	High

Trample zones can be viewed as both a positive and a negative aspect of site formation. Churn zone development on a soft substrate has the effect of blurring the occupational record of stratified sites (Hughes and Lampert 1977; Villa 1982). The positive aspect of churn zones is that their formation quickly hides artifacts and makes them unavailable for site cleaning and secondary refuse disposal (Schiffer 1987). In addition, items are much easier to lose in soft substrates (Schiffer 1987). As a result there is a higher potential for discriminating areas of high primary-discard (lodges, hearth activity areas, etc.) from those of low primary-discard in soft substrates. Additionally, there is probably less scuffage (horizontal artifact dispersal due to foot traffic) on loose substrates than on firm ones because items are less likely to skid.

Post-Occupational Dispersal

Post-occupational (but preburial) dispersal can alter the contextual integrity of surface archaeological materials. In general, soft substrates tend to hold onto artifacts after they have settled into the substrate (Wandsnider 1988). Additional trampling by animals, slope processes, and eolian movement are the major categories of post-occupational dispersal. But even in environments with high populations of hoofed ungulates, trampling by animals is a slow process (Gifford and Behrensmeyer 1976).

Slope wash and colluviation are two common processes that transport surface artifacts. The process of colluviation occurs commonly on relatively steep (>15°) slopes (Rick 1976). Colluviation is gravity-driven transport in which heavier and denser materials move farther down slope than lighter, less dense items (Rick 1976). Slope wash, on the other hand, involves transport in a sheetflow layer of water during storms (Butzer 1982; Reineck and Singh 1980). It can occur on low angle slopes, especially if vegetation is sparse and infiltration levels are low. This type of transport follows hydrodynamic rules in that smaller, less dense material is transported the farthest down slope.

Eolian transport of surface artifacts can occur whenever windshear exceeds the hold of gravity (Bagnold 1941). This can be a major source of dispersal for small artifacts unless they quickly become buried (Wandsnider 1988). Eolian transport is not confined to dune fields but can occur whenever wind conditions are suitable. It is most effective on locations with minimal vegetation cover.

Burial Dispersal

Artifact dispersal occurs in most depositional environments (Butzer 1982). An exception to this is eolian silt (loess) environments. Lack of dispersal in loess is the result of low surface wind shear (because vegetation is usually present) and low impact energy of silt particles. Many surface sites on flat, vegetated surfaces are eventually, albeit slowly, buried by silt. Depositional environments can be ranked into two categories of potential burial dispersal. The relatively low energy category includes alluvial overbank, sheetflow (including slope wash), and eolian sand environments. The high energy category includes alluvial channel, debris flow, and colluvial depositional environments. For most sediments entrained by water and air, artifact movement is a function of size and density (Gifford and Behrensmeyer 1976). The size distribution of depositional clasts within transported sediment provides a baseline for estimating artifact transport during burial (Frison et al. 1988). Artifacts up to the size of the coarsest natural clast in the natural deposit have potentially been moved along with the deposit. So, if natural clasts up to 2 cm diameter in size occur as part of a natural alluvial deposit, then it is likely that artifacts up to a similar size were transported away from their behavior position during the depositional event.

Post-Burial Dispersal and Alteration

A wide range of processes can act to disperse and alter archaeological remains after burial. Erosion and subsequent redeposition can produce a secondary deposit that preserves little or no behavioral context (Butzer 1982; Schiffer 1987). In the event that a site is buried in more or less primary context, archaeological components may still experience several biogenic and geogenic dispersal processes. The subsurface matrix surrounding artifacts is dynamic. There is constant mixing by soil

forming processes related to plant growth, animal and insect burrowing; and the matrix expands and contracts due to wet-dry and/or freeze-thaw cycles. These post-burial effects are cumulative and can partly modify or completely alter the original context of archaeological sites. Post-burial processes are briefly outlined here; more complete discussions can be found in Butzer (1982), Schiffer (1987), Waters (1992), and Wood and Johnson (1978). Archaeological components in saturated environments are also considered.

Expansion and contraction of the soil and sedimentary matrix are the result of freeze-thaw (cryoturbation) and wet-dry cycles. Although much of the project area is in a warm climate, it does contain small areas of alpine and subalpine terrain where soil freezing can be intense. Cryoturbation is most prominent in fine-grained deposits where freezing temperatures are sustained for long periods, and where soil moisture is abundant (Kessler and Werner 2003). The net effect of this process is upward movement of artifacts, possibly to the point of being ejected onto the ground surface. Work on high altitude sites in the Colorado Front Range suggests artifacts with longer axes and larger surface areas are more quickly displaced by cryoturbation than are smaller ones (Benedict and Olson 1978). Cryoturbation may not only destroy archaeological contexts, but it may also damage artifacts through abrasion as they move through the matrix.

Depending on the original context of archaeological remains, wet-dry cycles can have similar effects as cryoturbation. Wetting and drying is most prominent in Vertisols (self-swallowing), soils composed of expandable clay minerals (argilliturbation) with pronounced wet and dry seasons (Soil Survey Staff 1999). During dry periods, desiccation cracks penetrate into the subsoil, and artifacts and other material on the surface may fall into the cracks. Likewise, the matrix swells upon wetting, and artifacts in a buried context can be jacked upwards in the matrix, and may be ejected onto the ground surface. Surface evidence for ongoing shrinking and swelling of clay-rich soils are patterns of mounds and depressions referred to as gilgai. Continued wet-dry cycles can destroy stratigraphy and soil horizons, and can modify or completely alter the spatial relationships among artifacts.

Bioturbation is a broad category of physical mixing processes resulting from plant growth (floralturbation) and burrowing organisms (faunalturbation). Floralturbation is most common in areas of tree and/or shrub growth, and includes disturbances of archaeological sites by root growth and decay and tree-throw. Probably the most damage to archaeological sites by floralturbation is caused by tree-throw, which occurs especially in the higher elevation forests in the project area. As trees are toppled by heavy winds and/or gravity, large craters form where the root mass is upturned (Gabet et al. 2003). Depending on the size of the tree and root system, the craters can be several meters across. In heavily forested areas, tree-throw can obliterate stratigraphy and modify or destroy the context of even large archaeological sites.

As summarized by Waters (1992:309-310), faunalturbation results from mixing due to burrowing vertebrates (mammals, amphibians, birds, and reptiles) and invertebrates (arthropods, earthworms, and crustaceans). The degree of faunalturbation at any given site depends on the type and number of burrowing animals present, as well as the nature of subsurface deposits. Nevertheless, the end result is partial or total disturbance of archaeological contexts. In deposits that are resistant to collapse, burrows are in-filled with overlying sediments, forming krotovina that are discernable from the surrounding matrix by differences in texture, color, and/or compaction. In less-compact deposits, such as recent dune sands, burrows may collapse and fill with similar surrounding matrix, making them difficult to discern. Several generations of cross cutting burrow systems may move even large artifacts. Burrowing by pocket gophers, for example can concentrate large stones and artifacts at the base of the zone of maximum bioturbation (Johnson 1989).

Saturation is an important post-burial process in seasonally or perennially wet settings. As a rule, saturated settings tend to produce remarkably well-preserved organic archaeological materials. In a comparison of archaeological materials from sites in Europe, Coles (1987) demonstrated that sites in wetland and dryland settings are characterized by similar preservation of the non-organic components (i.e., stone, flint, bronze, glass, and pottery), but wetlands contain substantially more organic remains (dung, antler, wood, skin, basketry, etc.). Nevertheless, preservation or degradation of organic remains in saturated environments is variable (Caple 2001; Coles 1987; Cronyn 2001), and depends largely on the

local characteristics of the "burial context", which is characterized by a host of biological, chemical, and physical processes (Raiswell 2001), each of which may vary temporally and spatially.

As mentioned by Holliday (2004:266), draining of wetlands, either as a result of land use or natural environmental change, results in decomposition and oxidation of organic matter. Although few studies exist that examine such phenomena, the result is likely detrimental to organic archaeological components (Van Heeringen and Theunissen 2001). One result of dewatering of organic sediments is compaction. For example, at the Lubbock Lake archaeological site in Texas, skeletal remains of an adult *Bison antiquus* from a Paleoindian level in compacted marsh sediments were crushed to ~2 cm thick (Johnson 1987).

SUGGESTIONS FOR DOCUMENTING EVIDENCE FOR THE PRESERVATION OF SPATIAL CONTEXT AND ASSOCIATION

As discussed previously, cultural (occupant discard, pedestrian trampling, reoccupation), geological, and soil formation processes modify the spatial relationships of primary human behaviors of interest to archaeologists (e.g., butchering, plant processing, cooking, site spatial organization). Seeking to understand site formation and site destruction processes forms one of the major goals of archaeological middle-range theory (along with experimental archaeology and ethnoarchaeology). This understanding enlightens the interface between the natural environmental setting (climate, geology, soils, fauna, flora) and the archaeological record including site preservation or destruction. However, applying this knowledge within a research or cultural resource management setting is not necessarily obvious. It is important to develop testing and excavation methodologies that bridge site formation (middle-range theory) and lead to the evaluation of cultural zone context and association (integrity) during testing and excavation (Eckerle et al. 2011a and b).

Relatively intact subsurface occupation zones are those that fall within the predicted thickness range for the sediment occupation substrate texture. In addition, an intact occupation zone would (1) have random/non-patterned artifact orientations (i.e., show little evidence for preferred artifact orientation that might indicate water or wind transport or other redeposition); (2) contain artifact refits that suggest little winnowing by geological transport; (3) contain <50 percent bioturbation and hopefully even less; and (4) represent a limited temporal span of occupation as documented by upper and lower bounding dates (either radiocarbon or OSL) that statistically overlap.

SITE BURIAL AND EROSIONAL PROCESSES IN SOUTHERN NEVADA

This section examines the depositional processes summarized above in the context of archaeological site formation in the southern Basin and Range Province, with the goal of creating a general model of site burial and erosion. In particular, we focus on alluvial piedmonts and basin floors. To augment the generalized model, we discuss sites that have undergone geoarchaeological investigations and represent good archaeo-stratigraphic examples of components occurring in the various depositional environments (Table 2.5). Moreover, depositional processes are correlated to the surface geologic units defined by House et al. (2010), which are in turn correlated to common semi-bolson landforms described by Peterson (1981) (Table 2.3).

Potential for in situ site burial varies on alluvial fan surfaces. As discussed above, depositional processes on upper fan surfaces are relatively high energy, so these settings are not conducive to in situ site burial and preservation. In addition, fan deposits occurring along valley margins can be relatively old, especially when the fan head distributary channel is incised below the fan surface. With the exception of areas undergoing recent eolian depositions, archeological sites in proximal fan settings stand little chance of deep (>0.5 m) burial.

Valley bottoms are locations of ongoing alluvial deposition, often involving lower energy processes and relatively fine-grain deposits. This includes the distal margins of alluvial fans. Late Pleistocene and younger surface units that fall into these settings in Clark County are alluvial valley deposits (Avi and Avy) that correspond to fan piedmont, fan skirt, and terrace landforms (Table 2.3).

Ongoing sheetwash and overbank deposition are dominant depositional processes in these valley bottom settings, and are among the most favorable to burying sites more or less in situ. As mentioned previously, chronostratigraphic records indicate that distal fans prograded into valleys during the Holocene, probably due to entrenchment on upper fan surfaces (Mayer and Bull 1981). One result was ongoing deposition on fan skirts during the middle and late Holocene. Because of the proximity to the axial stream, fan skirts may also experience deposition by periodic overbank flooding. Springs situated on fan piedmonts and fan skirts can also contribute alluvial sediments. The stratigraphic result is interfingering sheetwash, overbank, and sometimes channel deposits. Likewise, the interactions between distal fan and axial stream processes result in gradual rather than abrupt transitions from fan skirts to toeslopes, that is, floodplains and terraces.

Several excellent examples of buried sites in fan skirt settings have been studied in southern Nevada (Table 2.5). In the pasture area at Corn Creek (26CK2605), buried Middle and Late Archaic and Ceramic features were associated with interfingering sheetwash, overbank, and channel deposits under a fan skirt surface adjacent to Corn Creek Spring (Roberts and Lyon 2011). One of the buried Archaic features yielded a ^{14}C age of ~3785 B.P. The late Holocene fan deposits apparently overlie older (late Pleistocene) fan deposits. In the parking lot area at Corn Creek (26CK2605), Virgin Anasazi features occurred in similarly interfingering deposits. One feature yielded an age of ^{14}C age of ~1680 B.P. In the Clark County Wetlands Park, several features yielding late Holocene ^{14}C ages were excavated in deposits composed of sheetwash interfingering with Las Vegas Wash alluvium (Finley et al. 2009; Kolb et al. 2010). Pithouses, storage pits, and hearths at the Larder (26CK6146) and Scorpion Knoll (26CK6147) sites were excavated in fan sheetwash overlain by overbank alluvium, indicating that flooding along Las Vegas Wash was contributing sediments quite recently (<~1000 B.P.). At the Fairbanks Springs site (26NY1729) in the Ash Meadows Wildlife Refuge, sheetwash and sheetwash-reworked eolian sand in sideslope and toeslope settings adjacent to Carson Slough contained buried features producing ages of ~470 B.P. and ~1960 B.P.. Prior to the work along Carson Slough, Mehringer and Warren (1976) found interbedded peat and eolian dune sand containing stratified late Holocene archaeological components. Thus, eolian deposition probably was occurring along Carson Slough periodically during the late Holocene with slope processes subsequently (and perhaps simultaneously) reworking sand downslope.

Stream incision isolates former floodplain and fan skirt settings from active channel processes, and reduces the importance of overbank flooding to deposition. Once a stream achieves grade and energy is no longer expended toward incision, lateral migration becomes important. Although incision may isolate sites in former floodplain deposits, lateral migration and removal of alluvium may ultimately negatively impact sites. While this process is convenient in regards to the discovery of sites through archaeological material observed in cutbank exposures, at least some portions of the sites are probably lost to erosion.

Recent incision along lower Las Vegas Wash has exposed several meters of late Holocene alluvium containing archaeological remains, indicating regular use of the wash by prehistoric groups (Ahlstrom 2008b). Alluvium consisting of stratified upward fining deposits indicates that, prior to the recent incision; the floodplain of lower Las Vegas Wash was undergoing gradual alluviation by overbank flooding during the last 3000 years (Buckingham et al. 2004). Along the Muddy River, a cutbank exposed a pit feature that was radiocarbon dated to ~2000 B.P. (Ahlstrom et al. 2001). The dated feature was in fine-grained alluvium at a depth of 4.8 m below the floodplain surface. Historical and stratigraphic evidence indicates that prior to recent incision, the Muddy River floodplain surface was at least locally characterized by marshes (Ahlstrom et al. 2001).

In eolian settings, burial and incorporation of archaeological material occurs by dune movement and/or accumulation on sand sheets. Sand shadows provide unique settings for the preservation of buried archaeological information because accumulation of sand exceeds erosion. Dunes can be relatively complex, with erosion and deposition separated by short distances. In addition, scouring and deflation due to eolian erosion can occur prior to or after burial, or both. Blowouts littered with artifacts attest to this in

Table 2.5. Summary of Previous Geoarchaeological Studies in Southern Nevada.

Report Year	Who	Project Location	Site	Depositional Setting	Landform	Component	Component Context
1976	UNLV/ NPS	Ash Meadows Wildlife Refuge	Geological trenching and archaeological observations at several localities	Interbedded eolian and paludal deposits	Primarily eolian dunes and cienegas	Several components	Defined several episodes of eolian activity and peat formation occurring contemporaneously during the last 5300 years; several pre-ceramic and ceramic late Holocene archaeological components were observed in the in the eolian dune stratigraphy.
1990	DRI	Same	Archaeological survey and testing as well as geo-archaeological trenching in several localities	Interbedded eolian, alluvial slopewash, and paludal deposits	Primarily eolian dunes, piedmont slopes, and cienegas	Several components	Determined that Holocene deposits in Ash Meadows fall into four discrete groups: pre-5300 B.P., 5300–2000 B.P., 2000–400 B.P., post-400 B.P.; these chronostratigraphic conclusions fall well in line with the original work of Mehringer and Warren (1976); most buried and stratified components are late Holocene and occur in large eolian dune fields and sand sheets; older sites, if present, are likely deeply buried and/or occur on older piedmont slopes.
2010	HRA / WGR	Same	Fairbanks Springs site (26NY1729)	Alluvial: sheetwash	Sideslope and toeslope/terrace adjacent to Carson slough	~470 B.P. and ~1960 B.P. from buried features elsewhere in site area.	Holocene sheetwash and sheetwash-reworked eolian sand; buried and sheetwash components associated with sandy sheetwash; Mehringer and Warren (1976) found interbedded peat and aeolian sand (reworked?) throughout the late Holocene as well as stratified late Holocene occupations (<4500 B.P.) in eolian dune sand.
2003	HRA / WGR	Desert National Wildlife Refuge, Corn Creek dunes	Corn Creek (26CK2605)	Eolian dunes	Eolian dunes on relatively fine grained distal fan skirt adjacent to Corn Creek Springs	Several middle and late Holocene features discovered in previous investigations; surface and subsurface	Initial work by Williams and Orlins (1963) reported hearths in surface context; Haynes (1967) reported several dates on buried hearths between 5000 and 4000 B.P..
2011	HRA / WGR	Desert National Wildlife Refuge	Corn Creek (26CK2605): Pasture	Alluvial: interfingering sheetwash, overbank, and channel	Distal fan skirt adjacent to Corn Creek Springs	Ceramic and Middle and Late Archaic, ~3785 B.P.	Interfingering late Holocene sheetwash, overbank, and channel deposits underlying an alluvial fan; late Holocene deposits overlie fan deposits with stage II carbonates (late Pleistocene?).
2011	HRA / WGR	Desert National Wildlife Refuge	Corn Creek (26CK2605): Parking lot	Alluvial: interfingering sheetwash, overbank, and channel	Distal fan skirt adjacent to Corn Creek Springs	Far Western Puebloan (Virgin Anasazi); ~1680 B.P.	Interfingering late Holocene sheetwash, overbank, and channel deposits underlying an alluvial fan.

Report Year	Who	Project Location	Site	Depositional Setting	Landform	Component	Component Context
2009	HRA / WGR	Clark County Wetlands Park (In HRA Persistent Place report)	Larder (26CK6146)	Alluvial: sheetwash and overbank; overlain by recent eolian	Distal fan skirt adjacent to Las Vegas Wash; fan footslope is buried by overbank alluvium	Storage pits and hearths; Ceramic (400 B.P.) and Terminal Archaic (2000 and 1300 B.P.)	Late Holocene fan sheetwash and channel alluvium overlain by recent eolian sand and overbank alluvium.
2010	HRA / WGR	Clark County Wetlands Park	26CK6139	Alluvial: interfinger-ing fan and stream	Distal fan skirt adjacent to Las Vegas Wash; fan footslope is buried by overbank alluvium	Prehistoric and Historic	Cultural staining (~1600 B.P.) occurs at ~50 cmbs in fine sandy massive overbank deposits from Las Vegas Wash that is overprinted with Bw horizon development. LVW overbank alluvium interfingers and buries fan alluvium.
2009	HRA / WGR	Clark County Wetlands Park (In HRA Persistent Place report)	Scorpion Knoll (26CK6147)	Alluvial: sheetwash and overbank; overlain by recent eolian	Distal fan skirt adjacent to Las Vegas Wash; fan footslope is buried by overbank alluvium	Pithouses, thermal features, and storage pits; Early Pithouse (~1200 B.P.)	Geology very similar to the Larder Site (Late Holocene fan sheetwash and channel alluvium overlain by recent eolian sand and overbank).
2009	HRA / WGR	Clark County Wetlands Park (In HRA Persistent Place report)	26CK6007	Alluvial: interfingering fan and stream	Inset alluvial fan toe/terrace along Las Vegas Wash at confluence with Three Kids Wash	Prehistoric	Interfingering axial stream and fan deposits: stratified overbank, channel, and debris flow (fan).
2007	HRA / WGR	Clark County Wetlands Park	Bishop Ranch and Glendale Farms (26CK6001)	Alluvial: fan overlying stream	Stream terrace adjacent to Las Vegas Wash	Historic	Fan sheetwash overlying stratified overbank silts and very fine sands and lenses of channel sands and gravels; historic component buried in recent overbank and sheetwash.
2002	HRA / WGR	Tule Springs Harry Allen Powerline	Tule Springs Archaeological District	Alluvial and eolian dominant	Upper Las Vegas Wash	various	Bajada is composed of gravelly Holocene and Quaternary fanglomerates; fine-grained latest Pleistocene and Holocene spring/wetland deposits in valley bottom; undifferentiated Holocene coarse to fine alluvium, eolian sand and slopewash sand and silt comprise most of valley bottom deposits.
2010	HRA / WGR	Sandy Talus, Grapevine Wash	42WS1802	Alluvial: slopewash	Slope below sandstone cliff overhang	Ceramic	Virgin Anasazi occupation within colluvial rock fall and slopewash-reworked eolian sand.
same	HRA / WGR	same	42WS1803	Eolian, overlying alluvial	Dune covered interfluve	Ceramic	Virgin Anasazi occupation occurring on surface and to a depth of 10cmbs; stratigraphy varies, but typically late Pleistocene alluvium overlain by Holocene mixed eolian and sheetwash.

Report Year	Who	Project Location	Site	Depositional Setting	Landform	Component	Component Context
same	HRA / WGR	same	42WS1804	Mixed eolian and sheetwash overlying alluvium	Dune covered interfluve	Ceramic	Virgin Anasazi occupation occurring on surface and to a depth of 38 cmbs; Holocene alluvium overlain by sheetwash and eolian sand.
2001	HRA / WGR	Coral Canyon I: Cottonwood Wash	42WS1219	Eolian, overlying alluvial	Eolian sand covered interfluve between Cottonwood Wash in a tributary	Late Prehistoric (~200 B.P.) and Archaic(?) (~5430 B.P.)	Between 2 and 6 m of eolian sand overlie Pleistocene gravels; the late Prehistoric and Archaic component at depths of ~25 cm and ~75 cm in eolian sand.
same	same	same	42WS1233	Eolian	Eolian sand covered bank of ephemeral tributary of Cottonwood Wash	Archaic(?) (~3080 B.P.)	Several eolian units and at least two buried soils; a cultural feature dated at ~3080 B.P. at ~35 cmbs in a Bwb horizon.
2002	HRA / WGR	Coral Canyon II	42SW1220	Eolian	East side of Cottonwood Wash;	Ceramic (Virgin Anasazi and Southern Paiute)	Lower component includes staining in eolian sand with Bw soil; upper component includes staining in eolian sand.
same	same	same	42SW1221	Eolian	Hillslope adjacent to arroyo tributary of Cottonwood Wash	Lower (~6270 and 6340 B.P.); Upper (~3850 B.P.)	Lower component includes staining in eolian sand with Bw soil and Stage I to I+ carbonates; upper component includes staining in eolian sand.
same	same	same	42SW1222	Eolian	Hillslope adjacent to arroyo tributary of Cottonwood Wash	Lower (~6080 B.P.); Upper (~3910 B.P.)	Lower component includes staining in eolian sand with Bw soil and Stage I to I+ carbonates; upper component includes staining in eolian sand.
2007	HRA / WGR	Warm Springs	42WS1748	Eolian, overlying older alluvial	Alluvial terrace along Mill Creek	Humboldt point; subsurface feature dates to Archaic/Virgin Branch Anasazi	Holocene eolian sand overlies late Pleistocene/earliest Holocene alluvial gravel; feature in middle of eolian sequence dates to ~2110 B.P.. Subsurface material concentrated in a zone 50 cm thick.
same	same	same	42WS4466	Eolian, overlying older alluvial	Pediment mantled by an alluvial fan adjacent to Mill Creek	Pinto	Holocene eolian sand overlies Pleistocene(?) fan gravels capping pediment surface. Early Archaic Pinto component at 15-20 cmbs in eolian sand.
same	same	same	42WS4468	Eolian, overlying older alluvial	Pediment mantled by an alluvial fan adjacent to Mill Creek	Ceramic (Southern Paiute)	Holocene eolian sand overlies Pleistocene(?) fan gravels capping pediment surface. Extensive surface Ceramic component but probably no subsurface.
same	same	same	42WS4478	Eolian, overlying older alluvial	Dissected pediment along ephemeral tributary of Mill Creek	Pre-ceramic?	Holocene and late Pleistocene eolian sand (possibly partly spring-related) overlying fan gravels; lithic debris occurs in surface and probably subsurface context in eolian sand.

Report Year	Who	Project Location	Site	Depositional Setting	Landform	Component	Component Context
same	same	same	42WS4718	Eolian	Terrace surface formed by dissection of pediment along Mill Creek	Subsurface feature dates to Archaic/Virgin Branch Anasazi	Large surface scatter occurring on eolian sand; as many as 27 features occurring in subsurface context to depths of 50 cmbs in eolian sand.

dune fields throughout the west. Detecting deflation in the stratigraphic record often requires identifying paraconformities characterized by a concentration of coarse sand and granules. Determining the length of time across erosional contacts requires determining ages of sand above and below the stratigraphic contact.

Geoarchaeological examination of sites occurring in dune fields in southern Nevada include the Corn Creek Dunes in the upper Las Vegas Wash and Ash Meadows in the Amargosa Valley (Table 2.5). Williams and Orlins (1963) identified hearths and artifact scatters in surface context. Later work by Haynes (1967) presented several ^{14}C dates of buried hearths between ~5000 and 4000 B.P. More recent work at the site by WGR accompanied test excavations by HRA, Inc., Conservation Archaeology, and determined that additional eolian deposits with potential to contain cultural remains are fairly extensive (Eckerle 2002). As mentioned previously, work at the Fairbanks Springs site in Ash Meadows by Mehringer and Warren (1976) determined that several occupation levels occur in the dunes, and range in age from ~4450 to 200 B.P. This work was also significant because it revealed interbedded peat and eolian deposits, indicating eolian deposition occurring in conjunction with other modes of deposition. More recent work at the site described buried late Holocene features (<2000 B.P.) in slope-reworked eolian sand (Taddie et al. 2010). The results of geoarchaeological investigations at several sites in southwest Utah in conjunction with work by HRA, Inc., Conservation Archaeology are pertinent as well (Table 2.5). Eolian sand overlying older alluvium and slope deposits at sites in the vicinity of Cottonwood Wash and Mill Creek contained buried Archaic through Ceramic period components. The depth of burial of the components varied at the sites, but was typically <50 cm, though several meters of eolian deposits occurred locally.

IMPACTS OF GEOMORPHIC PROCESSES ON THE ARCHAEOLOGICAL RECORD

Depositional processes influence the archaeological record beyond the burial or erosion of cultural components. In particular, the geomorphic context of an occupation will also influence the preservation of various parts of the archaeological assemblage (e.g., lithics versus bone), as well as how multiple components relate stratigraphically to one another. Ferring (1986) presents a simple model of how sedimentation rate impacts occupations in alluvial settings (Figure 2.13), but the model also translates reasonably well to eolian settings. Under relatively rapid deposition, components show better stratigraphic isolation and preservation of perishable items such as bone and wood. In slowly aggrading settings, successive components may be superimposed and will show differential preservation of perishable items. Isolating contextual patterning among artifacts of individual occupations will be difficult at best in the latter example.

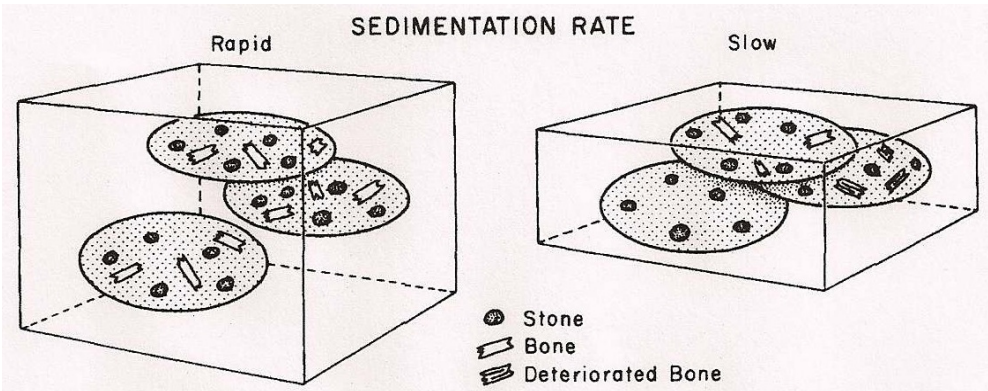


Figure 3. Schematic model of site formation. The same hypothetical occupation episodes are contrasted between settings with rapid and slow sedimentation rates. Note better superpositioning, spatial patterning resolution, and preservation in settings with rapid sedimentation.

Figure 2.13. Model of the effects of depositional rate on archaeological components (Ferring 1986).

We can also examine geomorphic impacts from the perspective of evolving landforms. In Figure 2.14, landforms and geomorphic surfaces hold varying potential for yielding stratigraphically isolated occupations, and thus offer varying potential for examining behavioral contexts. For example, occupation on the dune in the upland setting occurred while eolian sand was accumulating, and thus occupations are somewhat stratigraphically isolated. Deflation and formation of the blowout following the most recent dune occupation created a lag deposit incorporating material from all three components, which was buried during subsequent eolian activity.

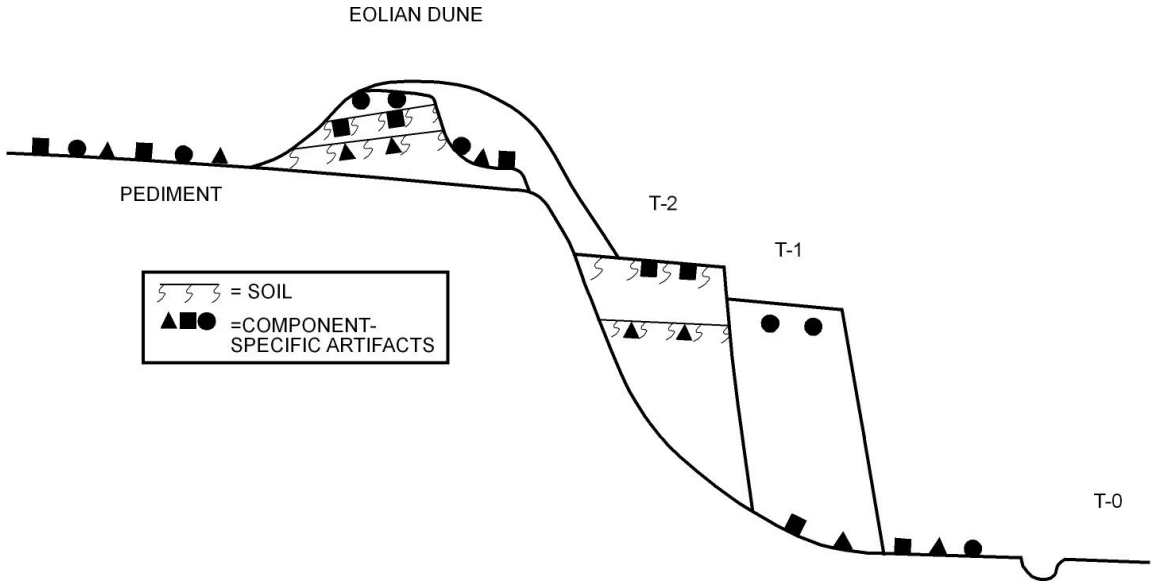


Figure 2.14. Hypothetical geomorphic cross section showing relationships of landforms, deposits, and archaeological components.

The alluvial setting illustrates a somewhat more complex scenario, where older and younger fill terraces have different archaeological potential. The first two occupations occurred successively during aggradation of T-2 alluvium. Subsequent degradation created the T-2 terrace and formed a lag deposit of at least a portion of both components. The most recent occupation occurred during aggradation of T-1 alluvium. Incision and establishment of the modern floodplain (T-0) created the T-1 terrace surface and a lag deposit incorporating material from all occupations.

The surface assemblages illustrated in Figure 2.14 hold differing potential for studying behavioral contexts. The pediment surface is older than all the occupations, and thus the assemblage represents a palimpsest of all the archaeological components. If, however, certain traits allow some spatial isolation of different components (i.e., lithic raw materials, ceramic types), then it may still be possible to pursue some meaningful study of behavior. On the floodplain (T-0) surface, materials from each component are redeposited, thus representing nothing in the way of a behavioral context.

Implicit to the simple alluvial example presented here is that each of the deposits has the potential to preserve in situ components of specific ages. For example, alluvium comprising the T-2 landform may contain buried and in situ occupations of the older two components, whereas T-1 alluvium will only contain in situ occupations of the youngest component. Thus, assuming the landforms are not isolated entities, it is possible to use the morphostratigraphic relationship to target a specific landform-sediment relationship for survey and testing to find components of particular interest. For example, if we are interested in the older component occurring in T-2 alluvium (the triangles), we can target the higher (older) terrace in the sequence.

SEDIMENT-LANDFORM RELATIONSHIPS IN SOUTHERN NEVADA AND THEIR GEOARCHAEOLOGICAL POTENTIAL

The review of late Quaternary surface processes and regional chronostratigraphy presented in this chapter allow for some general hypotheses about how landscape evolution has impacted the archaeological record in the study area. It must be stated that without systematic investigations aimed at understanding how geomorphic processes have impacted the archaeological record on a regional scale, establishing preservation biases is highly speculative and is subject to reinterpretation as new geoarchaeological data emerges.

Several studies have identified relatively fine-grained valley fill and spring mounds dating to the latest Pleistocene and early Holocene (Haynes 1967; Quade 1986; Quade et al. 1995, 1998). The stratigraphic record along valley axes indicates aggradation largely resulting from alluvial and paludal deposition during a period of increased spring discharge. Locally, up to 6 m of deposits accumulated between 11,000 and 8000 B.P. (Quade et al. 1998). In Clark County, the valley floor mapping units of House et al. (2010) are relatively widespread, especially in the upper reaches of drainages (Figure 2.12). This is significant because it implies that sediments exist in several valleys of the correct age and of appropriate depositional energy to contain buried Paleoindian components, though at present Tule Springs is the only site to have produced buried and in situ latest Pleistocene-earliest Holocene archaeological deposits. Whether or not the paucity of buried Paleoindian components is because they never existed or have not been found due to deep burial would require systematic survey of exposures along valley bottoms. Quade (1986) mentions that the upper Las Vegas Valley experienced drying and degradation beginning at ~7200 B.P.; this may have removed some early sites along valley bottoms.

In southern Nevada, eolian sand can overlie surfaces of varying ages across valley floors and piedmonts (Figure 2.12). Although eolian deposition probably occurred locally during the latest Quaternary, ^{14}C ages indicate that most of the existing eolian landforms are middle Holocene and younger. This is consistent with drying in basins beginning in the middle Holocene, which supplied large amounts of sediment for eolian transport and deposition. Consequently, the majority of archaeological sites excavated in eolian settings are Archaic and younger. Eolian deflation has negatively impacted sites, but many appear to be at least partially intact in dune and sand sheets.

Sites in fan skirt and terrace settings indicate that periodic deposition occurred in distal fan and toeslope settings throughout the late Holocene. The majority of sites in these settings appear to be Ceramic Period in age, though a slightly older occupation is present in the pasture at Corn Creek. Interfingering overbank alluvium and distal fan deposits along lower Las Vegas Wash implies that axial valley bottoms were aggrading at the same time deposits were accumulating on fan skirts. The majority of ^{14}C ages from sites in these contexts are <2000 B.P. Radiocarbon ages from terrace exposures along the Muddy and Virgin Rivers indicate that floodplains were also aggrading during the late Holocene; archaeological sites older than ~2000 B.P. are not expected to be associated with these deposits.

In Clark County, late Pleistocene and older deposits are common in alluvial piedmont and valley settings (House et al. 2010), and similar deposits are probably common throughout southern Nevada. Regardless of depositional environment, buried sites are not expected in these deposits. These are old, relatively stable surfaces and archaeological components of any age are expected to occur in surface contexts, and palimpsests comprised of cultural materials of varying age are possible.

The chronostratigraphy in the Las Vegas Valley appears to reflect differential preservation. In particular, there is variability in the ages of alluvial units present along the upper part of the valley (upstream of Las Vegas) and the lower valley. Latest Pleistocene and early Holocene alluvial valley fill are present at Corn Creek Springs (Quade 1986) and Tule Springs (Haynes 1967) in the upper Las Vegas Valley. Radiocarbon dating indicates that alluvium exposed along the lower Las Vegas Valley is largely late Holocene (<2000 B.P.). Thus, although deeply buried Paleoindian sites are possible in the upper Las Vegas Valley, they are not expected in the lower Las Vegas Valley. Whether or not similar discrepancies exist between the upper and lower portions of other valleys in southern Nevada is currently unknown.

Constructing a formal archaeological model of the entire project area is beyond the scope of this chapter. As indicated above, however, it was possible to use Clark County surficial geology mapping (House et al. 2010) to tabulate and map areas more or less conducive to site preservation (Table 2.3; Figure 2.12). In summary, areas of high potential for preservation occur on latest Pleistocene and Holocene terraces, floodplains, fan skirts, alluvial flats, and playa margins containing relatively low energy deposits. Areas with moderate potential for preserving buried sites include those that contain significant areas of higher energy deposits and/or areas where much of the sediments accumulated earlier than the currently known age of human occupancy in the region. These areas include older fan piedmont, fan skirts, terraces, and playas. All other areas in Clark County are low potential and include bedrock, areas with sediment older than 15,000 B.P. including older fans, steep hill and mountains slopes, and interfluves.

A final comment is warranted regarding understanding the archaeological potential of regional stratigraphy. Establishing how geomorphic processes have filtered the archaeological record of southern Nevada requires a systematic study of all the major components of the landscape (i.e., alluvial, eolian). This should incorporate data generated in site and non-site settings. Archaeological sites are places selected by people for settlement, and it is important to understand how the stratigraphy, chronology, and paleoenvironments compare with areas not utilized by humans. Although there is a solid geoarchaeological database emerging in southern Nevada, there is still work that could be done to understand how geomorphic filters have altered the archaeological records and where elusive buried and in situ Paleoindian sites are to be expected, if at all. It is encouraging that the chrono- and lithostratigraphy at the Sunshine Locality in east-central Nevada reported by Huckleberry et al. (2001) is virtually identical to that in alluvial valleys in southern Nevada.

ACRONYMS

amsl – above mean sea level
CGDD - cumulative growing degree day
COHMAP - Cooperative Holocene Mapping Project
GCM - global circulation model
LGM - last glacial maximum
NCH - National Corn Handbook
NRCS - Natural Resources Conservation Service
OSL – Optically Stimulated Luminescence
SSURGO - Soil Survey Geographic database

GLOSSARY

O Horizon: Soil surface horizon dominated by presence of large amounts of organic material in varying stages of decomposition.

A Horizon: Soil surface horizon dominated by mineral matter mixed with decomposed organic matter, or "humus"; analogous to 'topsoil'.

B Horizon: Soil subsurface horizon characterized by accumulation of material such as clay and iron oxides.

Bt Horizon: B horizon characterized by an accumulation of translocated clay relative to underlying horizons.

Bw Horizon: B horizon characterized by minor structural development and/or reddening.

Chronostratigraphy: Grouping deposits into stratigraphic units based on time (i.e., the age of the deposit).

Morphostratigraphy: Establishing the relative ages of sediments based on their surface morphological (landform) relationships, i.e., terraces, moraines, etc.

Optically stimulated luminescence dating: A numerical dating method that measures "stored" electrons in mineral defects of sand or silt grains. Essentially measures the length of time a mineral grain has been buried from exposure to sunlight.

Teleconnection: The coupling of climate anomalies (i.e., atmospheric pressure and/or ocean temperatures) over large distances (i.e., 100s to 1000s of kilometers).

CHAPTER 3
LITERATURE REVIEW

Heidi Roberts

HISTORY OF ARCHAEOLOGICAL RESEARCH

This discussion is organized according to the four geographic regions—Western, Central, Southern, and Eastern, which are described in Chapter 1 (Figure 1.1). The project area is segmented into these regions because each area has experienced different levels of archaeological research and, one could argue, that after A.D. 200, they also have somewhat divergent culture histories. These discussions are further subdivided into three periods of research, each of which had unique goals and theoretical orientations. The primary objectives of the region's first archaeologists (see Appendix J), during the era of the Early Explorers, were to procure collections for museums, provide jobs during the Great Depression, develop tourism, and understand regional culture histories through artifact seriation methods. The University Era began in the 1950s after the use of radiocarbon and dendrochronology dating methods became widespread and led researchers to focus on the refinement of regional culture histories. During this period several pieces of legislation were passed protecting cultural resources. Many universities across the region established contract archaeology programs to meet the demand that these laws created for archaeological surveys and mitigation. When the "Newer Archaeology," with its focus on culture process and theory, swept the academic world in the 1980s, many university contract programs were dismantled and cultural resource management (CRM) compliance became privatized (Roberts et al. 2004).

Western Region

The Western Region encompasses the eastern edge of the Mohave Desert and three areas within this region have been the focus of intensive research—the Ash Meadows National Wildlife Refuge, the Yucca Mountain area, and the Nellis Air Force Range/Nevada Test Site (Figure 3.1). Ash Meadows National Wildlife Refuge is a lush concentration of springs, marsh plants, and mesquite trees in the Amargosa Desert. The Yucca Mountain area located northeast of Ash Meadows has been under study since the 1970s when it was selected as a potential nuclear waste repository (Buck et al. 1998). Nellis Air Force Range and Nevada Test Site have undergone considerable archaeological research to mitigate the impacts related to use as a military facility and weapons-testing range. Other areas, such as the modern communities of Pahrump and Beatty, contained flowing springs and important plant resources that made them attractive habitation areas (Fowler 2010; Steward 1938); however, little systematic archaeological research has been undertaken in either of these communities or their surrounding areas.

EARLY EXPLORERS (1900–1950)

Malcolm Rogers, of the San Diego Museum of Man, and Mark Raymond Harrington, of the Heye Foundation and later the Southwest Museum, began archaeological research in the Mojave Desert. Their work defined the major cultural periods of the region (McClellan et al. 1980). Rogers (1939, 1945, 1966) is best known for his classification of the three major cultural periods, which include the San Dieguito, the Amargosa, and the Yuman periods. Harrington also explored the Western Region, but he is better known for his work directing the Civilian Conservation Corps excavations of Lost City prior to the site's inundation by Lake Mead, as well as for his search for Pleistocene remains at Tule Springs and Gypsum Cave (McClellan et al. 1980).

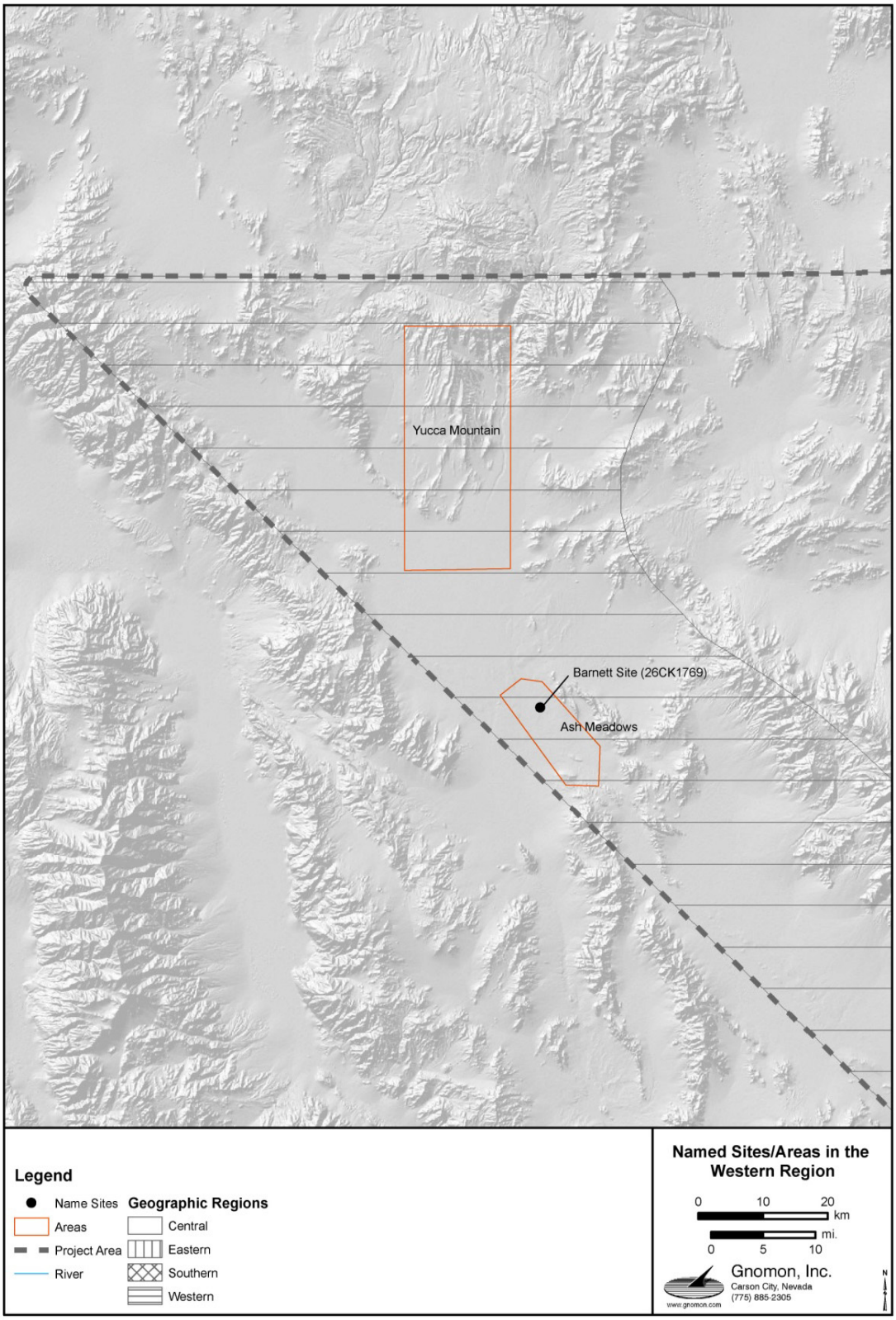


Figure 3.1. Important archaeological sites and locales in the Western Region.

Ash Meadows has long been known as an area that is rich in archaeological sites. Mark Harrington collected artifacts near Fairbanks Springs that included stone objects, pottery, shell beads, and arrow and knife points from two sites (26NY45 and 26NY46). Alice and Charles Hunt conducted the first systematic survey of Ash Meadows and adjacent areas in the early 1960s (Hunt 1960; Hunt and Hunt 1964). Charles Hunt, a geologist, made a reconnaissance survey of the area that resulted in a regional chronology (Hunt and Hunt 1964). The Hunts found no evidence of the earliest, Death Valley I (fluted and Lake Mojave points) tradition, but they identified the next period, Death Valley II (Pinto/Gypsum points) along the Amargosa River, and they found the most recent sites, Death Valley III (Saratoga Springs Period) and Death Valley IV (Shoshonean Period) around the large springs on the eastern part of the Refuge. The artifacts collected during these investigations were curated at the Death Valley National Museum (Hunt and Hunt 1964:3).

THE UNIVERSITY PERIOD (1950–1990)

The first recorded excavations in the region were at the Barnett site, conducted between 1968 and 1971 by Claude Warren and Peter Mehringer, Jr. The Barnett site was located approximately 650 meters southwest of Crystal Springs near the Refuge Office in the Ash Meadows National Wildlife Refuge. The site was discovered by Russell Hulse and reported to the University of Nevada after human burials were uncovered during backhoe leveling operations. Although the site was disturbed by plowing and grading, some pits and portions of the midden extended below the disturbance zone and were excavated. The site contained two hearths, three cache pits, and three human burials. Six radiocarbon dates were taken from charcoal recovered from the pits and midden (Appendix A). No ceramics were associated with the burials or the midden, but six Humboldt projectile points, a bone tool, two manos, and a metate were recovered from Burial 2 (Muto et. al. 1976).

The burials were inhumations placed in steep-sided pits that had been burned, presumably before internment. Although the skeletal remains were mostly decomposed, it was still apparent that Burial 1 had been placed in a sitting position facing southwest and that Burial 2 was also flexed and north facing. Burial 2 was a unique "shadow burial" where the remains were decomposed but "a 'shadow' of light colored sand [formed] where the bones had been." (Muto et. al. 1976:270). The bone tool recovered from this burial was probably a composite pressure-flaker made out of a sheep or deer rib. Radiocarbon dates on the charred materials associated with the burials yielded a calibrated date range of 200 B.C. to A.D. 260.

Except for a report on the burials (Muto et al. 1976) and an unpublished manuscript focusing on the geochronology discussed by Mehringer and Warren (1976) the excavations at the Barnett site were never reported in detail. A brief summary of the collections is provided on the University of Nevada, Las Vegas, Anthropology Department web site. According to this website (www.unlv.edu/depts/archaeology/ash meadows), the report by Mehringer and Warren (1976) and Hal B. Rager, who examined these collections recently as background research for his M.A. thesis (Rager personal communication 2008), at least three sites were excavated. The sites contained middens, occupation surfaces, hearths, and storage pits. The earliest site is represented by the Barnett site. Southwest of the Barnett site, two hearths were excavated at a site with Virgin Anasazi and Paiute ceramics. A radiocarbon date of 1280±110 B.P. was obtained from an area with extensive evidence of occupation, but no diagnostic artifacts were directly associated. A radiocarbon date from a second hearth associated with Paiute pottery provided a date of 220±100 B.P. A third date of, 440±220 B.P., was obtained from a charcoal sample taken from a backhoe trench placed in a sand dune. This sample was not directly associated with artifacts.

Artifacts collected by the University of Nevada during these excavations include 15,200 artifacts, faunal remains, and macrobotanical samples. According to the website the artifacts suggest "that people ate mesquite beans, squash, corn, pinyon nuts, and various other seeds. Chipped stone scrapers, projectile points, and burned faunal remains from fish, amphibians, and tortoise also show that the prehistoric people of this area had a rich and varied diet. Textiles, mats, and cordage tell of how people added comfort to their surroundings."

Soon after Ash Meadows became a wildlife refuge the Quaternary Sciences Center of the Desert Research Institute (DRI) entered into a cooperative agreement with Fish and Wildlife to sample the cultural resources within the refuge and develop a description of the Holocene environments there (Livingston and Nials 1990:1). Toward this goal, DRI conducted a sample survey of 26 40-acre sample units selected based on environmental zones and 10 40-acre judgmental sample units in areas slated for disturbance. Small prehistoric sites were found primarily in cienegas/marshes and on piedmont slopes and large sites occurred in aeolian dunes. Artifacts collected from the survey and test excavations at two sites suggested that people have lived in the Refuge for 4,000 years.

As part of these investigations Peter Wigand (1990) summarized the Late Pleistocene and Holocene vegetation history of Ash Meadows and Fred Nials conducted stratigraphic investigations to evaluate the Quaternary geology. Twelve backhoe trenches were excavated at seven "stratigraphic Localities" in the Refuge to provide stratigraphic exposures. Stratified cultural deposits were identified in the backhoe trenches at sites near Fairbanks Spring and Longstreet Spring. In a trench excavated at Fairbanks Spring (Livingston and Nials 1990: Figure 3.3), two cultural levels and a disturbed hearth feature were identified. Although these deposits were not radiocarbon dated it is likely that they represent prehistoric occupation surfaces or churn zones (Eckerle 2011a). Cultural strata were also identified in Backhoe Trench 4 excavated at Longstreet Dunes (Livingston and Nials 1990: Figure 3.5). A radiocarbon date of 1290 ± 80 B.P. was obtained from these ashy sediments. Artifacts were collected and test units excavated at several of the larger sites including Fairbanks Dunes (26NY1729), Peat Mine Dune (26NY5877), Anasazi Dune (26NY1724), and Longstreet Dunes (26NY1735).

DRI also led the archaeological investigations for the proposed Yucca Mountain Repository. The investigations included several large surveys across the repository area that resulted in the documentation of more than 900 archaeological sites and isolates. Other research included test excavations at more than 47 sites (Pippin 1984; Reno et al. 1989), a large data recovery project in Midway Valley (Buck et al. 1994; Buck et al. 1998), and a random sampling program to characterize the resources of the region (Buck et al. 1998). Most of the sites in the Yucca Mountain area were open camps and lithic scatters with no stratification. The largest, located in the main drainages, dated to the early Holocene. The rockshelters investigated contained shallow deposits associated with ground stone and brown ware pottery (Buck et al. 1998).

Archaeological research at the Nellis Test and Training Range began in the 1970s by Richard Brooks and the Archaeological Research Center at the Museum of Natural History (Bergin et al. 1979; Crownover 1981). The Range is the Air Force's largest training range and it encompasses more than three million acres of land in southern Nevada. The southern portion of the Range falls into the present project area. In the 1980s DRI performed many of the archaeological surveys and testing, and data recovery projects on the Range (Hicks et al. 1991; Livingston and Nials 1990; Pippin 1984, 1986; Pippin et al. 1982).

CRM PERIOD (1990–PRESENT)

Most of the archaeological projects conducted since DRI's investigations in Ash Meadows and Yucca Mountain have been small surveys related to Fish and Wildlife, Air Force, or other development projects. In Ash Meadows several of these surveys were conducted by LouAnn Speulda following wildfires and for other habitat and culture resource restoration projects. Her investigations resulted in excellent summaries of the histories of the Fairbanks, Longstreet, Point-of-Rocks, and Jackrabbit springs, which are briefly described below, and the restoration of Longstreet's Cabin (Lyon et al. 2008).

In 2007 HRA was hired to conduct an archaeological survey of 20,500 acres of the 22,000 acre-Ash Meadows Refuge. The goal of the survey was to provide Fish and Wildlife with information on the nature, significance, and distribution of the Refuge's culture resources so that they could be avoided during planned habitat restoration projects. During their survey HRA identified 250 sites and 368 isolates. Temporally diagnostic artifacts suggested that the Refuge had been occupied by Native Americans since the Paleoindian period. In addition to National Register recommendations, HRA conducted obsidian sourcing and hydration studies (Lyon et al. 2008), as well as compositional analyses of prehistoric pottery

by Margaret Lyneis and Thomas Hoisch (Lyneis 2011b), and test excavations in the vicinity of Fairbanks Spring (Eskenazi and Roberts 2011).

Since 1990 numerous archaeological surveys (Buck 1997; Duke and Slaughter 2000a and 2000b, Duke et al. 2001) and other investigations (Pippen 1997; York et al. 1996) have been conducted by DRI, Dames and Moore, Geo-Marine, Inc., HRA and a host of other private contractors on the Nellis Test and Training Range. In 1998, a management plan for the Range was developed and recent research focusing on the Range's obsidian sources have made important contributions to our understanding of trade patterns and regional prehistories (Haarklau et al. 2005).

Central Region

EARLY EXPLORERS (1900–1950)

Gypsum Cave, located less than 10 miles east of Las Vegas (Figure 3.2), was one of the first stratified rockshelters excavated in the Great Basin. Between 1930 and 1931, Harrington, then of the Southwest Museum, led an expedition financed by private donations to excavate the cave and hopefully recover evidence of man living alongside, and hunting, extinct Pleistocene mammals. In the winter of 1930, a camp was set up and excavation began, following mapping and establishment of a grid. The five stratigraphic levels excavated in the cave were called, from youngest to oldest, Layers 1 through 5. Layer 5 was covered by sloth dung. The five rooms comprising the cave were either partially or completely excavated.

Harrington (1933:190) interpreted the association with sloth dung as evidence of man in Gypsum Cave 13,000 to 15,000 years ago. Radiocarbon dating later disproved the association (Fowler and Madsen 1986:173), as sloth dung from the cave dated to 9700 and 6500 B.C., whereas dates from the artifacts fell in the range of 900 to 400 B.C. (Heizer and Berger 1970, cited in Fowler and Madsen 1986:173; Willig and Aikens 1988:7). The recent date on the atlatl dart that was associated with sloth dung hints at the use of older cave materials by the site's more recent occupants (Willig and Aikens 1988:7).

A comprehensive reevaluation of these collections by the Far Western Anthropological Group (Gilreath 2009) has shown that the focus of use was between 4,500 and 3,000 years ago. During the wetter conditions that followed the close of the middle Holocence, the cave served as a logistical camp for hunting forays. Other radiocarbon dates, including one from a fragment of a bound-weave basket that dated to 9,500 years ago and two dates with a range of A.D. 1000 to 1300 associated with occupation debris in the upper levels of Room 1, suggest other episodes of more sporadic occupation for the last 9,000 years. Today this site is considered the "type site" for the Gypsum style projectile points.

THE UNIVERSITY PERIOD (1950–1990)

The 1962–1963 Tule Springs expedition overshadowed all other archaeological research during the period from 1960 to 1980. Spurred by Harrington and Simpson's (1961) claim that man and Pleistocene mammals were associated near Tule Springs (Figure 3.2), the expedition hoped to verify the presence of early man in Las Vegas. The Tule Springs site was first discovered in 1933 during a paleontological expedition by the American Museum of Natural History. Fenley Hunter, who financed and organized the expedition, found an obsidian flake in a deeply buried charcoal and ash layer containing remains of extinct animals (Harrington 1985:223–224; Shutler 1967:3). Upon hearing of the finding, Mark Harrington, of the Southwest Museum, applied for excavation permits and, with Fay Perkins, visited Hunter's site in October 1933. They excavated two ash deposits that were associated with charcoal and two bone objects that Harrington considered tools. In 1955 the charcoal from these original expeditions was located by Ruth DeEtte Simpson at the Southwest Museum, and Harrington sent it to Willard Libby at the Institute of Nuclear Studies, University of Chicago (Harrington 1985:226; Shutler 1967:299) for radiocarbon dating. The largest Tule Springs expedition was born out of a meeting called by Willard Libby in 1962 to discuss "matters relating to better coordination and understanding of radiocarbon dating in relation to archaeology" (Shutler 1967:3). The participants of the meeting included

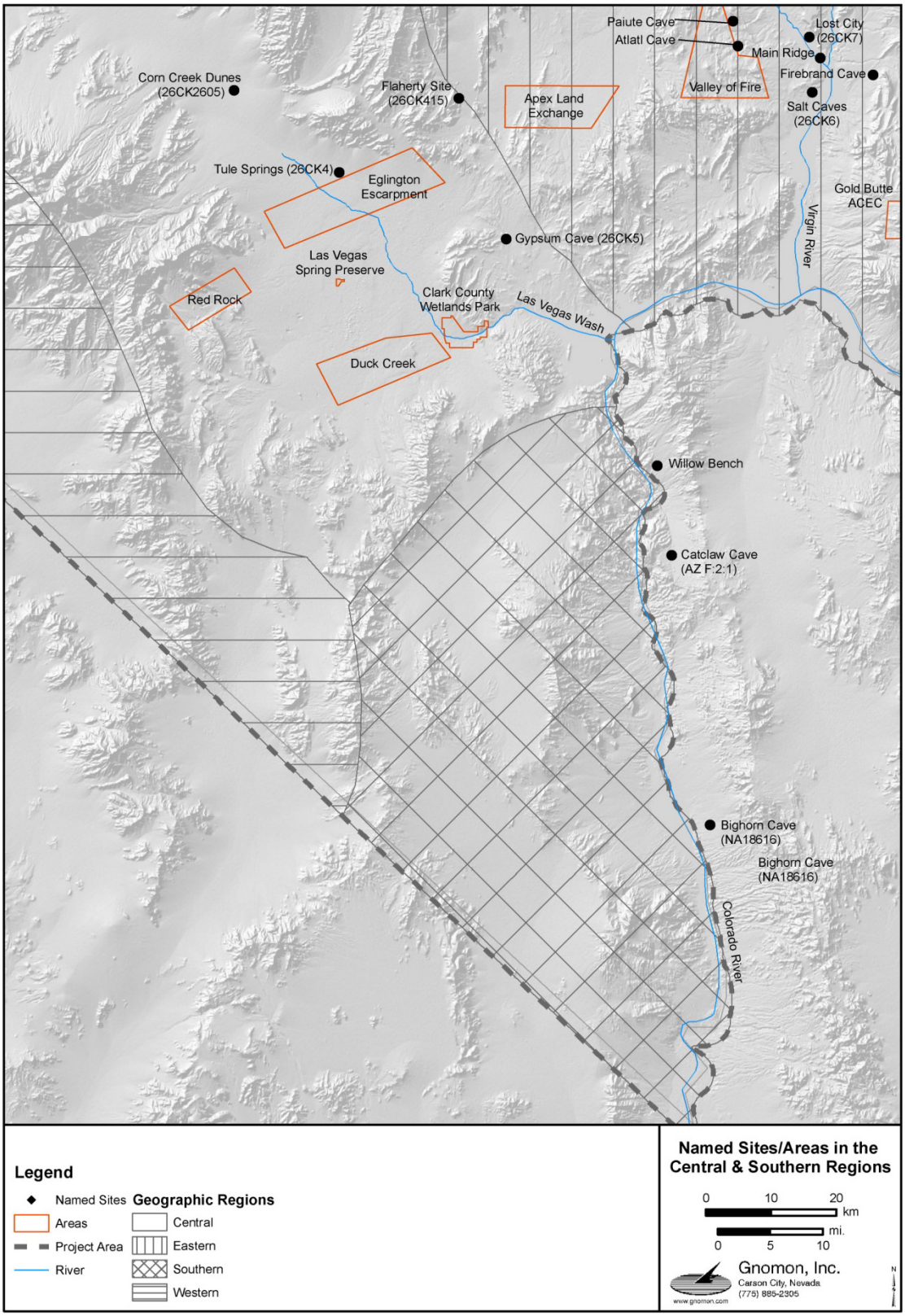


Figure 3.2. Important archaeological sites and areas in the Central and Southern Regions.

Desmond Clark, Robert F. Heizer, Willard F. Libby, Clement Meighan, Charles Rozaire, Richard Shutler, Jr., and Claude Warren. They agreed that Tule Springs was the best available candidate for a study on the topic of early man in the Americas. The complexity of Tule Springs' geology, paleontology, and archaeology made a multidisciplinary approach essential, and Heizer proposed that a "major effort be made to determine if man and Pleistocene fauna were contemporaneous at Tule Springs and, if so, on what time level" (Shutler 1967:3). Richard Shutler agreed to serve as director of the project and an advisory board was established.

Excavations began on October 1, 1962, and were continued through January 31, 1963. During the field season, 200,000 tons of overburden was removed, and two miles of trenches, 12 ft wide and up to 30 ft deep, were cut (Figure 3.3). At least 50 localities of bone and carbonized wood were excavated for evidence of associated tools, burning, cut-marks, and other evidence of human modification. Despite weeks of effort and, to the disappointment of many, the claim that artifacts were associated with extinct fauna could not be substantiated. Although Harrington and Simpson's earlier dates (>20,000 B.P.) were dismissed, evidence of man's presence in Tule Springs during the Paleoindian period (10,000–11,500 B.P.), consisting of five flakes and one scraper, was widely accepted (Wormington and Ellis 1967).

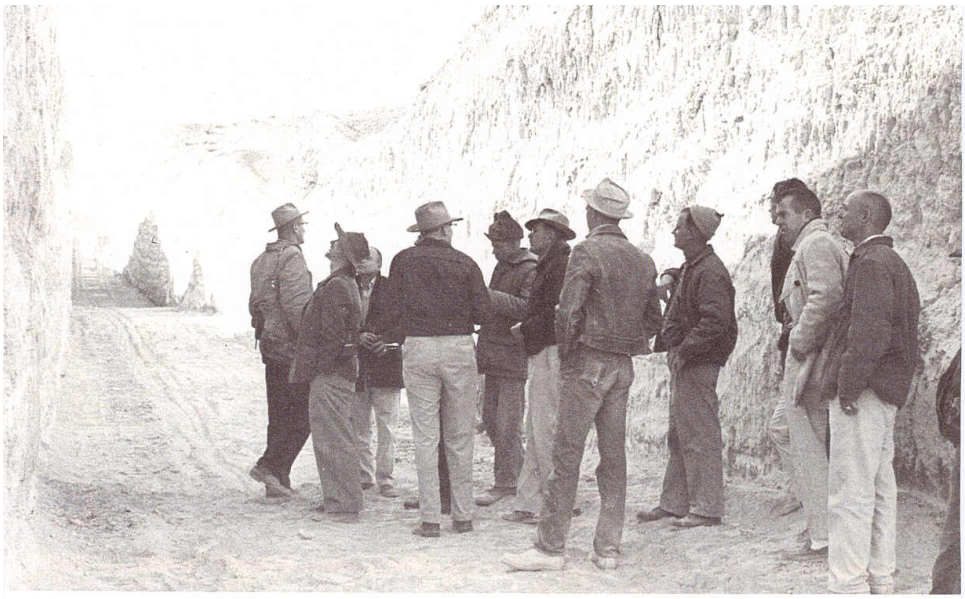


Figure 3.3. Photo of Vance Haynes conducting a tour in one of the trenches during the 1962–1963 Tule Springs Expedition (from Shutler 1967: Figure 5a).

Another important aspect of the project was an intensive surface collection of artifacts in the project area. At Shutler's request, Margaret Susia (Lyneis) performed an intensive survey of the Tule Springs area during the final six weeks of the project (Susia 1964). All surface artifacts previously located were collected, and Susia surveyed the area for additional artifacts. In her final report of these investigations, Susia (1964) convincingly argued that the artifacts represented use of the area during the Pinto period (7000–5000 B.P.) (Lyneis 1982b; Warren and Crabtree 1986).

As part of the Tule Springs Project, the Corn Creek Dunes (Figure 3.2) archaeological site was also explored and partially excavated (Williams and Orlins 1963; Wormington and Ellis 1967). After radiocarbon samples collected from two hearths produced two dates between 5300 and 4300 B.P., Shutler and Haynes decided that the site should be investigated further. Fieldwork was conducted at Corn Creek in December of 1962 and January of 1963. Seven radiocarbon dates obtained from the surface and buried features fall between 5300 and 3930 B.P.

Many of the other archaeological projects conducted in the region during the period from 1960 to 1980 were undertaken in an effort to save or salvage the area's important archaeological sites. The Berger site, an open midden located near the confluence of Duck Creek and Las Vegas Wash, was partially excavated by the Archaeo-Nevada Society, by Robert Crabtree of NAS, and by Richard Brooks for UNLV's field schools (Rafferty 1986:52). A large rockshelter, the Flaherty site, was also excavated in the 1960s by Richard Brooks, DRI, and UNLV. Although these excavations were not reported on until much later (Blair and Wedding 2001; Seymour 1997), the original notes and artifact collections are held at UNLV's Natural History Museum.

In 1962, Richard and Mary Elizabeth Shutler conducted an archaeological survey of Red Rock, located west of Las Vegas, that resulted in the recording of 18 archaeological sites, including mescal pits, petroglyphs, and campsites (Shutler and Shutler 1962). The ceramics found at the campsites suggested to the Shutlers that the area was used by Virgin Anasazi, Patayan, and Southern Paiute groups (Shutler and Shutler 1962:19). In 1972, Claude N. Warren, from the Department of Anthropology at UNLV, conducted test excavations in the Las Vegas-Big Springs vicinity in what is known today as the Las Vegas Springs Preserve, located east of the intersection U.S. 95 and Valley View. Warren's excavations located substantial, intact prehistoric and historic archaeological deposits at the Preserve. Also in the 1970s, Richard Brooks and students from the Archaeological Research Center (ARC) at UNLV carried out numerous surveys and excavations in the Spring Mountains (Rafferty 1984a:36). Some of these investigations were reported as student theses (Cunningham 1978; Larson 1978; Turner 1978).

In 1972, Claude Warren's UNLV Field School conducted a survey along the Duck Creek Drainage. Numerous sites were recorded and artifacts were collected from many of the recorded sites. During this period the Archaeo-Nevada Society was active in excavating the Berger site and other sites along the Eglington Escarpment that were in danger. In 1978 and 1979, the Nevada Archaeological Survey (NAS) of UNLV conducted test excavations at the Grapevine Springs site (26CK1333) (Crownover et al. 1978; Ellis et al. 1978) for a Las Vegas Water District project.

Richard Brooks and the NAS undertook the Navajo-McCullough transmission line survey, one of the earliest contract projects in the Las Vegas Valley (Brooks et al. 1975). (The NAS has experienced several name changes over the years: soon after the Navajo-McCullough project, it became the Archaeological Research Center [ARC], and today it is known as the Harry Reid Center for Environmental Studies (HRC, UNLV.) Under the direction of Brooks, the survey led to the discovery of a concentration of archaeological sites at the southern end of Las Vegas Wash in Henderson and the excavation of several small rockshelter and open sites across southern Nevada. Soon after the completion of the Navajo-McCullough transmission line project, the Bureau of Reclamation (Reclamation) and the Waste Water Management Agency of Clark County hired NAS and its archaeologists to conduct large-scale, intensive surveys of major portions of the Wetlands Park area. Following the initial Salinity Control survey, NAS and Reclamation recommended that the archaeological sites recorded by the project (except 26CK1279 and 26CK1295) were eligible for nomination to the National Register as a district (the Las Vegas Wash Archeological District), and a mitigation plan was developed and implemented.

The awareness that archaeological sites in the Las Vegas Valley were endangered spurred the local archaeological community and the Nevada State Historic Preservation Office (SHPO) into action. A state historic preservation plan was prepared in 1982 (Lyneis 1982a), and funds were allocated by the Nevada Division of Historic Preservation to NAS, UNLV, to undertake a program of survey "designed to preserve for posterity the record of human occupation of the region, a record which is being threatened by the rapid expansion of the Las Vegas urban area" (Rafferty 1985b:1). The monies were used to conduct a sample inventory of areas with high site densities and record the archaeological sites. Initially, it was hoped that funding would be made available to excavate important sites prior to their destruction; however, no additional excavation phases followed the surveys. During three years of fieldwork, high-density site areas, including the Duck Creek Drainage and the Eglington Escarpment, were surveyed using a random sampling method (Rafferty 1984a:9-12). A total of 7320 acres was intensively surveyed, resulting in the documentation of 148 new sites and reevaluation of seven sites. In addition, curated and archival data from 48 sites that were no longer in existence was reviewed.

Archaeological surveys were performed for land sales and exchanges, and infrastructure such as flood control, schools, and utilities projects. Several large, multi-state projects conducted during this period fit into the infrastructure category including the Kern River Project (Blair 1993; Blair et al. 2001; Cleland et al. 1986; Talbot et al. 1991) and the Intermountain Power Project transmission line (Tucker and Nickens 1983).

CRM PERIOD (1990–PRESENT)

In the late 1990s, archaeological surveys were conducted on thousands of acres of BLM lands for exchanges and land sales (see Ahlstrom et al. 2004 for a summary). The rapid pace of the city's growth continued over the last two decades, and the focus of city, state, and federal agencies shifted from project-specific mitigation to preservation planning. Between 1993 and 2004, preservation plans were developed for Clark County Wetlands Park (Seymour 1999; Seymour and Hatzenbuehler 1995), the Old Las Vegas Mormon Fort (Hohmann et al. 2000), the Las Vegas Springs Preserve (Seymour 1999), the Southern Nevada Water Authority's planned water transportation system (Ezzo 1995), and the Sloan Canyon National Conservation Area (Duke et al. 2004).

In the last decade, Ahlstrom and Roberts (1999 and 2001a) demonstrated that small thermal features, with or without associated artifact scatters, can provide useful subsistence and settlement data. HRC excavated features of this kind at Site 26CK3799 during data recovery for the Beltway Project (Blair et al. 2000). The features produced radiocarbon dates and subsistence data. Ahlstrom and Roberts (1999) demonstrated that small rockshelters, concentrated at the base of the mountains in the Apex Project Area, were occupied primarily during the Post-Puebloan period. The people who used these sites were foraging in the area for yucca seeds, tortoises, and cactus flowers. Importantly, the existence of this period of occupation was revealed by patterning in radiocarbon dates and was not indicated by assemblages of temporally diagnostic artifacts.

HRA's excavations in the Clark County Wetlands Park floodplain for water transport and habitat restoration projects led to the discovery of a prehistoric pit structure buried under 2 m of floodplain deposits (Ahlstrom and Roberts 2001a, Ahlstrom 2003b), a small habitation site occupied around A.D. 800, and an open site with over 50 pit storage features (Ahlstrom 2008b) that contained evidence of maize and mesquite storage between 200 B.C. and A.D. 1500. Seymour's discovery of a second prehistoric habitation feature at the Las Vegas Springs Preserve (Roberts and Seymour 2006), the identification of a cluster of possible pit structures at the Corn Creek Field Station in the Desert National Wildlife Refuge have demonstrated there are still important archaeological resources left intact in the Las Vegas Valley (Roberts et al. 2003b, Roberts and Lyon 2011). Most recently, HRA completed a data recovery project at Corn Creek and learned that site's residents were farming maize and making a local Logandale Gray variety of pottery there around A.D. 700–900.

Southern Region

The prehistory of the Southern Region, which incorporates portions of the Patayan culture area, is the least well understood region of southern Nevada (Figure 3.2). Only a few archaeological excavations—Willow Beach and Catclaw Cave—have been conducted, and both of these were completed before radiocarbon dating methods became widely used (Figure 3.2). These projects, and many of the other surveys and investigations in this region were sponsored by the National Park Service and Bureau of Reclamation with the goal of managing the region's cultural resources located along the Colorado River and its reservoir systems (McClellan et al. 1980).

EARLY EXPLORERS (TO 1950)

In 1943 Gordon C. Baldwin, as a Park Service naturalist, conducted a survey of the lower Colorado area that would be flooded by Lake Mohave following the construction of Davis Dam (Baldwin 1943). His reconnaissance survey located 155 historic and prehistoric sites from Willow Beach to Cottonwood Island, many of which were associated with Tizon Brown Ware and Lower Colorado Buff

Ware pottery (Pat Hicks, Personal communication 2012 indicated that the number of discrete site locations may be inflated). Between 1947 and 1948 he conducted test excavations at approximately 10 of these sites, including Willow Beach. Most of the prehistoric sites were campsites that lacked structures or other evidence of habitations (Baldwin 1948). Baldwin also test-excavated rock ring features and demonstrated that they lacked buried cultural deposits. Baldwin recorded features within sites as separate sites, where the 155 "sites" would be classified today as 16 sites with clusters of features.

Another important contributor of the period was Albert Schroeder, noted for his excavation of the Willow Beach site (Schroeder 1961). Willow Beach, located along the Colorado River 10 miles below Hoover Dam, was an open, stratified campsite that was occupied from 250 B.C. to A.D. 1150 and sporadically after that. The site was first excavated in 1936 by M. R. Harrington with the Civilian Conservation Corps and the National Park Service, then between 1947 and 1948 by Gordon C. Baldwin and the National Park Service, and lastly in 1950 by Albert Schroeder (1961). As part of his Willow Beach investigations Schroeder (1952) also surveyed the Colorado River below Davis Dam. Based on this research Schroeder defined the Hakataya culture as the prehistoric culture found along the Lower Colorado River, and he preferred the term Cerbat for the Upland Yuman groups in western Arizona (Schroeder 1979) and Amacava branch for the riverine groups. Schroeder saw the Hakayata as a mobile-oriented farming society, who made undecorated paddle-and-anvil pottery, practiced cremation burial, and lived in rectangular jacal surface houses. Pottery and other traditions were borrowed from the Hohokam along the Gila River. By A.D. 900 Pyramid Gray became the dominant type at Willow Beach. Today the term Hakataya is not used, and the term Patayan is favored for all pre-Yuman groups along the Lower Colorado River and Arizona uplands.

UNIVERSITY ERA (1950–1990)

For his master's thesis at the University of Arizona, Barton A. Wright dug a cave site—Catclaw Cave—15 miles downstream of Hoover Dam (Wright 1954). Although the site was on the Arizona side of the river, it is one of two sites excavated in the region, and was located less than 200 m from the river's edge. Wright felt that the large dry rockshelter's cultural deposits (Stratum 1) represented an unstratified occupation. Pyramid Gray pottery dominated the ceramic assemblage and intrusive sherds demonstrate contacts with the Upland Patayan areas and the Virgin Branch region. Wright felt that the cave deposits consisted of a single level (Stratum 1) with artifacts and this level overlay a deeper stratum (Stratum 2), which lacked evidence of occupation. Stratum 1 contained a number of pit hearths, basin hearths, grass pits, and a cache. Perishable artifacts that were excavated included fringed hide with bone tinklers, basketry, sandals, cane arrows, and fur robe fragments. Figurines resembling those collected in the Lost City investigations were also reported and reexamined recently by Amy Gilreath (2012).

Gilreath (2012:63) also radiocarbon dated 10 items from the cave, and eight of dates cluster within the last 650 years and support's Wright's belief that the site was not stratified. Gilreath (2011:63) concluded that the paddle and anvil pottery suggested a Patayan affiliation for the bulk of the occupation, and only a few artifacts (gray ware pottery and Rose Springs/Saratoga Springs projectile points) indicated earlier use. However, two earlier dates (1110+-30 B.P. on a sandal and 1930+- 25 B.P. from a hearth) support an earlier, but likely less intensive use by Puebloans.

In 1980 the Park Service prepared a synthesis of prior archaeological research undertaken in the Lake Mead National Recreation Area (McClellan et al. 1980). This report summarized previous research and described the prehistoric and historic occupation as well as research topics and management recommendations.

One excavation project that was conducted just outside the present project area boundaries, yet deserves mention was the excavation of Bighorn Cave. In the late 1980s, the Museum of North Arizona and Northern Arizona University conducted test excavation at Bighorn Cave, located in the Black Mountains of northern Arizona 20 miles east of the Colorado River (Geib and Keller 2002b). With support of the BLM and the State of Arizona this large rockshelter site was partially excavated to learn the extent and condition of the deposits and to evaluate the cave's information potential. Test excavations at Bighorn Cave demonstrated that the site was occupied intermittently between the Late Archaic and

Post-Puebloan periods. Twenty-three radiocarbon dates were processed that demonstrated the site was used between 1200 B.C. and the Post-Puebloan period. During the Late Archaic period the site was used as a hunting camp, and then between A.D. 550 and 1200 (based on radiocarbon dates) processing became more important. Analysis of the coprolites from this period suggests that the prehistoric diet was focused on mesquite, agave, and cacti until the last occupation period, when the cave was used less frequently. Geib and Keller (2002a:199) suggested that during the earlier periods the site's use was structured within a subsistence-settlement round and visited regularly; however, during the post A.D. 500 occupation, the site's use was more sporadic, perhaps due to food shortages.

CRM PERIOD

Many archaeological inventory projects have been conducted in the Southern Region for a host of energy, housing, and infrastructure development projects. Intensive inventories of the areas surrounding Hoover and Davis Dams were conducted over the last decade, many of which were for related facilities improvement and construction projects. In addition, Park Service archaeologists have continued their program of culture resource inventories and site assessments related to water level fluctuations, recreational use, and facilities development.

In the 1990s intaglios, which were first discovered by archaeologists in 1930s near Blythe, California, were reported to extend as far north as Las Vegas Wash (Rafferty 1990b, 2008). In this region sites also contain pottery types more commonly associated with the lower Colorado River (Seymour 1997; Rafferty 2008). It is clear from these studies that Patayan influences extended north into the Central Region. The form these influences took, possibly the migration of populations or the adaptation of Patayan traditions by resident populations, cannot be evaluated without focused research.

Eastern Region

The Puebloan ruins of the Virgin and Muddy river valleys drew pioneer archaeologists and research funding to the region. Between 1924 and 1941, Mark Raymond Harrington, Irwin Hayden, and many others explored and excavated some 116 multi-room Virgin Puebloan habitations, known as "houses," 59 campsites and other open sites, and 23 rockshelters and caves (Harry 2007) (Figure 3.4). This early period of exploration was recently synthesized by Karen Harry of the Department of Anthropology and Ethnic Studies at UNLV (Harry 2007, 2008b, Table 3.1) for the National Park Service, Lake Mead National Recreation Area. Presented below is a brief summary from her research of the highlights of this early era of research; the reader is referred to her document for additional detail.

The two subsequent periods of research, the University Era (1950–1980) and the CRM Period (1981–present) are less well known. The University Era was dominated by archaeological field schools and Park Service sponsored research under the direction of professors Margaret Lyneis and Claude Warren of UNLV. These individuals and their students made substantial contributions to our understanding of the region's archaeology. From this research Lyneis' reevaluations of the artifacts recovered during the earlier era have contributed substantially to our knowledge of the region's culture history and ceramic technology.

EARLY EXPLORERS

The existence of the ancient Indian ruins that came to be known as Pueblo Grande de Nevada, or the Lost City, was first reported in 1923 by two brothers who lived nearby in Overton, Nevada. In the hope of developing tourism, then Governor James Scrugham launched an expedition to the Muddy River region that initiated an unprecedented era of discovery and excavation. Over a period of 20 years, many of the region's Puebloan ruins were excavated to promote tourism, provide work projects for the Civilian Conservation Corps, obtain artifact collections for various museums, salvage sites before their inundation by Lake Mead, and most importantly, to understand the region's prehistory (Harry 2007). This 20-year period of exploration, between the time the region's rich archaeological resources were discovered and excavations ceased in 1941, is summarized in Table 3.1.

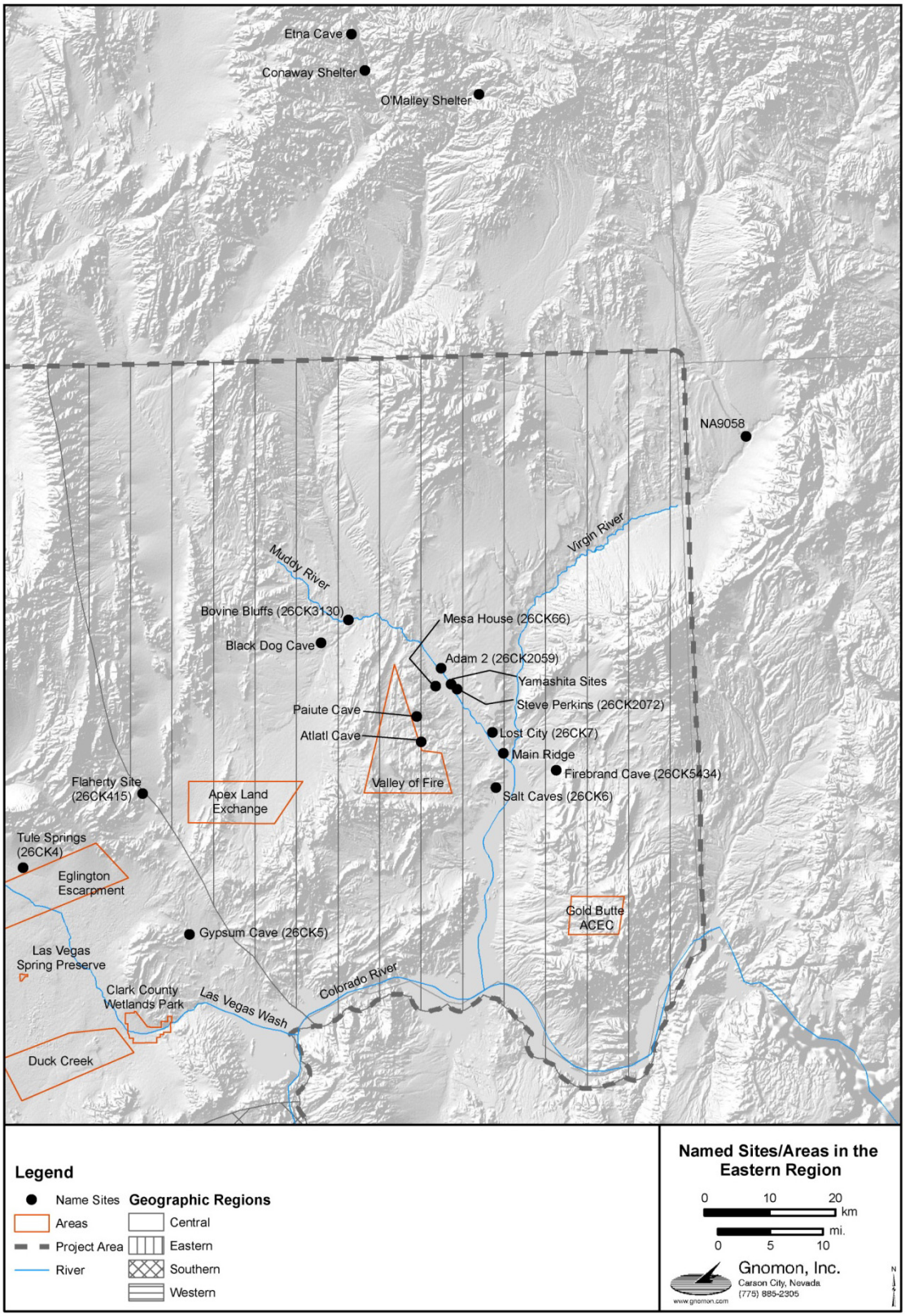


Figure 3.4. Important archaeological sites and locales in the Eastern Region.

Mark Raymond Harrington directed these investigations, first for the Museum of the American Indian (Heye Foundation) and later the Southwest Museum and other institutions. Harrington (1925, 1927, 1930a, 1930b, 1937a, 1937b, 1937c, 1942) published more than 24 articles (Harry 2007: Appendix 5) on his investigations in several journals, and he can probably be credited with the first description of the Virgin Puebloan Branch and its areal extent. Irwin Hayden (1930) also published on his excavations at Mesa House in 1929, and Richard Shutler (1961) examined extant artifact collections and prepared a comprehensive report using available field notes, drawings, maps, artifacts, and other materials generated by Harrington and his crews. Under the direction of Richard Brooks, in 1980 Lysenda Kirkberg reconstructed the "complex political and curatorial history" of these investigations (Kirkberg 1980:2). In the 1980s, Margaret Lyneis (1986a, 1990, 1992a) obtained research funding to reevaluate the condition of the "Houses" excavated during the first years of excavations at Main Ridge (Houses 1–46), and she also reexamined the collections held at various repositories. Karen Harry has continued this important work and her research is ongoing (Harry and Watson 2010).

Table 3.1. Summary of the Lost City Work (reproduced from Harry 2007: Table 3).

Phase and Period	Dates	Sponsor	Nature of Work
Phase 1 (Pre-Excavation)			
1	<1924	None	Sporadic mention of archaeological sites by explorers, etc.
Phase 2 (Excavation)			
2	1924-1926	State of Nevada and the Heye Foundation	Excavations
3	1927-1931	Southwest Museum	Survey and test excavations
4	1933-1935	Southwest Museum and the National Park Service	Excavations
5	1936-1941	National Park Service	Excavations
Phase 3(Post-excavation)			
6	1942-1979	National Park Service	Curation activities
7	1980-1990	National Park Service, Water and Power Resources, UNLV	Surface collection of Main Ridge; records reconciliation; archival search

The following is a summary based on Harry (2007) of the accomplishments of the various years of excavations in the region; the reader is referred to her *Finder's Guide* for information on the disposition of the collections from these investigations. Appendix E contains a summary, compiled by HRA, of the excavations as described in the foreman's notes on many of the excavated sites, with exception to Main Ridge (Houses 1–46), which has been reviewed by Lyneis (1986b, 1990, 1992a) and most recently by Harry and Watson (2010).

1924–1926

This phase included two field seasons, during which work was concentrated on (but not limited to) what Harrington termed "Pueblo Grande de Nevada." This "community" consisted of those sites located on the eastern side of the Muddy River, and within the stretch of land that extended some five to six miles north of the confluence of the Virgin and Muddy rivers. During the 1924–1925 field season, work was conducted on Houses 1–42, 44, and 45; during the 1925–1926 season, work took place on Salt Cave #1, Burial Hill, the Bonelli site at the confluence of the Virgin and Colorado Rivers, Houses 46, 47, and 50, and Burial 72 from House 29 and Burial 73 from House 1 (Harry 2007:10–11). During this period Harrington also surveyed the east side of the Muddy River between St. Thomas and Overton and recorded the major sites (Harrington 1929; Harry 2007).

1929

Excavations were conducted at the site of Mesa House, located approximately two miles northwest of Overton, and at Paiute Cave, about 1.5 miles south of Overton. The Mesa House excavations were supervised by Irwin Hayden and are reported on in Hayden (1930). The Paiute Cave excavations are described in Harrington (1930b; Harry 2007:12).

1933–1936

During this period Harrington was under contract to oversee the salvage work being conducted in advance of the filling of Lake Mead, but he spent most of his time at the Southwest Museum. Fay Perkins and Willis Evans supervised much of the excavation of 17 pueblos and 16 pit dwellings, and they continued Harrington's practice of assigning house numbers (Shutler 1961). The fieldwork was carried out by the 573rd Company from Boulder City of the Civilian Conservation Corps (CCC). During the later part of this period the CCC men continued to excavate some of the sites initiated in previous years, and they began construction on the Boulder Dam Museum (now the Lost City Museum) near Overton, Nevada (Harry 2008b:14). After 1936, Lake Mead began filling rapidly, and because of the rapidity of the flooding many of the submerged sites, located below the 1080-foot elevation level, retain integrity today.

1937–1941

Fieldwork conducted during this period was again carried out by members of the CCC and under the supervision of the National Park Service. Fay Perkins continued as supervisor and he oversaw the excavations of Houses 12, 50, 87, 89, 91, 93, 96, 98, 99, 101–115, 120 and 121. By 1941 Lake Mead was filled, and the archaeological fieldwork came to an end. (Harry 2007:16).

UNIVERSITY ERA (1950–1990)

Several important projects were undertaken in and just outside the region during this period. Between 1967 and 1971 DRI conducted surveys and excavations in the Meadow Valley Wash area of southeastern Nevada under the direction of Don D. Fowler and Floyd W. Sharrock (Fowler et al. 1973). Most of their investigations were conducted just to the north of the present project area; however, because these investigations have formed the basis of many culture history reconstructions, they are included here. The goal of DRI's project was to understand the prehistory of this little known region and to clarify the relationship between the Fremont/Virgin Branch groups and the Shoshonean Culture. The survey resulted in the recording of 152 sites and the test excavation of six. Based on these test excavations, the Conaway (26LN126) (Figure 3.4), O'Malley (26LN418), and Scott site (26LN407) were selected for more extensive excavations. Although these sites are technically located outside the present project area, the sites' undisturbed stratigraphy has provided the cleanest chronological data, which has been used to reconstruct the region's prehistory, particularly for the Archaic period.

Fowler et al. (1973) concluded from these excavations that the region was first occupied 7,000 years ago by foragers who hunted bison, bighorn sheep, mule deer, and smaller animals. They also ate and processed wild plants. The large quantity of flaked tool manufacturing debris from this occupation level suggests that hunting and tool manufacture were important activities during this period. All these sites were abandoned 4,600 years and then re-occupied 3,000 years ago by groups who lived in much the same ways as the sites' first occupants. During this Late Archaic occupation split twig figurines were manufactured and left in nearby Etna Cave (Wheeler 1942) (Figure 3.4).

Following a second period of abandonment, the Meadow Valley Wash region was reoccupied around A.D. 1000 by the Parowan Fremont groups who traded with the Virgin Branch Puebloans. The rockshelter's components that dated to this occupation contained cultigens, Fremont pottery, Fremont style moccasins, rock art, and one-rod-bundle basketry. The presence of quantities of Shoshone pottery, mixed throughout the Fremont levels, suggested to Fowler et al. (1973) that the Fremont and Shoshone occupation was "coeval" and the two cultures lived in the region after A.D. 1000. Soon after A.D. 1300,

the Fremont style artifacts drop out of the archaeological record, suggesting that the Fremont abandoned the region, and occupation continued by Shoshone groups.

A watershed event for the archaeology of the region occurred in the late 1950s when Richard Shutler, Jr., who was then a graduate student at the University of Arizona, assembled Harrington's notes, maps, and extant artifacts and published a comprehensive record of the Lost City investigations (Shutler 1961).

Less well known, and largely unpublished until recently, was a large data recovery project conducted for Interstate 15 just east of Mesquite, Nevada, at the confluence of Beaver Dam Wash and the Virgin River. Between 1964 and 1966 the Museum of Northern Arizona excavated a large Virgin Puebloan habitation site (NA9058) under the direction of William D. Wade. The site is one of the largest Virgin Puebloan sites excavated outside the Moapa Valley, and it contained 21 pithouses, 22 storage cists, 14 human burials, and numerous extramural features. In 2009 David Purcell and the Museum of Arizona assembled and published Wade's 1967 manuscript of these investigations (Wade 2009). Although none of the features at the site have been radiocarbon dated, the artifacts and pottery suggest an occupation during the Basketmaker III and Pueblo I periods.

In the 1970s UNLV began a series of field school projects in the Moapa Valley. Between 1970 and 1972 Claude Warren and Robert Crabtree supervised the excavation of the Steve Perkins site (Myhrer 1989), a Virgin Puebloan habitation located near Overton, Nevada. In 1976 Claude Warren and Daniel Larsen excavated a large pithouse at the Black Dog site (Winslow and Blair 2003), and Jeanne Clark conducted a survey of the Muddy River Valley in 1984 (Clark 1984) for her master's thesis at UNLV. Claude Warren (1982) also directed excavation in the Valley of Fire State Park, located several miles to the west of the Moapa Valley.

In the 1980s Margaret Lyneis began a series of field schools at endangered Virgin Puebloan sites in the Moapa Valley near Overton. Sites excavated included the Bovine Bluff site (Myhrer and Lyneis 1985), Adam 2 (Lyneis et al. 1989), Main Ridge (Lyneis 1992a), and the Yamashita sites (Appendix D). These excavations and their related studies provided resolution of pottery chronologies (Lyneis 1990, 2008a), and a more detailed understanding of regional settlement patterns (Lyneis 1986b) and social organization (Lyneis 1992b, 2008b). Lyneis' research in the Muddy River Valley represents the definitive body of work on the Virgin Puebloan culture in Nevada, and it has led to a reassessment of Harrington's Main Ridge complex (Lyneis 1986a, 1992a), contributions to several regional syntheses (Lyneis 1982c, 1994, 1996, 2000), and an authoritative synthesis of the Virgin Branch (Lyneis 1995).

CRM PERIOD

Three of the earliest large contract archaeology projects in the region, the Navajo McCullough Transmission Line (Brooks et al. 1975), the Intermountain Power Transmission Lines (Talbot et al. 1991), and the Kern River pipeline (Cleland et al. 1986) resulted in the recording and excavation of numerous prehistoric sites. These projects are described in the Central Region history. In the early 1980s, Kevin Rafferty and Lynda Blair (1984) conducted a sample survey of the Wechech Basin-Bitter Ridge region (Gold Butte Area) of eastern Clark County for the Nevada Division of Historic Preservation and Archaeology. Their investigations resulted in the recording of numerous prehistoric sites and an assessment of the region's cultural resources.

In the late 1990s the Bureau of Reclamation hired Statistical Research, Inc., to complete a Class I cultural resources survey of the Reclamation lands adjacent to the Overton Arm of Lake Mead and the Muddy and Virgin Rivers in Clark County (Ezzo 1996). This document synthesized information on the region's environment, prehistory, and history, and made recommendations regarding future data needs. It also developed a predictive site location model to guide the agency's management of the region's culture resources.

The HRC was contracted in 1997 by the Bureau of Land Management to document and collect artifacts found on the surface of a large cave in southeastern Nevada—Firebrand Cave (Blair and Winslow 2006). The well-illustrated report of these investigations describes the radiocarbon-dated perishable artifacts and infers that the cave served as a ceremonial site during the Archaic and probably

later periods. Perhaps the largest archaeological project conducted recently in the region was the excavation of the Black Dog Cave site by the HRC for the Bureau of Land Management and the Nevada Power Company (Winslow and Blair 2003; Winslow 2006, 2009). The rockshelter and portions of the pithouse areas were excavated, and radiocarbon dates suggest the site was occupied during the Basketmaker II and III periods. Numerous perishable items were analyzed and radiocarbon dated, and several habitation features, and extramural features were excavated and evaluated. The reports of these investigations contain a wealth of new data on the region's first Puebloan settlers.

In 2003 HRA excavated a small rockshelter in the upper Moapa Valley for the BLM and the Southern Nevada Water Authority (Harper 2006). The shelter contained a late Post-Puebloan-Historic Period occupation, probably by Southern Paiute groups, who were interacting with the area's first Euroamerican settlers.

Other development, resource management, and infra-structure projects include surveys in the vicinity of Mesquite associated with the Lincoln County Land Act (Giambastiani and Tinsley 2002), a Class II cultural resource inventory and testing project of the Gold Butte ACEC (McGuire et al. 2010), a cultural resource survey related to the development of ATV recreation trails (Winslow and Wedding 2004), numerous inventory and research projects associated with the Lake Mead National Recreation Area, Public Lands Institute sponsored research projects at Main Ridge for the Park Service (Harry 2008b), and development of the Lost City document's finder's guide (Harry et al. 2008).

PREVIOUS CULTURAL RESOURCE OVERVIEWS

Several cultural resource overviews have been prepared for Southern Nevada, or for specific regions or land jurisdictions within southern Nevada (Ezzo 1995; Hauck et al. 1979; Lyneis 1982a; McClellan 1980; Stone 1991). Other overviews cover adjacent regions that have cultural relevance, yet they fall outside our specific area of study. Perhaps the best known of these documents is the BLM Class I Overview prepared by Jeffrey Altschul and Helen Fairley in 1989 for the cultural resources in the Arizona Strip District (Altschul and Fairley 1989) and the Colorado River (Fairley 2003). Connie Stone's BLM Lower Colorado River region overview also has relevance to our study area. Randall McGuire and Michael Shiffer's BLM Class I of the Hohokam and Patayan regions of Arizona is applicable because the Patayan culture tradition extends north into southern Nevada (McGuire and Schiffer 1982). This chapter focuses on overviews that pertain specifically to southern Nevada, but where these other documents are often relevant they will be addressed and referenced.

The first comprehensive attempt to synthesize the Southern Nevada's prehistory was undertaken by the Archaeological-Environmental Research Corporation in 1979 for the BLM in Las Vegas (Hauck et al. 1979). The report summarized Clark County's environment, past cultural research, artifact collections, the established prehistory and history of the region, and then made recommendations regarding future management options and research directions. Although much of their culture history constructions are now outdated, the data gaps they recognized and many of their recommendations for future research are still valid. Some pertinent recommendations that have yet to be implemented are as follows:

1. Perform a Class II survey of the region's dry lakes to determine if the area was occupied during the Paleoindian and Early Archaic periods (Nellis Air Force Base and Fish & Wildlife have funded some research related to dry lakes in southern Nevada).
2. Excavate a rockshelter with Archaic deposits to understand the period between 7500 B.P. and 5500 B.P. because no sites dating to this period are known in the region. Analyses of macrofloral and pollen samples would aid our understanding of the environmental changes related to the widespread abandonment of the Great Basin during this period.
3. A systematic program of flotation analysis of the large roasting pits would verify the widely held assumption that these features were used to process agave and piñon nuts and improve our understanding of the settlement patterns and season land use.

4. The dating of the Muddy River, Lost City, and Mesa House Phases are based entirely on cross dating of Kayenta pottery, and efforts should be made to obtain flotation samples for absolute (radiocarbon) dating, and also to understand the subsistence practices of the Virgin Puebloans.

Margaret Lyneis' (1982b) prehistoric context for the same region, written a few years later, recognized these data gaps and evaluated what we currently know about the Archaic, Puebloan, and Post-Puebloan periods. For the Archaic period she recommended a focus on directional trends, such as cultural adjustments in response to changing environment, and she also recognized the problems associated with decoding the region's numerous lithic scatters. For the Anasazi period, Lyneis felt that chronological control, in the order of 25- to 50-year intervals, should be considered an important goal of future research. Lyneis' main concern for the Southern Paiute-Mohave period was understanding the relationship between the Virgin Puebloans and the region's historic occupants. Her prehistoric context includes a comprehensive list of key questions and recommendations for each period, which we have briefly summarized below.

Archaic Study Unit

What is the chronology of the sequence and what are the diagnostic artifacts (projectile points and other artifact types)? Are there significant changes in lithic technology through time? Do materials or the morphology of other tool types change? How have climates changed, and what was the impact of these changes on human populations? Lastly, can long term directional trends be recognized in settlement patterns, community size, population density and distribution, assemblage composition, technological change, intercommunity exchange, and ritual/ceremonial system?

To study these questions she suggested that a particular emphasis should be placed on stratified open and rockshelter sites, stratified sites with good preservation of plant and animal remains, sites with or without artifacts that contain environmental data, the spatial patterning of surface sites, and rock art sites with heavily patinated panels. In addition, she recommended field inventories to identify Archaic sites, look for settlement system changes at such sites, study lithic scatters to identify the best methodologies for understanding them, and protect the sites with stratified cultural deposits, particularly rockshelters.

Anasazi Study Unit

What can the abandonment of the region by the Virgin Anasazi tell us about the Puebloan abandonments of A.D. 1100 to 1400 in the northern Southwest? Were they environmentally related? What was the subsistence base and the relative proportions of domesticated versus wild foods? How did the Virgin Puebloan adapt to the unique conditions of the hot desert? How did the Virgin Anasazi maintain their cultural identity on the fringes of the Puebloan world? Were they linked more closely with the Upland Virgin or St. George Virgin groups and did these relationships change over time? Why was the Moapa Valley abandoned when it the flow of the Muddy River was not affected during times of drought? What relationship did the Virgin Puebloans have with surrounding agricultural and non-agricultural populations? What was the nature of their involvement in long-distance trade with the Fremont and other Anasazi communities? Were there attempts to colonize areas farther west?

To study these questions Lyneis proposed that habitation sites be protected from further vandalism, construction, and development. Backhoe trenches should be inspected in the region for evidence of irrigation ditches, field patterns, or other evidence of farming techniques. Single component sites in agave and piñon forest, stratified rockshelters, roasting pits, and rock art sites all contain important information that should be protected for preservation and research. Her recommendation for management needs included survey of private lands in the Moapa and lower Virgin Valleys and to establishment of a group of protected sites with interpretation and appropriate displays.

What were the relationships between the Mohave and the lowland Virgin Anasazi? What role did farming play in the Southern Paiute/Chemehuevi subsistence strategies and how did it change through time? Can we determine if portions of the region were controlled by the Mohave before the arrival of the Southern Paiute/Chemehuevi in prehistory? How were the settlement and subsistence practices different for these groups? Did these practices contribute to the Southern Paiute/Chemehuevi replacement of the Desert Mohave in the desert regions? How did the Southern Paiute/Chemehuevi adaptation compare to the late Archaic patterns? What foods were more or less important and how do population densities compare?

Lyneis recommended that to answer these questions preservation and research emphasis should be placed on large open sites with soil modification or cultural deposits, single component open sites with or without cultural deposits, rock art and rock alignment sites, and rockshelters with unmixed deposits. She also suggested that Native American communities in the area be consulted about important cultural sites and preservation plans be developed to ensure their protection. She felt that stratified and single component sites should be protected, and field inventories be conducted in upland and lowland settings to identify base camps and villages. Lastly, she proposed that surface sites be studied to identify chronological sensitive technologies, and other temporally sensitive patterns.

The progress we have made toward addressing each of these questions will be addressed in the synthesis chapters on each temporal period including the Paleoindian/Archaic, Puebloan, and Post-Puebloan periods. Chapter 10 will address the relevance of each of Lyneis' questions for future research.

CHAPTER 4
SITE AND PREVIOUS SURVEY DATABASE

Michael Drews, Eric Ingbar, and Jeremy Hall

Site and inventory data for the project area was derived from several sources including the Nevada Cultural Resource Information System (NVCRIS), California Historic Resources Information Centers including the Eastern Information Center (EIC) and the San Bernardino Information Center (SBrIC), and AZSITE, the Arizona Archaeological Site and Survey Database. Baseline data included GIS site location and site records from which assemblage specific attributes were compiled. Additional site information was derived from National Park Service GIS datasets, and from supplemental data provided by Las Vegas Springs Preserve, Lost City Museum, USDI, Reclamation, USDI BLM Las Vegas, Battle Mountain, and Ely Districts, USFS Humboldt-Toiyabe National Forest, USDI Fish and Wildlife Service, and USDI Bureau of Indian Affairs. Existing databases including the HRA Las Vegas Wash and Ash Meadows Database; manuscripts from excavated sites augmented the analytical dataset.

The site and previous survey information gathered from these sources were compiled in to both GIS and relational database datasets. The compilation goal was two-fold: (1) to gather all known sites and inventories that were reasonably accessible, and (2) to collect sufficient information from sites and inventories to characterize the archaeology for use by other authors of this context. To achieve these goals, we used a variety of techniques. These are described in the methods section of this chapter. A short summary of our results is presented in this chapter too, along with some suggested improvements for data management within the southern Nevada study area. Compiled information is presented in the Appendix C, F, and G (in digital form) with detailed descriptions of the contents of the different datasets that are provided digitally and a guide for their usage.

METHODS: RECORD SEARCH

NVCRIS

A baseline record search was compiled for the project area by submitting a request to NVCRIS for all sites and inventories within a 1-mile buffer around the project area. The NVCRIS query returned a total of 9,461 sites and 7,212 inventories within the project vicinity (Figure 4.1). The project area covers approximately 5,178,000 acres of land, of which nearly 23 percent (1,181,205 acres) have been inventoried. Of the 9,461 sites within the project area, 681 were identified as prehistoric, 452 were historic, 59 are multicomponent, and one is ethnohistoric. The remaining 87 percent lack a temporal designation (see Appendix C).

CHRIS

Two CHRIS information centers maintain an archive of sites and surveys along the western boundary of the project area. The western boundary was buffered by a distance of 1 mile, and a search of all sites and surveys within that corridor was requested of each Information Center. To facilitate a manual search of the archive by Information Center personnel, applicable portions of USGS 7.5-minute quadrangles were included with the request. Results of the California record search request are provided in Appendix C.

The Eastern Information Center holds the archive for Inyo County, located along the northwestern half of the California/Nevada border. Records at the EIC indicate that four cultural resource studies have been conducted within the search area, and that six additional studies comprise overviews of the general project area. Twenty-four cultural resources have been recorded within the search boundary.

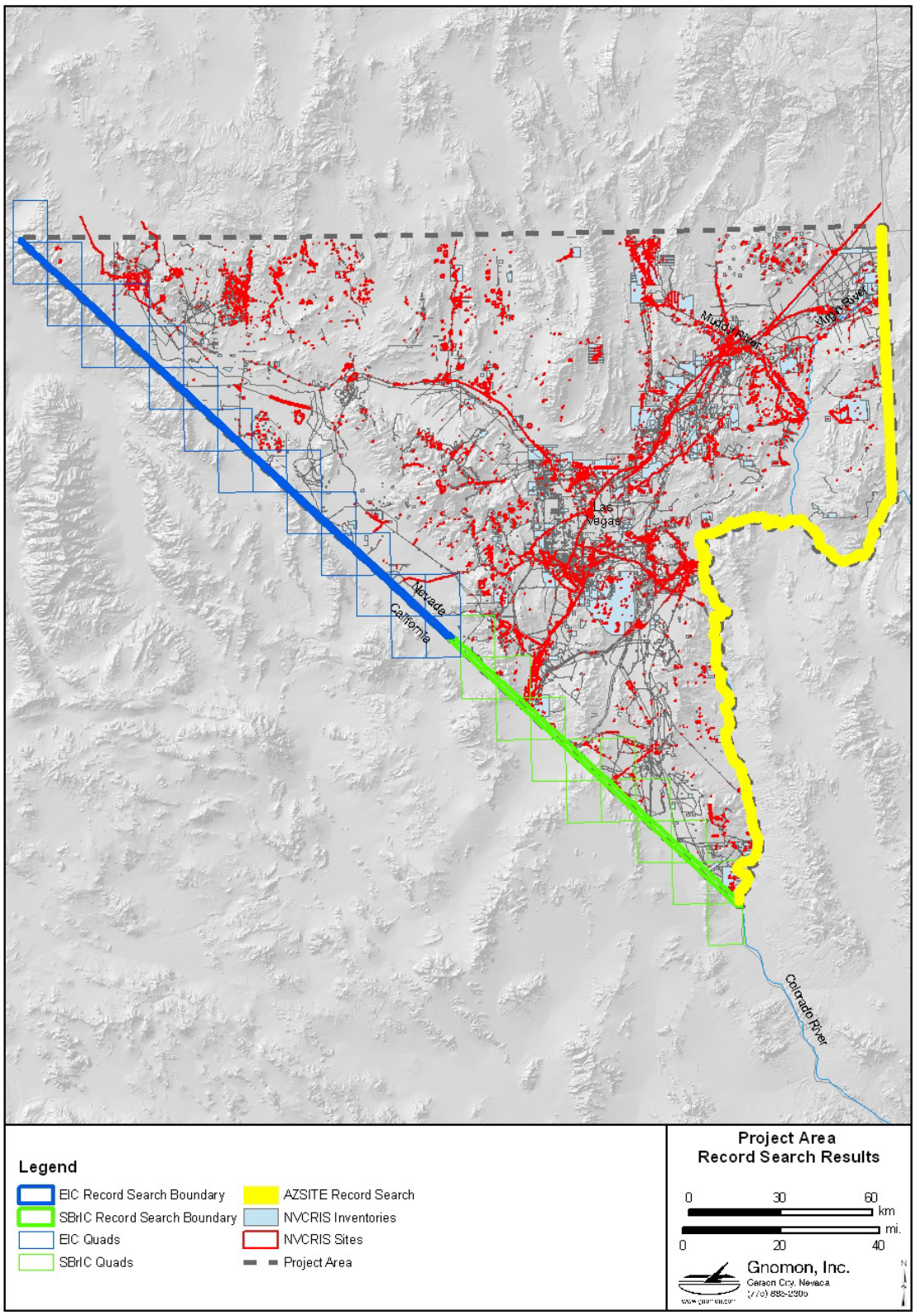


Figure 4.1. Project area record search results.

Cultural resource data for San Bernardino County is archived at the San Bernardino Information Center (SBrIC). The record search revealed 60 previous cultural resource inventories and 21 general overviews within one mile of the project boundary. Seventy-one prehistoric sites and 53 prehistoric isolates are located within the record search boundary.

AZSITE

The Arizona State Museum provides an electronic database of sites and surveys for that state. A request was made of AZSITE to provide GIS shapes and attribute tables for sites and surveys lying within a mile of the Arizona state line. That search returned 78 previous surveys and 186 archaeological sites (Appendix C). Seventy-four of the AZSITE sites lie within Nevada and 50 within 0.25 miles of sites currently in NVCRIS. The remaining 24 sites, all lying along the western side of the Colorado River below Lake Mead are not present in the Nevada dataset.

Analytical Dataset

The information collected from the records forms the basis for time period-specific analysis of research themes and contexts. To do so, we created an analytical dataset of 4372 sites (60 percent of the NVCRIS sites less those identified as historic). Sites were selected from the NVCRIS sample in several ways. First, the Las Vegas Valley provided a large initial compilation of data. Second, several other large, well-designed surveys provided area coverage that was unbiased. Third, we included well-known sites from both the oldest end of the spectrum (Paleoindian) to Puebloan sites. These were generally discovered very early in the area's history (Puebloan sites) and are thus "missed" by inventories, or are sufficiently rare that they needed to be included for the sake of completeness of the record. The records chosen were encoded from the paper site records and reports with the general time-sensitive and functional classifications used in the IMACS site record. This attribute encoding followed the schema utilized by Ahlstrom and Lyon (2004: Table 1). A majority of the site records lack IMACS encoding forms, so pertinent Part B site data was transcribed from the narrative portion of each site form. The NVCRIS dataset included both a designed and random sample of sites. Encoded data from other sources including the Las Vegas Wash dataset (Ahlstrom and Lyon 2004), and several supplemental site datasets yielded a combined sample of 7,027 sites (Table 4.1). Tabular data from the analytical dataset are presented in Appendix F.

Table 4.1 Analytical Site Sources

Site Source	Site Count
NVCRIS Design Sample	2144
NVCRIS Random Sample	2228
Las Vegas Wash (Ahlstrom and Lyon 2004)	855
Supplemental Data	
Arrow Canyon (HRA)	20
Ash Meadows (HRA)	219
C14_From NVCRIS	36
Gold Butte Sites (FWARG)	356
Lake Mead NRA (NPS)	250
Lost Cabin NRHP	2
Misc from NVCRIS Site Record	10
Spring Mountains NRA	898
Warm Springs Ranch (HRA)	18
Total	7027

Designed Sample

The initial step in data encoding was to select a subset of sites derived from the NVCRIS database. Hydrologic basins were used to stratify sites within the project area in order to insure an even spatial distribution (Figure 4.2). A selection of 2526 sites (30 percent of all NVCRIS sites) was included in the "Designed Sample" dataset (Table 4.2). The sites selected had the highest Smithsonian site numbers (assumed to be most recent and authoritative recordings). After removing duplicate site numbers and historic sites from the dataset, the designed sample consisted of 2144 sites.

Random Sample

Once the designed sample was encoded, the remaining NVCRIS sites were randomly selected for encoding. This sampling was sorted based on hydrologic basin, and the sites checked to insure that at least some early site numbers were included. The sample included 2527 sites. After removing duplicates and historic sites, the sample yielded 2228 prehistoric sites.

Las Vegas Valley

Ahlstrom and Lyon's synthesis of the Las Vegas Valley inventory (Ahlstrom and Lyon 2004) provided the framework for analysis of the larger Southern Nevada dataset. Many of the assemblage characteristics coded in that data mirror the IMACS codes, or are easily translatable to an IMACS designation. The original analysis included 1045 sites, of which 190 were encoded as part of the random and designed sample. The remaining 855 encoded Las Vegas Valley sites were converted to an IMACS encoding format and added to the larger dataset.

Supplemental Datasets

Initial analysis of site assemblage characteristics began with the combined NVCRIS and Las Vegas Valley dataset (5287 sites). As additional analytic datasets became available (C14 and Obsidian Sourcing databases, and recent work by Far Western at Gold Butte), the spatial extent of those sites and pertinent assemblage characteristics were appended to the core analytic dataset. Of the 7,027 sites within the total analytical dataset, 1,293 have no spatial presence in the NVCRIS database. Spatial location and assemblage characteristics for those sites were derived from various archival datasets listed in Table 4.1.

SUMMARY INFORMATION AND RECOMMENDATIONS

The analytic dataset provided a detailed spreadsheet comprised of site assemblage characteristics. This dataset can be queried for information to suit specific research questions posed by the project team. As previously stated, NVCRIS indicates that approximately 23 percent of the project area has been inventoried. Highest concentrations of inventory occur within the Las Vegas Wash, Upper Amargosa, and Muddy River hydrologic units. Not surprisingly highest site frequencies occur within those areas. Area that have not been inventoried, or were inventoried poorly, include the northwest corner of Clark County and southeastern Nye County on portions of the Nevada Test Site, Nellis AFB and the Desert NWR.

Most of the site records encoded for the analytical dataset were derived from IMACS records that lacked encoding sheets. The resulting database is now relatively robust and should be maintained as part of ongoing work in the project area. At a minimum, IMACS encoding sheets should be included with records for more efficient access to encoded data in the future. By and large, the IMACS forms were accurate in identification of functional classes within the assemblage, but typological identifiers like projectile point type and, especially, ceramic type were often unreliable.

As ^{14}C and obsidian sourcing data was integrated into the dataset, it became apparent that a number of sites were not in the NVCRIS database. This may be attributed to the lag between initial release of NVCRIS and on-going clean up. Or it may be due to an inventory bias in that dataset. Agencies and archivists are generally conscientious about logging inventories conducted within their jurisdiction

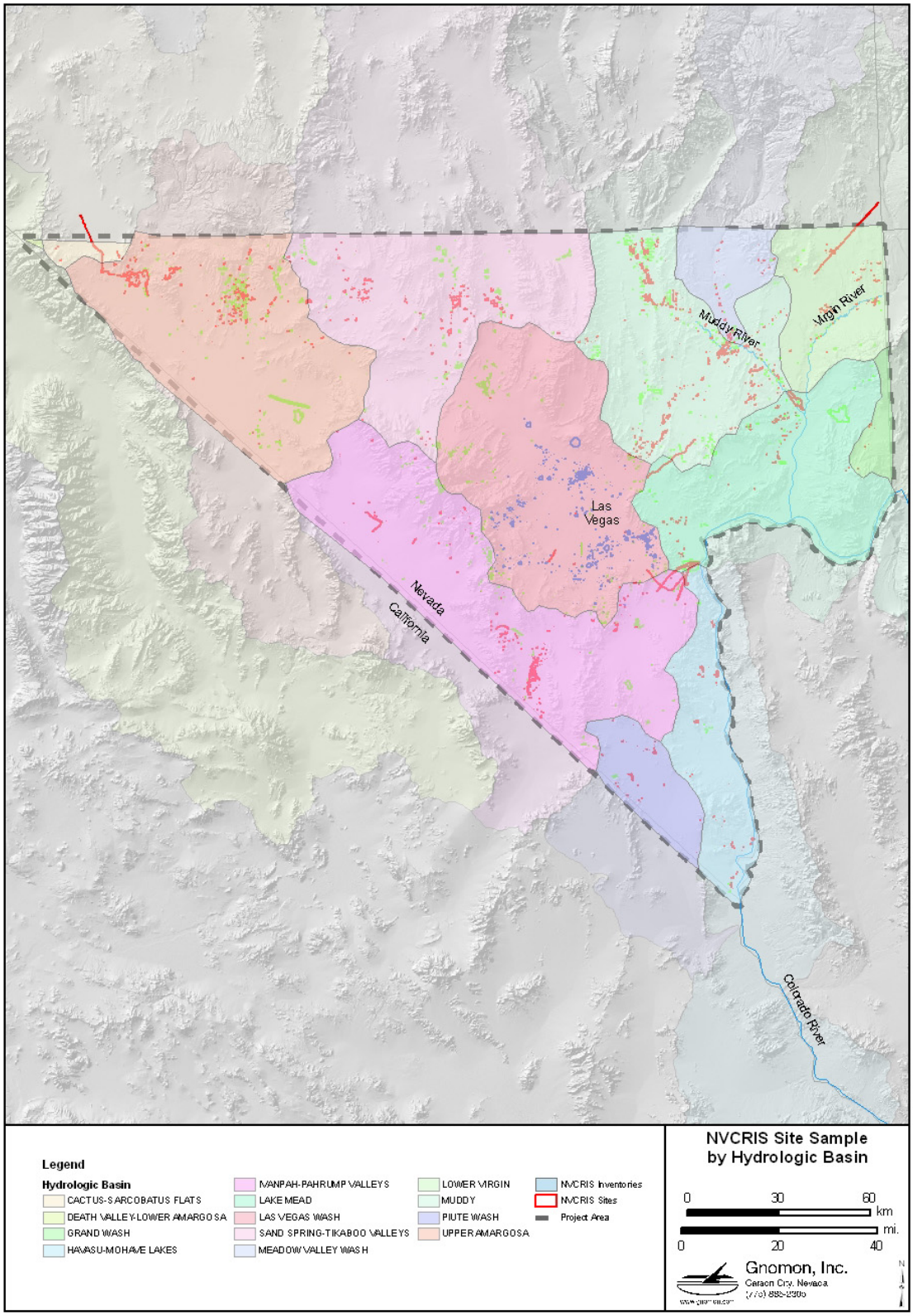


Figure 4.2. NVCRIS site sample by hydrologic basin.

Table 4.2. NVCRIS Designed and Random Sample by Hydrologic Unit.

Hydrologic Unit	NVCRIS Site Count	*CK*	*NY*	*LN*	*60%Ck*	*60%Ny*	*60%Ln*	*Sample Sum*	**Design Selection**			**Design Sum**	**Random Selection**			**Random Sum**
									CK	NY	LN		CK	NY	LN	
Cactus-Sarcobatus Flat	33	*5*	*28*		*3*	*17*	*0*	20	3	17	0	20	0	0	0	0
Havasu-Mohave Lakes	446	*446*			*268*	*0*	*0*	268	134	0	0	134	134	0	0	134
Ivanpah-Pahrump Valleys	872	*852*	*20*		*511*	*12*	*0*	523	256	20	0	276	256	6	0	262
Lake Mead	571	*571*			*343*	*0*	*0*	343	171	0	0	171	171	0	0	171
Las Vegas Valley*	1913	*1913*			*1147*	*0*	*0*	1147	1045	0	0	1045	102	0	0	102
Lower Virgin	347	*218*		*129*	*131*	*0*	*77*	208	65	0	39	104	65	0	39	104
Meadow Valley Wash	243	*157*		*86*	*94*	*0*	*52*	146	47	0	26	73	47	0	26	73
Muddy	1638	*1461*		*177*	*877*	*0*	*106*	983	438	0	53	491	438	0	53	491
Piute Wash	59	*59*			*35*	*0*	*0*	35	35	0	0	35	18	0	0	18
Sand Spring-Tikaboo Valleys	784	*332*	*282*	*170*	*199*	*169*	*102*	470	100	85	51	235	100	85	51	235
Upper Amargosa	1516		*1516*		*0*	*910*	*0*	910	0	455	0	455	0	455	0	455
	8422	*6014*	*1846*	*562*	*3607*	*1108*	*337*	5052	1803	554	169	2526	1804	554	169	2527

*includes 998 sites previously encoded from Ahlstrom and Lyon (2004).

but site forms may not be updated or generated as part of subsequent studies. Fieldwork conducted in conjunction with testing, mitigation, or research investigations often provides a wealth of information but is rarely integrated into a managed database.

IMACS site records have long been a contentious issue in Nevada archaeology. This data compilation provided an opportunity to evaluate, informally, the utility of IMACS records and encoding sheets. In general, our team found that IMACS records provided a well-structured (paper) record to read and enter in to the "summary" information categories used in this context. The IMACS encoding records (which contain codes paired to the descriptions in the narrative forms) similarly provide information that is quite highly structured. Our experience is that the IMACS record contained redundant information but was easier to work with than more narrative formats, like those forms that pre-dated the IMACS format.

IMACS reliability, and the reliability or consistency of site records in general, is a different question from their ease of use. Short of revisiting sites, there is no good way to assess reliability and completeness. No site record format will serve to alleviate this problem. Instead, assiduous, critical review of records by the agencies who receive them is probably the best method of ensuring some observational consistency.

During the course of this study, we converted IMACS encoding records to analytical information categories (see Appendix F). In general, this conversion was easy to design but hard to execute. It was easy to design because of the granular nature of IMACS codes. These lend themselves well to summarization. The analytical data was complex to actually convert because the IMACS encoding system is inherently relational and we sought to combine derivative values with their siblings, cousins, and nephews from other tables. For instance, a given artifact type may have functional meaning, temporal meaning, and even geographic meaning in the analyses conducted in this study. Thus, it counts "three times" and must be grouped with other artifacts (and features) using three different sets of rules.

In the future, a more integrated approach to gathering archaeologically meaningful information might save time and effort compared to IMACS encoding followed by data machinations (at best) or re-reading records and reports to glean information (at worst). Our suggestion is that professional archaeologists in southern Nevada consider using the analytical data format(s) presented here as the starting point for a regionally meaningful dataset. Information must be added to this dataset for every site recorded. This approach is not difficult to implement via a supplemental recording form (one per site), or even better, a simple data entry form either on-line or as a separate spreadsheet. By creating a maintained, growing, body of information, the context itself can grow along with our knowledge of southern Nevada archaeology.

CHAPTER 5
PALEOINDIAN AND ARCHAIC PERIODS

Barbara J. Roth

The Paleoarchaic and Archaic prehistory of southern Nevada has been largely defined using cultural historical periods described by Warren and Crabtree (1986) for the southwestern Great Basin. Other chronological schemes have been proposed (e.g., Gilreath 2009), but because Warren and Crabtree's (1986) scheme has been used by many other researchers working in the Mojave Desert (Basgall 2000; McGuire et al. 2010; Sutton et al. 2007; Wriston et al. 2007), they are used in this overview (Table 5.1). Each section also contains a discussion of the sites dating to these time periods within the project area that have been investigated and reported, followed by a summary of site distributions for each period of occupation gleaned from the NVCRIS site data.

Table 5.1. Paleoindian and Archaic Chronological Sequence

Period	Date Range	Diagnostics
Paleoindian	13,100–12,800 B.P.	Fluted points
Early Archaic	11,000–7500 B.P.	Lake Mojave points Silver Lake points Great Basin stemmed Crescents?
Middle Archaic	7500–4000 B.P.	Pinto points Gatecliff Split-stemmed points
Late Archaic	4000–1550 B.P.	Gypsum points Elko Series points
Terminal Archaic	200 B.C.–A.D. 200	Elko points

PALEOARCHAIC PERIOD (13,100-7500 B.P.;11,150-5550 B.C.)

The Paleoarchaic period, first defined by Willig and Aikens (1988), encompasses both the Paleoindian and Early Archaic periods in southern Nevada and falls within the Terminal Pleistocene/Early Holocene (Chapter 2). Most work on Paleoarchaic sites has been done in the Great Basin north of the project area and around Pleistocene lakes in the Mojave Desert (Beck and Jones 1997, 2009; Campbell et al. 1937; Graf and Schmitt 2007; Rogers 1939; Willig and Aikens 1988). The following section provides a general discussion of the Paleoindian and Early Archaic periods in the project area.

Paleoindian Period (13,100–12,800 B.P.: 11,150–10,850 B.C.)

The earliest documented occupation of southern Nevada, the Paleoindian period, is represented primarily by surface finds of fluted points resembling Clovis-style points found elsewhere in the Great Basin, Southwest, and Plains. Clovis points are the hallmark of the Paleoindian occupation of North America and are generally thought to characterize an adaptation centered on the hunting of large now-extinct Pleistocene megafauna including mammoth, bison, camel, and horse. Fluted points have been found associated with extinct megafauna at several sites in the Desert West, primarily in southern Arizona. Clovis hunters are inferred to have practiced high mobility following game movements.

The environment during the Terminal Pleistocene was cooler and wetter than at present and Pleistocene lakes dotted the landscape throughout the Great Basin and Mojave Desert. Clovis points are rare in southern Nevada and are generally recovered from restricted contexts confined to lowland valleys

and lake shores. The distribution of these points may represent entry into the region by Clovis hunters along game routes. No Clovis points have been found in direct association with Pleistocene megafauna in southern Nevada, nor have they been found in stratified, well-dated contexts elsewhere in the Great Basin or Mojave Desert (Beck and Jones 2009). This inference is thus based primarily on analogy with Clovis finds in other areas.

PALEOINDIAN SITES IN THE PROJECT AREA

Paleoindian sites have been found within all of the defined geographic regions of the project area (West, Central, East, and South) but as shown in Figure 5.1, they are rare and widely dispersed. Only a small number of these sites have been investigated and reported.

Western Region

Most of the reported evidence for Paleoindian occupation of the project area comes from surface finds of fluted points. Many of these were found in and around Forty Mile Canyon near Mt. Diablo, Yucca Mountain, and Timber Mountain in the Western region of the project area (see Figure 5.1). The prevalence of fluted points in this area in comparison to the rarity of fluted points elsewhere suggests that this distribution is not a function of sampling bias and it is likely that the Forty Mile Wash area was a game corridor that attracted Paleoindian hunters (Jones and Edwards 1994:20). Site 26NY862 is a lithic scatter located on an alluvial fan near Mt. Diablo. The site contained hundreds of artifacts documenting long-term use throughout the Paleoarchaic period and into the Archaic period. One Clovis point, one Silver Lake point, a Pinto point, and a Humboldt Concave Base point were found, documenting this long-term use. Three Clovis points were found on the Nevada Test Site in the Forty Mile Wash area (Jones and Edwards 1994) and another Clovis point was found at a multicomponent lithic scatter on Jackass Flats near Forty Mile Wash (26NY3193). In addition to the Clovis point, 19 Lake Mojave and Silver Lake points were found at this site, along with Pinto, Gypsum, Elko, Humboldt, and Rose Spring points, indicating that this was a resource-rich area throughout the Archaic period and into the Ceramic period.

Central Region

The only site in the project area with radiocarbon dates dating to the Paleoindian period is the Tule Springs site, located in the Las Vegas Valley near Las Vegas Wash in the Central region of the project area (Figure 5.1). Several Pleistocene lakes were located near Tule Springs and during Paleoindian times Las Vegas Wash was a perennial stream. Pleistocene megafauna including mammoth, camel, horse, bison, sloth, and panther have been recovered from lacustrine mudstone deposits at Tule Springs. Harrington worked at the site in the 1930s, and Harrington and Simpson (1961) proposed that the earliest human occupation at the site dated to 28,000 B.P. based on the presence of lithic flakes and megafauna (camel, horse, bison) associated with "charcoal" deposits. Extensive trenching combined with radiocarbon dating was done at the site in the 1960s to determine if early human occupation was present (Wormington and Ellis 1967). This work established that the earliest level, E1, did not contain evidence of human occupation and the "charcoal" noted by Harrington and Simpson (1961) was not charcoal but organic spring deposits (Haynes 1967). Artifacts recovered from Stratum E2 were found in deposits dating to 11,000–12,000 B.P. (Shutler 1967). These included an obsidian flake, a possible bone tool, and a caliche bead; however, no diagnostic artifacts were found. These artifacts represent the earliest dated occupation of the project area. One quartzite scraper and several obsidian and chert flakes were found in deposits dating from 10,000–11,000 B.P. (Shutler 1967).

Several problematic finds of Paleoindian remains have also been reported from the Central region. Harrington (1933) found wooden artifacts within and below layers of sloth dung at Gypsum Cave in the Las Vegas Valley, leading him to argue that the cave was occupied during the Pleistocene. Subsequent work at the site has established that the bulk of these wooden artifacts date to the Late Archaic period and the sloth remains were not associated with human activity at the site (Gilreath 2009).

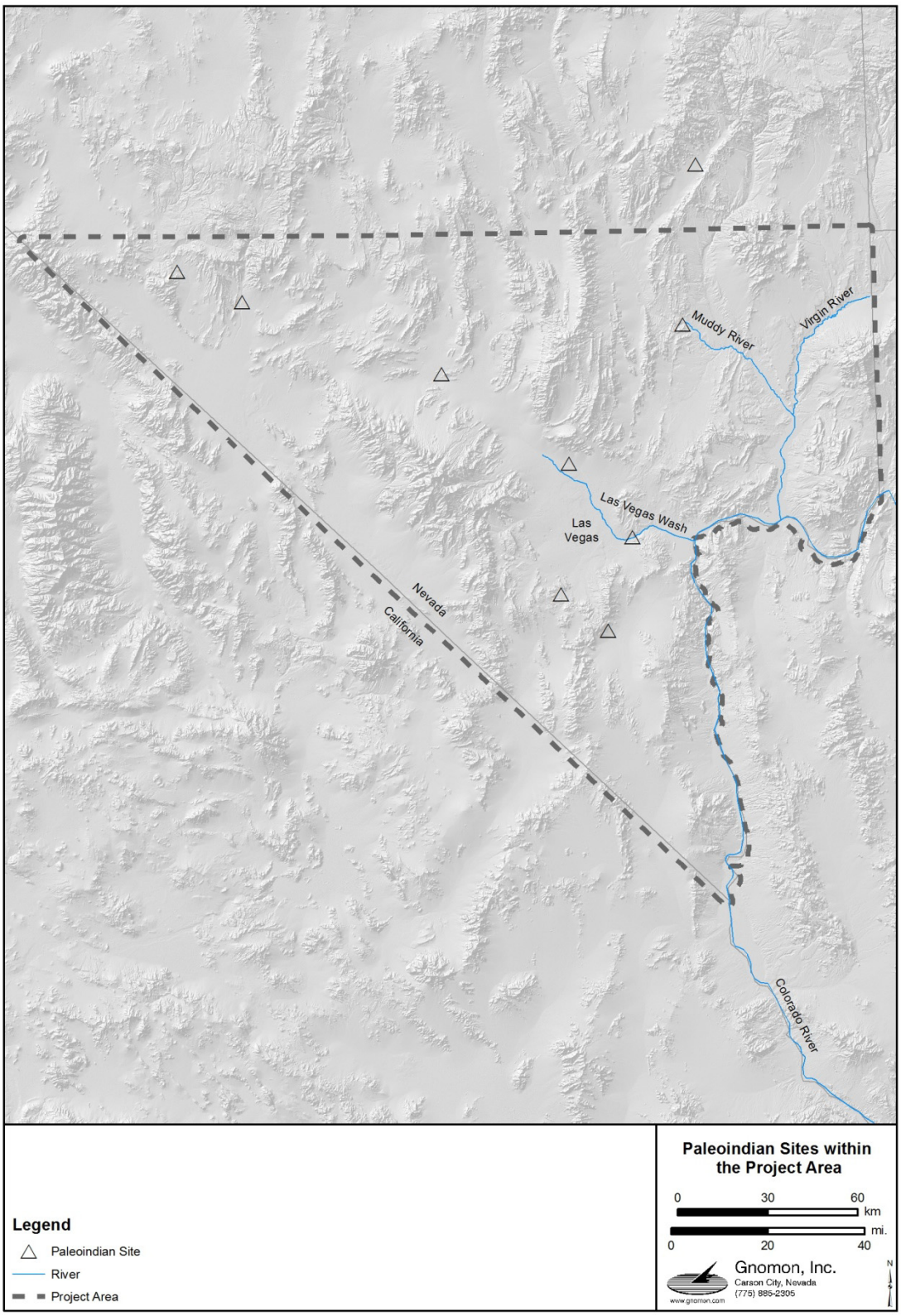


Figure 5.1. Paleoindian sites in the project area.

The excavators of Bird Springs Rockshelter (CK1) southeast of the Las Vegas Valley reported the recovery of a fluted point by a local collector (Clewlow and Wells 1980), but Ezzo and Majewski (1995) note that this point has never been found and refer to its recovery as "problematic."

Several surface finds of fluted points have been reported from the Las Vegas Valley. Roberts (2000) documented the base of a Clovis point at 26CK6000 located on desert pavement north of Las Vegas Wash. A second Clovis point was found on Nellis Air Force Base at the north end of the Las Vegas Valley (Roberts 2000). Perkins (1967) reported three Clovis point fragments from Lincoln County. Site 26LN251 is located on desert pavement on an old alluvial fan near the Delamar Mountains and yielded two Clovis points. Nearby sites contained Silver Lake, Pinto, and Gypsum points, indicating that groups may have been drawn to the springs in the area throughout the Paleoarchaic and Archaic periods.

NVCRIS SITE DISTRIBUTIONS

The distribution of Paleoindian sites, represented by fluted points (Figure 5.1), supports the data from the reported sites in showing that Paleoindian use of the project area was sporadic yet patterned. The majority of these sites were found in the Nevada Test Site region near Forty Mile Wash in the northwestern portion of the project area. The remaining finds are from lowland valleys. One site was found on a lake shore along with multiple Great Basin stemmed points. The distribution supports Jones and Edwards' (1994) idea that Paleoindian groups entered the area following game corridors. These data provide evidence of small-scale hunting forays into the region by highly mobile groups. This pattern mirrors the pattern of Paleoindian occupation identified in the central Mojave Desert (Warren and Crabtree 1986).

SUMMARY

No evidence of a substantial Paleoindian occupation of the project area is indicated by the existing data. These sporadic finds of fluted points and the dates from Tule Springs instead suggest small-scale Paleoindian forays into the region. Schroedl (1991) has suggested that Paleoindian occupations may have continued at higher elevations after Early Archaic occupations appear, but no evidence for this has yet been found in the project area.

EARLY ARCHAIC PERIOD (11,000–7500 B.P.: 9050–5550 B.C.)

The Early Archaic period in the Great Basin and Mojave Desert is represented by stemmed points comprising what is known as the Great Basin Stemmed series (Bryan 1980; Willig and Aikens 1988). In southern Nevada, this time period is often referred to as the Lake Mojave period (Warren and Crabtree 1986). Diagnostic projectile points most commonly associated with this period in southern Nevada include Lake Mojave and Silver Lake points (Amsden 1937). Pippin has also identified a stemmed point type from Pahute Mesa that he classifies as Long Straight Stemmed (Pippin 1997:48). This point type has a squared shoulder and straight-sided stem. Obsidian hydration results indicate that it is contemporaneous with Lake Mojave and Silver Lake points on Pahute Mesa (Pippin 1995).

Debate continues over the relationship between fluted and stemmed points in the Great Basin (Beck and Jones 2009; Graf and Schmitt 2007; Willig and Aikens 1988). Willig and Aikens (1988:11) proposed that stemmed points "post-date, but closely follow Clovis," and most researchers think that stemmed points are temporally later than fluted points (see chapters in Willig and Aikens 1988; Graf and Schmitt 2007); however, this is not universally accepted (Beck and Jones 2009). Fluted and stemmed points co-occur at some sites, but Warren and Phagan (1988) argue that the two point styles are technologically and culturally distinct and that the co-occurrence does not represent temporal overlap. Stemmed points dating to 12,200–11,200 B.P. have been recovered at several Paleocoastal sites on the Channel Islands in California (Erlandson et al. 2011). Erlandson et al. (2011:1184) argue that these island assemblages are "unlikely to be descended from Clovis" but suggest that they can be linked to the Western Pluvial Lakes tradition (Great Basin Stemmed series). Further technological studies are needed

to determine if these stemmed point types are related and to determine the temporal relationships of coastal and interior sites with stemmed points.

Sites with Great Basin stemmed points are generally dated based on geological association with lake shores, although several stratified cave and rockshelter sites in the Great Basin have yielded radiocarbon dates that generally support the inference that they were later than fluted points. Dates from rockshelters in the northern Great Basin such as Fort Rock, Connley Caves, and Dirty Shame Rockshelter place the use of stemmed points at 10,200 to 7300 B.P. (Willig and Aikens 1988:13). Smith Creek Cave in northern Nevada yielded dates of 9940±170 and 11,140± 200 B.P. (Bryan 1980). In the vicinity of the project area, dates on stemmed points have been obtained from several stratified sites on Fort Irwin in the Mojave Desert, including Henwood, Rogers Ridge, and the Awl Site, and these dates place the use of stemmed points at 7000 - 9000 B.P. (Jenkins 1987; Warren 1991).

Stemmed points have been recovered from Pleistocene lake shores throughout the Great Basin and Mojave Desert. The association of these point styles with lake shores and lowland valley settings that supported marsh communities led Bedwell (1973) to posit that they represented a lacustrine-focused occupation that he called the Western Pluvial Lakes tradition. Although this term is no longer used, in part because stemmed points have also been recovered from upland contexts, for the most part stemmed points have been found in association with wetland settings, especially in the Mojave Desert. It is clear that lacustrine and marsh resources were an important component of Early Archaic adaptations in southern Nevada.

Stemmed points appear to have been used for multiple functions rather than solely as dart points (Beck and Jones 2009). This is possibly tied to the fact that groups using these point styles were less specialized than those using fluted points, focusing on a wider variety of wild resources. Stemmed point sites often contain crescents, a tool type that appears to be diagnostic of the Early Archaic period in the southern Great Basin and Mojave Desert. The function of crescents is not known, but they may have been used as specialized cutting or processing tools (Beck and Jones 2009). Recent finds of crescents associated with stemmed points at coastal sites on the Channel Islands in California indicate that this tool type dates as early as 12,000 B.P. and was associated with a maritime adaptation (Erlandson et al. 2011). As with the stemmed points discussed above, the technological and temporal relationships between the crescents found on these island sites and those found in the Mojave Desert and Great Basin are in need of further investigation.

EARLY ARCHAIC OCCUPATION OF THE PROJECT AREA

The bulk of the Early Archaic sites in the project area are surface finds of Great Basin Stemmed series points, primarily Lake Mojave and Silver Lake points. No stratified sites with well-dated Early Archaic components are present in the project area, but several sites have yielded radiocarbon dates dating to this period (Figure 5.2). Several Early Archaic sites have been investigated and reported and many of these are multicomponent sites that are occupied into the Middle and/or Late Archaic periods.

Western Region

The majority of reported Early Archaic sites have been found in the Western Region, primarily in the Forty Mile Wash area. The prevalence of Early Archaic sites in this area is likely due to the fact that the area has been extensively surveyed, but it is also related to the environmental setting. This well-watered area appears to have attracted foragers throughout the Archaic period and is also an area where Paleoindian sites were present.

Two excavated sites in the Yucca Mountain/Forty Mile Wash area provide information on the Early Archaic occupation of this area. The Alice Hill site (26NY1011) and Tarantula Canyon (26NY8187) are both multicomponent sites with a large number of stemmed points, suggesting repeated use during the Early Archaic period (Buck et al. 1998). The Alice Hill site is a lithic and ground stone scatter located on a terrace above Yucca Wash near its confluence with Forty Mile Wash. The Early Archaic component was represented by 11 points, including five Lake Mojave, one Silver Lake, and five untyped stemmed points. Domed scrapers were also prevalent. Fewer points were found with the later

components, leading Buck et al. (1998) to suggest that a shift in site use occurred over time from a focus on hunting during the Early Archaic to a focus on raw material procurement, specifically welded tuff, during later periods.

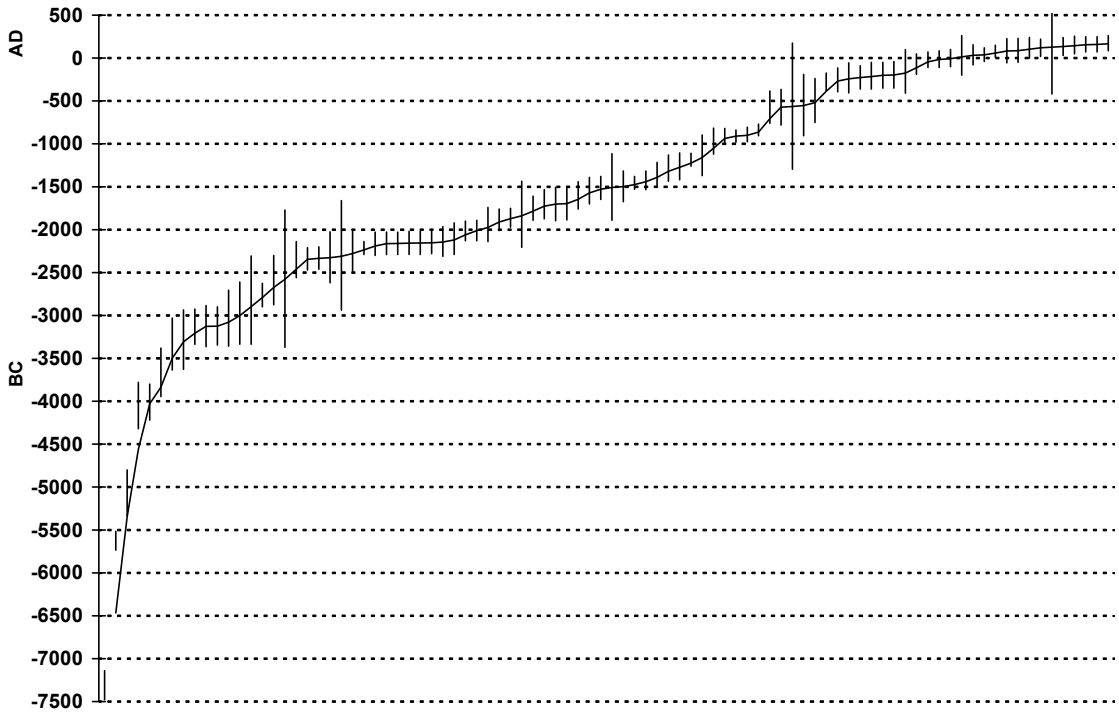


Figure 5.2. Archaic period radiocarbon dates: two-sigma calibrated date ranges with moving-average trend line.

The Tarantula Canyon site is also a multicomponent site located on an alluvial fan in the Forty Mile Wash area. It yielded six Great Basin stemmed points along with three Pinto, three Humboldt, one Gypsum, one Elko, and one Rosegate point. Buck et al. (1998) recorded a large number of formal tools at the site and they interpret it as representing long-term repeated episodic use for resource procurement.

An extensive complex of surface lithic scatters has been found in the Yucca Mountain/Forty Mile Wash area, many of which contain Great Basin stemmed points (Haynes 1996). Many of the sites are multicomponent, with evidence of Early, Middle, and Late Archaic occupations. Gregory Haynes (1996) found that tool stone procurement became highly patterned during the Early Archaic, with specific material types targeted for specific tool types, regardless of raw material access. Obsidian was used exclusively for projectile points while chert was reserved for scrapers. This patterning in raw material use points to highly standardized behavior by Early Archaic groups.

Central Region

Several sites in the Central Region have yielded radiocarbon dates that fall within the Early Archaic period. One piece of basketry found in Room 3 at Gypsum Cave dated to 9275 B.P. (Gilreath 2009), but its context does not provide any information on the Early Archaic occupation of the cave and it is possible that the basket was placed there as an early component of ritual use of the cave (see below). Charcoal from a hearth at Pintwater Cave (26CK253) dated to 9300 B.P., but the hearth was near the surface of the cave and the bulk of the occupation dates to the Late Archaic period, so Buck and DuBarton (1994) argue that the early date most likely derives from the burning of packrat midden materials. Three Lake Mojave points were recovered from Flaherty Rockshelter (26CK415) in the

northeastern Las Vegas Valley but the site did not yield any radiocarbon dates dating to the Early Archaic period (Blair and Wedding 2001).

Other sites with Great Basin stemmed points have been found scattered throughout the Central Region of the project area. Rafferty (1984b) reported five sites along Duck Creek in the southern Las Vegas Valley that contained Lake Mojave and Silver Lake points. These sites also contained numerous other tools including cores, choppers, and large scrapers, providing evidence of a focus on resource processing. Roberts and Ahlstrom (2000) reported a Lake Mojave point from the Dry Lake Valley, numerous Great Basin stemmed points were found along playas at Nellis Air Force Base, and Warren (personal communication, n.d.) reported a Lake Mojave point near Jean Lake southwest of the Las Vegas Valley. Again these sites appear to reflect a focus on wetland resources by Early Archaic foragers in the project area.

Eastern Region

Site 26CK6185 in the Eastern region may represent a single component Early Archaic site (Roberts 2002a). It is a large lithic scatter with two rock features located on a low terrace near California Wash. Diagnostic points recovered from the surface were confined to a Lake Mojave and a Silver Lake point, although one basal-notched point was also found. In addition to the points, leaf-shaped bifaces and thumbnail and end scrapers were found on the surface, and these tool types are generally associated with Early Archaic occupations (Warren and Crabtree 1986). No ground stone was found (Roberts 2002a).

NVCRIS SITE DISTRIBUTIONS

As can be seen in Figure 5.3, the number of recorded Early Archaic sites with Great Basin stemmed points is substantially greater than the number of Paleoindian sites. It is also apparent, however, that this distribution is targeted toward particular resource zones, primarily lake shores and wetlands. This mirrors the pattern found elsewhere in the Great Basin (Beck and Jones 2009). The Forty Mile Wash area in the northwestern portion of the study area contains the largest number of sites with significant quantities of Great Basin stemmed points, primarily Lake Mojave and Silver Lake points. This area also has the largest number of Paleoindian sites, indicating that it was resource-rich during the Terminal Pleistocene and Early Holocene. Many Early Archaic sites have been found along the Eglington Escarpment in the Las Vegas Valley in the Central region of the project area and this also represents an area that had a reliable water supply and abundant wild resources prehistorically.

SUMMARY

Early Archaic occupations are more common in the project area than fluted point sites and are found more widely distributed in a number of environmental zones (Figure 5.3). These sites appear to reflect the pattern observed in the Great Basin and Mojave Desert regions north and west of the project area in that most of these occupations are associated with lacustrine and spring settings, suggesting a focus on wetland resources. In general, both Paleoindian and Early Archaic sites lack features and ground stone, indicating a focus on hunting or gathering of plant resources that did not require extensive grinding or parching.

MIDDLE ARCHAIC – PINTO PERIOD (7500–4000 B.P.: 5550–2600 B.C.)

Sometime after 8500 B.P., the Pleistocene lakes that dotted the landscape of the region began to dry up. This lake desiccation was followed by an overall climatic warming and drying trend called the Altithermal that marks the beginning of the Middle Holocene (Antevs 1955). Antevs thought that this drying period resulted in the abandonment of large portions of the Desert West. Further research has documented that although some regions were abandoned during the Middle Holocene, others continued to be occupied, especially in areas with springs, streams, or other reliable water sources. The distribution of

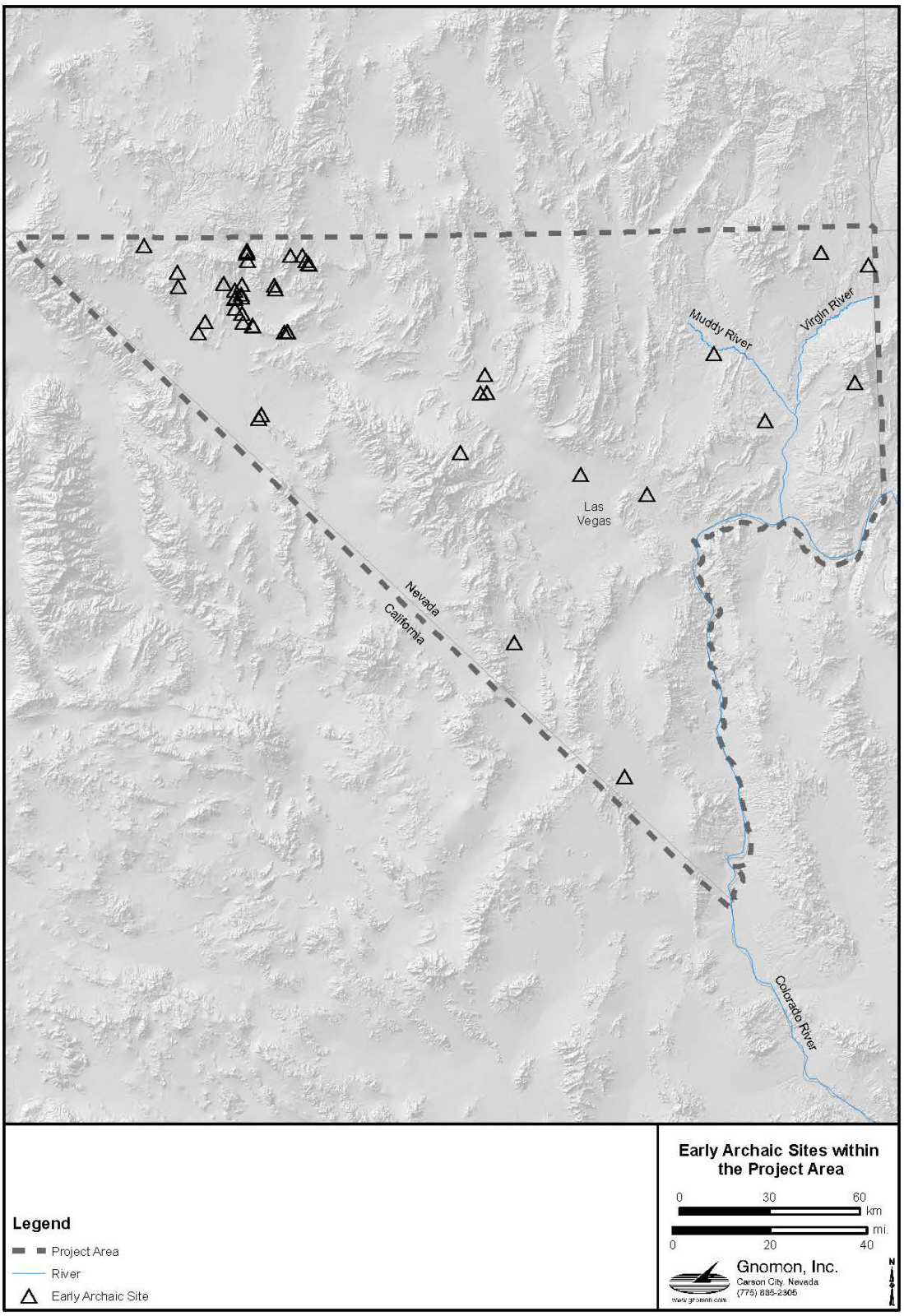


Figure 5.3. Early Archaic sites in the project area.

Middle Archaic sites tends to confirm this, as they are generally found near springs or streams. Middle Archaic sites are generally defined based on the presence of Pinto points, which are often found with leaf-shaped bifaces and domed scrapers (Warren and Crabtree 1986).

The relationship between Pinto points and stemmed points has been debated. Pinto points in the Mojave Desert have been found associated with Lake Mojave and Silver Lake points in the Fort Irwin area and along the shores of Pleistocene Lake Mojave, and continuity between the two is implied (Basgall 2000; Warren 1984). Changes in Pinto points may have occurred during the Middle Archaic period, as larger, broader Pinto points are likely associated with the earlier portion of the period, while smaller Pinto points occur later in the period (Vaughan and Warren 1987), perhaps associated with the shift to the use of the atlatl instead of spear. Pippin (1997) has also suggested that Pinto points may be earlier in the eastern Great Basin than in the Mojave Desert.

The Middle Archaic period in this region is characterized by an adaptation focused on generalized foraging and a broad-spectrum economy (Basgall 2000; Basgall and Hall 1992). Some Middle Archaic sites contain ground stone, usually small one-hand manos and flat or basin metates, indicating an increase in seed processing (Warren and Crabtree 1986). Warren (1984) argues that groups continued to focus on hunting and this may have led to a decrease in population in the Mojave Desert as game decreased with continued aridity.

To the north of the project area, the Middle Archaic component at O'Malley Rockshelter (26NY418) is apparently associated with generalized hunting and gathering activities (Fowler et al. 1973). The lower levels of the rockshelter yielded radiocarbon dates that encompass the Middle Archaic period. Unit I (comprising the lowest stratigraphic levels) was dated from 6500 to 7100 B.P. and contained two hearths, bison bone fragments, a basin metate, and Elko points. Unit II was dated from 3900 to 4600 B.P. and yielded ground stone, many stone tools, and Pinto and Humboldt points. Three Lake Mojave point bases were found in Unit II suggesting either reuse of these points or some degree of mixing within the rockshelter deposits.

MIDDLE ARCHAIC SITES IN THE PROJECT AREA

Middle Archaic sites, defined as sites with Pinto points and/or radiocarbon dates dating to the period, are relatively well-represented in the project area, especially compared with earlier Paleoarchaic components (Figure 5.3). As with the Paleoarchaic sites in the project area, most Middle Archaic sites are surface finds of Pinto points, often from multicomponent sites. However, numerous excavated sites have yielded Middle Archaic components, including radiocarbon dates that fall within the Middle Archaic period.

Western Region

Ten Middle Archaic sites have been reported from Ash Meadows in the southern Amargosa Valley (Figure 5.4; Lyon et al. 2008). This area was relatively lush throughout prehistory, offering a variety of wild resources including marsh resources, piñon, and mesquite. No evidence of Early Archaic occupation was found in Ash Meadows. Although Lyon et al. (2008) suggest that Early Archaic sites may be buried, it is also possible that the area was not occupied until piñon moved into the area at around 7500 B.P. Eight of the 10 sites are multicomponent, indicating that groups continued to move into the region once they initially occupied it. The Middle Archaic sites represent both seasonally used campsites and short-term hunting camps. Similar site types have been reported from the Forty Mile Wash/Yucca Mountain area; many of these are multicomponent sites with Great Basin stemmed points, Pinto points, and Gypsum and/or Elko points.

Central Region

Work at the Pardee site (26CK3799), a large multicomponent lithic and ground stone scatter along the Eglington Escarpment in the Las Vegas Valley yielded several thermal features with early Middle Archaic dates of 6730 and 6160 B.P. (Blair et al. 2000; see Appendix A). One Pinto point was found on the site surface. Other features were found clustered near the two dated features and these may

also be Middle Archaic in age (Blair et al. 2000). Another thermal feature at the site was dated to the latter portion of the Middle Archaic (ca 4400 B.P.). A dart shaft from Pintwater Cave dated to 6500 B.P., but little is known about the occupation associated with this date. No Pinto points were found at the site, but Buck and DuBarton (1994) report finding several Gatecliff Split Stem points, which are similar to Pinto points.

At the Corn Creek Dunes site (26CK2605), Williams and Orlins (1963) reported Middle Archaic period radiocarbon dates ranging from 4000 to 5200 B.P. from a number of hearths located in dunes adjacent to spring mounds (Appendix A). The hearths were associated with debitage, tools, and ground stone but no diagnostic projectile points were found. Williams and Orlins (1963) noted that the site contains an "Altithermal" occupation. Subsequent work at the site by HRA Inc. also yielded Middle Archaic dates concentrating in the 4200 to 4400 B.P. range (Appendix A). These data suggest that the area around Corn Creek was an important locus of occupation during the Middle Archaic period, likely due to the presence of a reliable water source.

The Middle Archaic occupation of Flaherty Rockshelter (26CK415) in the Apex area of northeastern Las Vegas Valley is, unfortunately, poorly documented. No Pinto points are reported from the shelter, but Gatecliff Split Stemmed points were found. One radiocarbon date from the shelter falls within the Middle Archaic period (5100 B.P.) but no other data are available on the Middle Archaic occupation of this site (Blair and Wedding 2001).

Susia (1964) reported on a surface Middle Archaic component at Tule Springs that contained Pinto points and numerous stone tools. No ground stone was found at the site. Susia (1964) argued that the site exhibited a different pattern than was observed by Williams and Orlins (1963) at the nearby Corn Creek Dunes site. The Pinto component at Tule Springs had no ground stone, lacked features, and contained a wider variety of cherts than did Corn Creek Dunes, which had abundant ground stone and numerous features. Susia suggested that temporal and/or regional differences could account for the differences. It is also possible that seasonal or functional differences can account for the variation she observed, as it appears that Corn Creek Dunes was used primarily for plant procurement and processing.

An extensive Middle Archaic occupation has been reported at the Twin Dunes site located near two spring mounds along the Eglington Escarpment (Figure 5.4). Surface collections at the site yielded 351 projectile points, ground stone, a variety of other stone tools, and ceramics pointing to long-term repeated seasonal use of the site (Rafferty 1985b). Most of the diagnostic points were Pinto points (N=35) and it appears that Middle Archaic groups were attracted to the area because of the presence of spring mounds. Rafferty (1984b) also reported five Middle Archaic sites in the Duck Creek area of the southern Las Vegas Valley. Several of these were large scatters and some had fire-cracked rock features. The sites were located in dunes, and like the Corn Creek Dunes site, it is likely that Middle Archaic groups focused their efforts on plant procurement and processing there.

NVCRIS SITE DISTRIBUTIONS

Sites with Pinto points and radiocarbon dates falling within the Middle Archaic period are found widely distributed throughout the project area with the exception of the far southern end, but this may be due to a lack of survey coverage in the Southern Region rather than an absence of sites (Figure 5.4). The distribution of Middle Archaic sites in the project area is much more extensive than would be expected if an "Altithermal abandonment" had occurred in this region. Middle Archaic sites tend to be concentrated in the uplands and mountain foothills or in areas with reliable water sources. A few sites with Pinto points are located along lake shores. In general these are multicomponent sites with Early Archaic stemmed points, suggesting that all lakes were not completely dry by the beginning of the Middle Archaic period and implying some level of continuity as has been proposed for other portions of the Mojave Desert.

The distribution of Middle Archaic sites shows that ground stone and features are far more common during this period than during the Early Archaic period (Figures 5.5 and 5.6). Sites with features form a surprisingly high percentage of the known Middle Archaic sites (~30 percent), suggesting a shift in behavior toward more processing activities. Figure 5.5 shows that sites with features are found in all

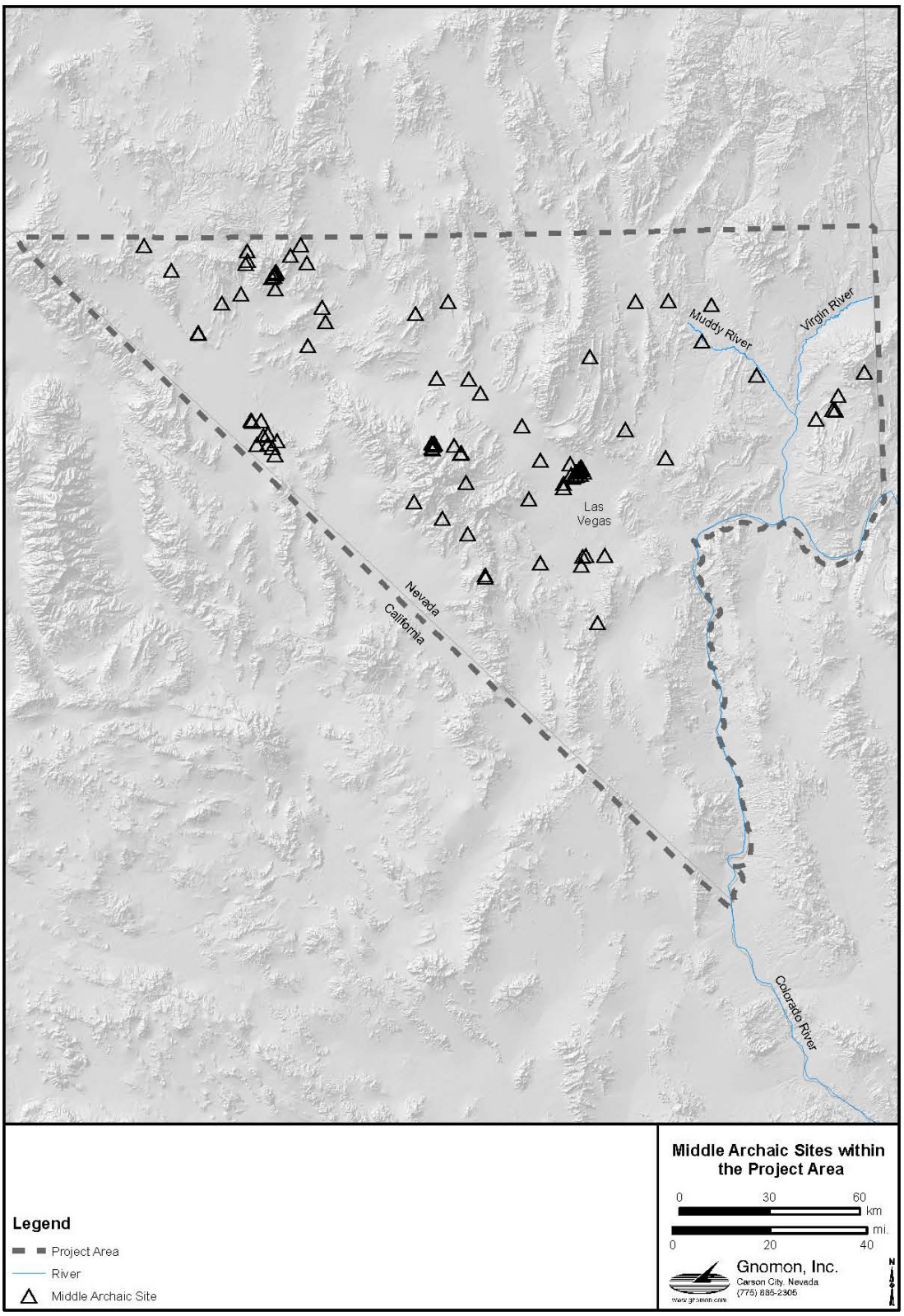


Figure 5.4. Middle Archaic sites in the project area.

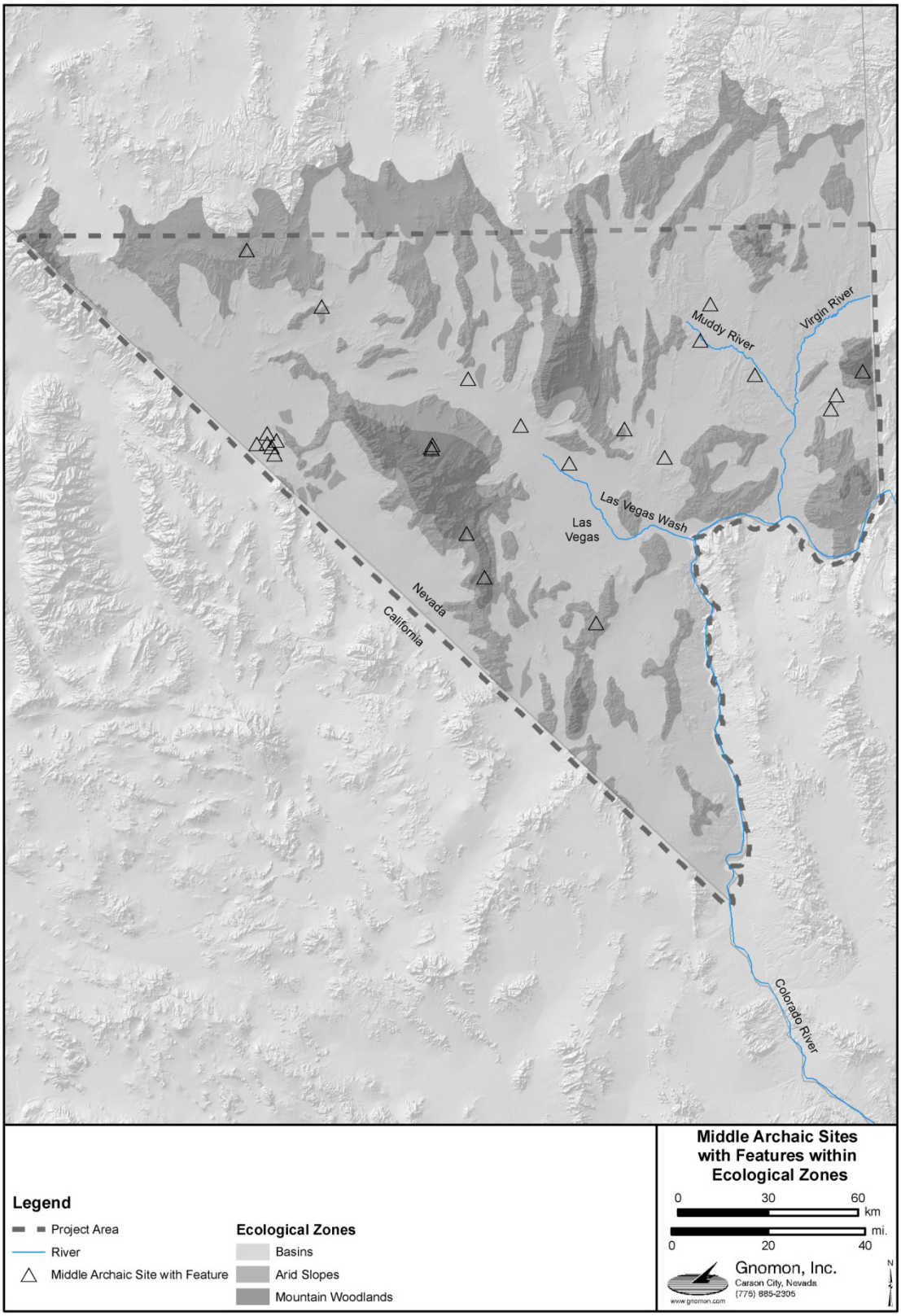


Figure 5.5. Middle Archaic sites with features by ecological zone.

ecological zones within the project area. Sites with rock rings are rare and are only found in upland settings. The features were apparently used for a wide variety of processing activities and as camp hearths. This indicates that Middle Archaic period occupations represent generalized foraging activities. Figure 5.6 shows that the distribution of Middle Archaic sites with ground stone and/or evidence of processing activities. These sites are also widespread and are found in multiple ecological zones. The presence of sites with features and ground stone in the piñon-juniper zone indicates that piñon use intensified during this period.

SUMMARY

Middle Archaic occupations appears to be tied to what Ahlstrom et al. (2004) refer to as "desert oases." These well-watered, resource-rich areas would have been particularly attractive to Middle Archaic period foragers as the climate changed; the warming and drying trend may have led them to diversify their subsistence strategies, incorporating a larger number of resources and focusing on well-watered areas. The wide distribution suggests a pattern of generalized foraging similar to that documented in the Fort Irwin area to the west of the project area (Basgall 2000; Basgall and Hall 1992). The focus of occupation in the project area appears to have been springs and streams that provided reliable water sources and likely attracted game.

LATE ARCHAIC – GYPSUM PERIOD (4000–1550 B.P.: 2600 B.C.–A.D. 400)

The Late Archaic period witnessed climatic amelioration beginning between 4000 and 4500 B.P. The more mesic climate resulted in some lake and spring recharge and is argued to have been associated with an increase in the availability of large game, especially bighorn sheep, along with an increase in the availability of plant resources. The Late Archaic period is characterized by a number of dart point styles, including Gypsum, Elko series (Elko Eared, Elko Corner-notched), and Humboldt Concave Base points (Warren and Crabtree 1986). The prevalence of ground stone increased during the Late Archaic and the mortar and pestle were first used, most likely for mesquite processing. Late Archaic groups were still mobile foragers, but site data indicate that the settlement-subsistence system was becoming more complex. Many specialized hunting sites have been recorded and large base camps were present in resource-rich areas, suggesting that a shift to logistical mobility occurred with groups inhabiting productive locales and exploiting adjacent resource areas with task-oriented forays.

Recently, the role of hunting during the Late Archaic period has been hotly contested. McGuire and Hildebrand (2005; see also Byrd et al. 2009; Hildebrand and McGuire 2002) have argued that the increase in the hunting of large game documented at Late Archaic period sites does not correlate with diet breadth models from behavioral ecology that predict that Late Archaic groups should have exploited high-ranking, easily obtained plant resources that would have proliferated with more mesic conditions, rather than large game. They argue that the increase in big game hunting, especially of bighorn sheep, is instead tied to a strategy where males hunted to gain prestige and power, providing them access to mates. Basgall (2000; Basgall and Hall 1992) argue for a different pattern. They see big game hunting as part of a more generalized pattern of hunting and gathering that incorporated a number of high quality resources. An increase in the use of valley floors is documented during the Late Archaic, and this may indicate that mesquite became an important component of the diet.

The Late Archaic period is also associated with a substantial increase in evidence of ritual behavior. This is manifest in several areas, including rock art (see Chapter 8), the presence of ritual caves, and the production of split-twig figurines that are inferred to represent bighorn sheep. Split-twig figurines have been recovered from a number of cave sites in California, Arizona, and Nevada (Coulam and Schroedl 2004). Although their recovery context clearly indicates their use as ritual objects, it is unclear what kinds of rituals they were associated with. They have been interpreted as both totemic symbols and as items associated with hunting magic.

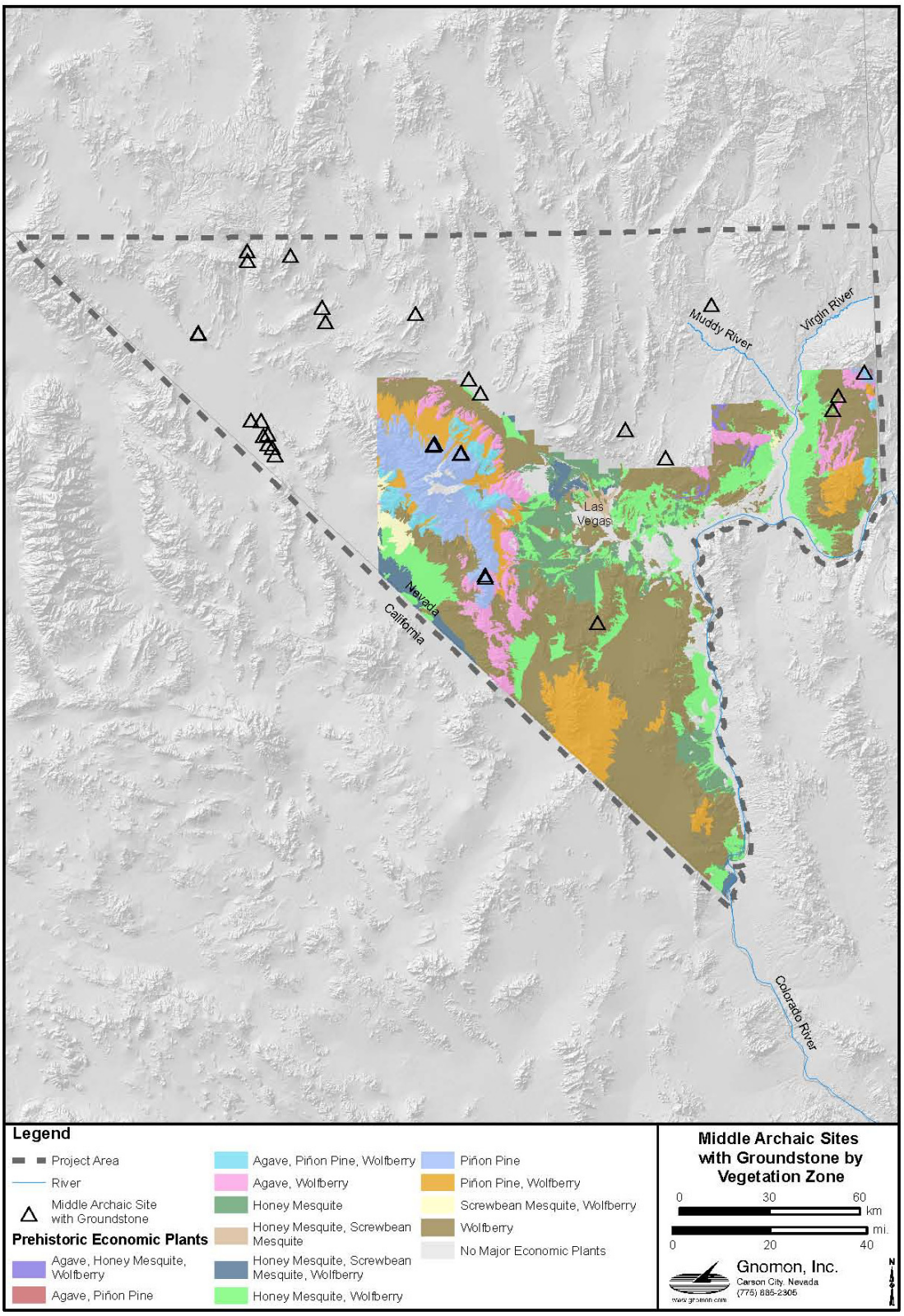


Figure 5.6. Middle Archaic sites with ground stone and/or evidence of processing activities related to the prehistoric economic vegetation zones.

The site in the region that is best known for this ritual behavior is Newberry Cave (CA-SBR-1999) located in the Mojave Desert in the Newberry Mountains near Barstow, California. Davis and Smith (1981) reported on the recovery of split-twig figurines and numerous figurine fragments along with other artifacts that, they argue, provide evidence of "magico-religious activities." Eleven split-twig figurines and 394 figurine fragments were recovered in Late Archaic period contexts at the site. Additional artifacts include broken dart shafts, crystals, a piece of bighorn sheep dung wrapped in sinew that was interpreted as a pendant, and sinew-wrapped feathers. Elko and Gypsum points were the predominant diagnostic projectile points recovered from the cave deposits and radiocarbon dates from the site range from 2900 to 3700 B.P. Davis and Smith (1981) remarked on the lack of domestic materials found in the cave. The recovered materials point to specialized use of the cave for hunting rituals.

A number of split-twig figurines were found in association with a Late Archaic occupation represented by Gypsum points and dart shafts at Etna Cave near Caliente, Nevada (Fowler et al. 1973; Wheeler 1942). A later Anasazi occupation was also documented at the site; this component was associated with a number of storage pits, leading to its designation as a cache cave. The presence of split-twig figurines and broken dart shafts, along with the apparent lack of other domestic-related artifacts in Late Archaic deposits at Etna Cave, suggest that it was used as a specialized ceremonial cave.

Evidence for domestic activities has been found at several cave sites in the region. At O'Malley Shelter (26LN418), located in the piñon-juniper zone near the Nevada-Utah border, seven cultural units with 21 strata were identified; the lower four units date to the Archaic period (Fowler et al. 1973). The Late Archaic occupation was found in Units III and IV associated with Gypsum and Elko points. Unit II was dated to 3900 B.P.; a late Middle Archaic classification for this unit is suggested by a hiatus represented by 1.8 m of fill following its deposition. Units II and III exhibit an increase in the percentage of recovered ground stone and Unit III contained many stone tools, hearths, and "use areas." These suggest increasing occupational intensity over time, perhaps tied to an increase in plant use given the increase in ground stone.

Bighorn Cave, located in the Black Mountains of west-central Arizona on the Lower Colorado River, is a large stratified rockshelter that contained substantial Late Archaic deposits (Geib and Keller 2002b). The Late Archaic component is represented by Gypsum and Elko points and a series of radiocarbon dates ranging from 3000 to 2400 B.P. Three split-twig figurines were found at the site and are likely associated with the Late Archaic component. Several hearths and a large storage pit were found in the Late Archaic levels; Geib and Keller (2002b) suggest that the pit was used to store mesquite. Faunal remains reveal the hunting of a variety of local game. The site also had a substantial Terminal Archaic occupation that included hearths, storage pits, and several coprolites containing agave, mesquite, and cacti.

LATE ARCHAIC SITES IN THE PROJECT AREA

Our knowledge of the Late Archaic period occupation of the project area comes from two primary sources: (1) the excavation of several stratified rockshelters and (2) surface lithic scatters (Figure 5.7). These sites have yielded Gypsum and Elko projectile points, as well as radiocarbon dates that fall within the Late Archaic period.

Western Region

Lyon et al. (2008) identified substantial Late Archaic occupations in the Ash Meadows region; many of these are multicomponent scatters with earlier Pinto components suggesting long-term reuse. A large number of sites with Late Archaic components have been recorded in the Forty Mile Wash area and many of these sites (Alice Hill, Tarantula Canyon, 26NY03193) contain evidence of occupation throughout the Archaic and into the Ceramic period (Buck et al. 1998).

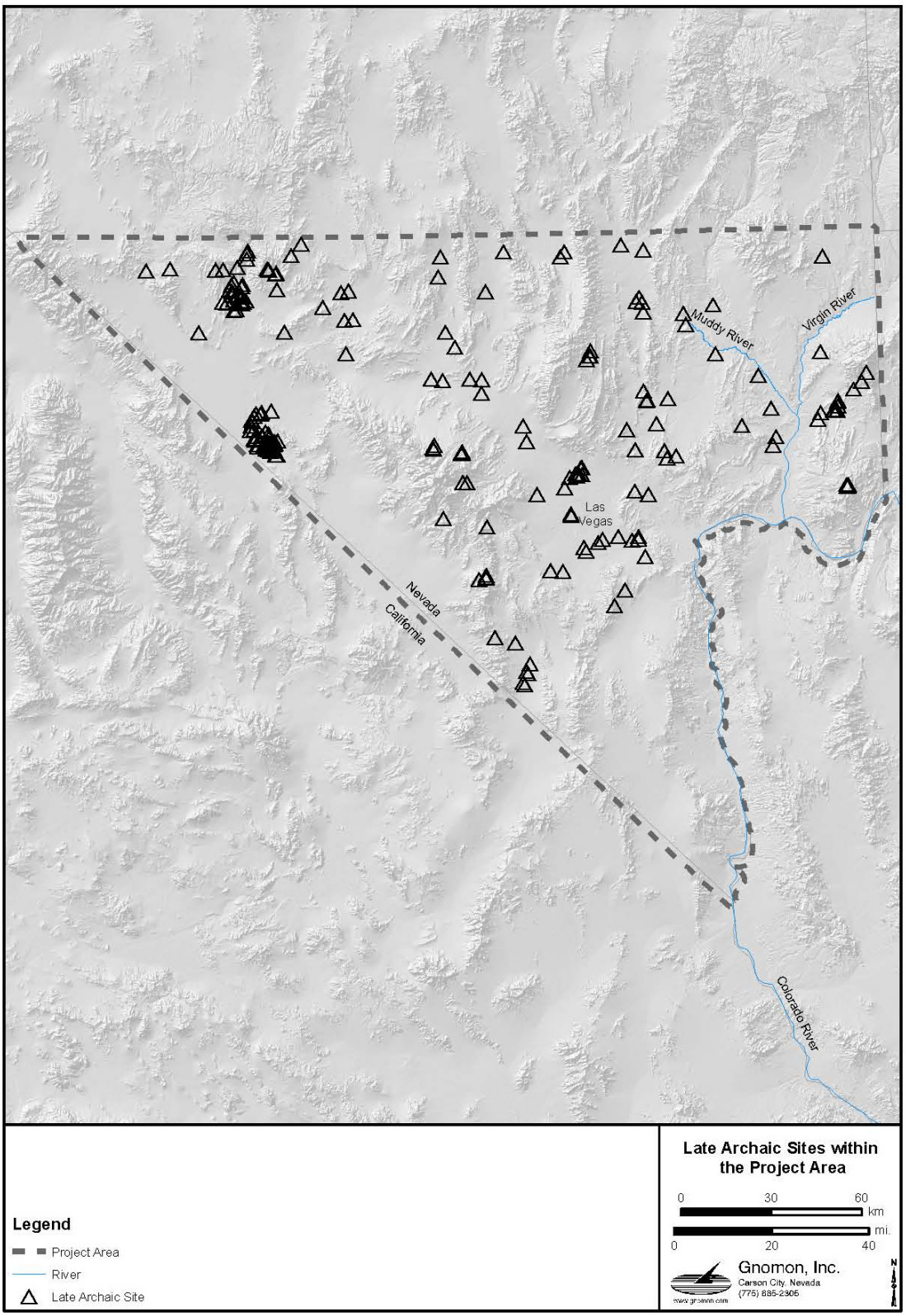


Figure 5.7. Late Archaic sites in the project area.

Central Region

Most of our knowledge of the Late Archaic occupation of the project area comes from excavated sites in the Central region. Gypsum Cave (26CK5) is the best known of all of the Late Archaic cave sites in the project area. It is known primarily from Harrington's (1933) work there in the late 1920s and early 1930s and his argument that sloth dung from the cave was associated with artifacts dating back to as early as 12,000 B.P. Reanalysis of Harrington's data and recent work at the site have documented a wealth data on the Late Archaic and later times (Gilreath 2009). Late Archaic materials have been identified from all of the cave's five chambers, but are concentrated in Rooms 1 and 3. Room 1 also contained a significant later component associated with abundant perishables, including corn cobs. Appendix A presents the radiocarbon dates from recent work at Gypsum Cave (Gilreath 2009). These data show that the Late Archaic component falls within the time period from 2400 to 3800 B.P. and most of the dates post-date 3000 B.P.

The Late Archaic assemblage recovered from Gypsum Cave appears to reflect specialized use for ritual activities. The ritual use of the cave is indicated by the present of a large number of dart fragments that appear to have been intentionally broken. Many of the fragments were decorated with paint and feathers. Several were dated and fall within the Late Archaic period (Gilreath 2009). One, which dated to 3400 B.P., was found below a layer of sloth dung, illustrating the complex taphonomic processes evident in the cave deposits. Room 3 contained other ritual items including two wooden flutes, a bighorn sheep hoof rattle, a "gaming" stick, and bundled feathers (Gilreath 2009). Very little evidence of domestic activity was found in the cave deposits dating to the Late Archaic period, in contrast to the remains of domestic activities evident in the upper Ceramic-period deposits in Room 1.

Ritual behavior at Gypsum Cave can also be inferred on the basis of the location of these specialized artifacts in crevices and deep recesses of the cave. Ethnographic data support the inference of ritual use, as they point to the placement of objects in these contexts during ritual performance. Caves were chosen for these rituals because they were perceived as having powerful energy. Paiute ethnographic data indicate that Gypsum Cave may have been a ritual "song cave" where shamans went to gain power (Gilreath 2009).

Other evidence of ritual behavior in the Central region during the Late Archaic comes from Firebrand Cave (26CK5434) (Blair and Winslow 2006). Little evidence of domestic activity was found at the site, but abundant evidence of ritual activities was recovered. A large number of dart fragments and some arrow fragments were found in the cave. These were apparently intentionally broken, suggesting ritual "killing" of the objects. These specimens resemble similar broken dart fragments recovered from Gypsum (Gilreath 2009) and Pintwater Caves (Buck and DuBarton 1994). Many of the darts were decorated with paint. In addition to the "killed" darts, other ritual items were found. Two forked branches referred to as regalia by the excavators were recovered and have been inferred to represent "spirit sticks" used ethnographically in ceremonies (Blair and Winslow 2006). Eight pahos (prayer sticks) were found in the cave. One desiccated barn owl skeleton was found that appears to have been an offering. Torches were found throughout the cave and in crevices, and one room of the cave has a natural outcrop of ochre. Other perishables were well-preserved at the site and support the inference of ritual behavior. One basketry tray found on a rocky shelf dated to 3200 B.P. (Appendix A). Cordage stained with red ochre recovered from the cave dated to 3600 B.P. (Appendix A). One net fragment that likely represents a carrying net dated to 4300 B.P.

In contrast to the abundance of ceremonial artifacts, no evidence of domestic activities was found; no hearths were present and no debitage, non-ritual faunal remains, or other more "mundane" artifacts were found. All of this indicates that the site was used for highly specialized ritual activities during the Late Archaic and possibly later periods (Blair and Winslow 2006).

Radiocarbon dates on dart components from Firebrand Cave extend back to 4400 B.P., with most dates falling in the 3200 to 3800 B.P. range (Appendix A). If the radiocarbon dates are representative, these dates and those from Gypsum Cave hint at the fact that the ritual behaviors documented at these special-use sites fall within a relatively short time frame from 3400 to 3800 B.P.

Pintwater Cave (26CK253), located northwest of Las Vegas, yielded evidence of a Late Archaic occupation that also reflects ceremonial use, although it is not as well-documented as that at Firebrand Cave. The site is a large stratified dry cave that was excavated by the Nevada State Museum in 1963–1964 and then tested in 1995–1996 by the Desert Research Institute (Buck and DuBarton 1994; Hockett 2000). Artifacts recovered during these investigations include many wooden dart shafts, bow and arrow components, cordage, lithic debitage, bone, and Gypsum, Elko, Humboldt, and Rosegate projectile points. Many of the dart and arrow components were painted. Radiocarbon dates on charcoal, dart shafts, pack-rat midden materials, and bighorn sheep dung yielded dates ranging from 9300 to 3500 B.P. As noted previously, the 9300 B.P. date has been attributed to the burning of packrat materials. The major occupation dates to the Late Archaic period from 3200 to 3400 B.P. Buck (1997) proposed four possible uses for the site, ranging from ceremonial/ritual use, specialized use for the repair of hunting equipment, specialized use for bighorn sheep hunting, and as a habitation for family groups. Given the data recovered during test excavations, it appears that the cave was used as a ritual cave like Firebrand Cave and Gypsum Cave. Additional data are needed to confirm this inference.

Although ritual use is common in both the study area and region-wide, caves and rockshelters were also used for domestic purposes. Flaherty Rockshelter (26CK415), located in the Apex area of the Las Vegas Valley, was excavated by Richard and Sheilagh Brooks in 1967. No report was written on the excavations, but data were recently compiled and reported by Blair and Wedding (2001). A small Pinto component was suggested by the radiocarbon dates, but the bulk of the occupation dates to the Late Archaic period and later (Blair and Wedding 2001). It is a large shelter for the area and unlike the shelters discussed previously, exhibits use for domestic versus ritual activities. The Late Archaic component is represented by Gypsum, Humboldt, and Elko points, along with a number of radiocarbon dates ranging from 2200 to 3800 B.P. (Appendix A). Although the stratigraphy from different excavated units is difficult to correlate, the Late Archaic component contained many stone tools, debitage, and faunal bone, along with some perishables. The faunal remains were dominated by tortoise, but included deer and rabbits. Two "prepared floors" were found during excavations at the site and one of these may be an occupation surface dating to the Late Archaic period based on its stratigraphic location. Blair and Wedding (2001) argue that Flaherty may have been used as a hunting camp, but the recovered assemblage represents generalized foraging activities. A number of other Late Archaic sites have been recorded in the Apex area, including small temporary campsites and raw material procurement sites, so this area was used regularly during the Late Archaic period.

Several thermal features have been found at the Corn Creek Dunes that date to the Late Archaic period (Roberts et al. 2003a). The lack of radiocarbon dates from features dating between 3750 and 2950 B.P. is intriguing given the abundance of dates between 4000 and 5000 B.P. It is possible that this area was not used during those 800 years, but this seems unlikely given the long-term occupation of this region documented by both surface and excavated remains. Instead this may represent sampling error or may indicate that occupation shifted to other portions of the dunes during that interval of the Late Archaic period.

The Late Archaic component at the Pardee site (26CK3799), an open camp along the Eglington Escarpment, is represented by a radiocarbon date from one hearth (Feature 8) dated to 3880 B.P. (Blair et al. 2000). No Late Archaic period diagnostic projectile points were found at the site. The presence of thermal features associated with a low density lithic and ground stone scatter suggest that the site was used primarily for plant processing. Ethnographic data indicate that the Eglington Escarpment area was not used for mesquite procurement, so groups may have been targeting other plant resources. As noted previously, several features dating to the Middle Archaic were also found, suggesting long-term use of this site.

Elko and Gypsum points were reported from Bird Springs Rockshelter (Clewlow and Wells 1980) suggesting a Late Archaic occupation of this shelter. Unfortunately, no information is available on the nature of the Archaic occupation of the site.

Occupation of Desert Dry Lake north of Las Vegas appears to have intensified during the Late Archaic period, as numerous Late Archaic period sites have been recorded along the southern end of the

playa (Wriston et al. 2007). One of these sites, 26LN2254, is an extensive scatter of lithics, ground stone, and fire-cracked rock with Humboldt and Elko projectile points, along with Ceramic and Historic period components. Test excavations at a second multicomponent Late Archaic/Ceramic period site, 26LN4970, yielded a radiocarbon date of 2000 B.P. from a hearth (Wriston et al. 2007). The recovery of a reworked Pinto point from the site suggests that the site may have been occupied as early as the Middle Archaic period. Rafferty (2006) notes that the primary occupation of the Coyote Springs region northeast of the Las Vegas Valley also dates to the Late Archaic period and some large sites with rock features have been recorded.

Eastern Region

Warren (1982) documented a Late Archaic occupation at Atlatl Rockshelter (26CK1345) in the Valley of Fire northeast of Las Vegas. The site was used as a campsite during the Late Archaic, with foragers drawn to the natural holding tanks in the area. Deposits dating to the Late Archaic were found in the lower levels of the rockshelter (30 cm and below). Elko and Gypsum points were found in Stratum I (<100 cm below surface), while Stratum II (30-100 cm) contained Elko, Humboldt, and a lower percentage of Gypsum points. A radiocarbon date from a roasting pit (Feature 16) yielded a date of 2500 ± 120 B.P. Stone tools, debitage, and ground stone were found, along with abundant fauna. Warren et al. (1982) note that bighorn sheep remains were predominant in the lower levels, representing 30 to 35 percent of the recovered faunal remains, but that this percentage dropped sharply in the upper levels and the percentage of tortoise and chuckwalla remains increased in the later Ceramic period deposits. Warren (1982) argue that a slight decrease in ground stone in Stratum II, coupled with the high percentage of bighorn sheep remains, may represent more specialized use of the site for hunting during the Late Archaic period.

A Late Archaic occupation is also present at the Turtle Bone site (26CK1384), an open midden located approximately 150 m north of Atl Atl Rockshelter. The midden contained fire-cracked rock, bone, and artifacts. Warren (1982) argue that it was used episodically by small groups for short durations throughout its occupation. The lower deposits yielded Humboldt and Elko points, suggesting its use began during the Late Archaic. Humboldt and Elko points were also found at nearby South Shelter (26CK1383), indicating that this portion of the Valley of Fire was used regularly by Late Archaic groups.

Stuart Rockshelter (26CK39) is located in Meadow Valley north of Moapa and was excavated by the Nevada State Museum in 1955 (Shutler et al. 1960). Two hearths from the lowest levels in the shelter were dated to 3870 and 4050 B.P. and the associated deposits contained Humboldt points. Like Flaherty, the recovered assemblage points to generalized foraging activities and included a variety of stone tools, basin metates, and faunal remains such as jackrabbits, tortoise, and deer.

Black Dog Cave, located in the Upper Moapa Valley, contains extensive Basketmaker deposits including a large number of storage pits and many perishables (Winslow and Blair 2003; Winslow 2009). Use of the cave appears to have begun during the Late Archaic period. No radiocarbon dates dating to the Late Archaic period were obtained from the cave deposits, but the recovery of Elko and Gatecliff Series points suggests an initial Late Archaic period occupation of the cave.

Use of the Gold Butte portion of the study area expanded during the Late Archaic period. Evidence of the occupation of caves, rockshelters, and open sites has been found, along with a large quantity of rock art (McGuire et al. 2010). The site data have been interpreted as representing specialized use of the Gold Butte area during the Late Archaic for logistical forays by big game hunters based at residential camps elsewhere (e.g., the Virgin and Muddy Rivers), but the archaeological data indicate that the Late Archaic occupation represented a variety of low-intensity foraging activities throughout the area. One site, Sheep Shelter (26CK8179), contained Elko, Gypsum, and Humboldt points associated with two superimposed agave roasting pits, one dating to 4190 B.P. and the other to 3170 B.P. (Appendix A). This represents the earliest use of agave in the project area and suggests, along with evidence for big game hunting, that groups may have made logistical forays into the area for a variety of resources including agave (spring), piñon (fall), and game. Several other sites (Ian's Rockshelter, Cedar Basin Midden) yielded radiocarbon dates within the Late Archaic/Terminal Archaic range (McGuire et al. 2010),

suggesting that occupation of this area was relatively continuous from the Archaic into the Ceramic period.

Southern Region

A Late Archaic component is present at the Willow Beach site, a multicomponent campsite located on the Colorado River that was occupied from the Archaic through the Post-Puebloan period (Schroeder 1961). The Late Archaic component was identified based on the recovery of Elko and Gypsum points in the lower stratigraphic levels of the sites, and Schroeder (1961) refers to this as the Price Butte Phase. The recovered assemblage included chipped and ground stone tools and several incised stones. One excavated hearth in Level N-O yielded a radiocarbon date of 2200 $\pm$ 250 B.P. (Schroeder 1961:61).

NVCRIS SITE DISTRIBUTIONS

The densest Archaic occupation in the project area occurred during the Late Archaic period. Sites with Gypsum and Elko points and radiocarbon dates that fall within the Late Archaic period are widely distributed throughout all ecological zones, again with the exception of the far southern portion of the study area, although as noted earlier, this may be due to lack of survey coverage (Figure 5.7). Late Archaic sites are found in the well-watered regions noted in previous sections including the Eglington Escarpment and Yucca Mountain/Forty Mile Wash area. Many of these sites are multicomponent lithic and ground stone scatters that reflect generalized hunting and gathering activities.

The Late Archaic occupation around the Muddy and Virgin rivers in the eastern portion of the study area is much denser than that of earlier periods. Other areas also exhibit denser occupation, but show some continuity in use from the Middle Archaic period. The site distribution changes somewhat from the Middle Archaic period, however, as more Late Archaic sites are found in lowland settings (Figure 5.8). Piñon was still exploited in the uplands during the Late Archaic, but the shift to lowland settings may reflect a shift in adaptation toward the exploitation of resources available in this zone. Future research is needed to determine if this shift is tied to plant use.

A significant number of Late Archaic period sites have features (Figure 5.9). Many of these are thermal features, perhaps reflecting an increased focus on processing activities, a pattern that began during the Middle Archaic period. A large number of the sites with features have ground stone. Mortars are only found at a few Late Archaic period sites (Figure 5.10), almost exclusively in lowland settings. These data suggest that mesquite may have been used during the Late Archaic, but was not a staple resource until later periods.

SUMMARY

As noted previously, most data on the Late Archaic occupation of the project area comes from the excavation of stratified rockshelters, many of which exhibit evidence of specialized use, or from surface lithic scatters. This creates some problems with analyses of Late Archaic period settlement-subsistence strategies and overall cultural behavior. Most subsistence data for this region derive from the rockshelter deposits; however, many of the Late Archaic sites exhibit specialized ritual use that is not related to domestic activities. The data from these excavated contexts cannot then be used to make inferences about hunter-gatherer subsistence strategies. The lack of stratified deposits at open-air lithic scatters also makes interpretations of hunter-gatherer behavior difficult. These scatters usually represent palimpsests of materials and generally lack subsistence remains. Recent work at open air sites in the project area has, however, begun to expand our understanding of the Late Archaic period and both supports and challenges existing models of Late Archaic adaptations.

The site distribution data do not support the inference that Late Archaic groups were specialized hunters making forays from base camps in well-watered areas. Base camps are present in zones that have reliable water and dense resources, but sites around these camps have assemblages indicative of a range of hunting and gathering activities rather than a specialized focus on hunting.

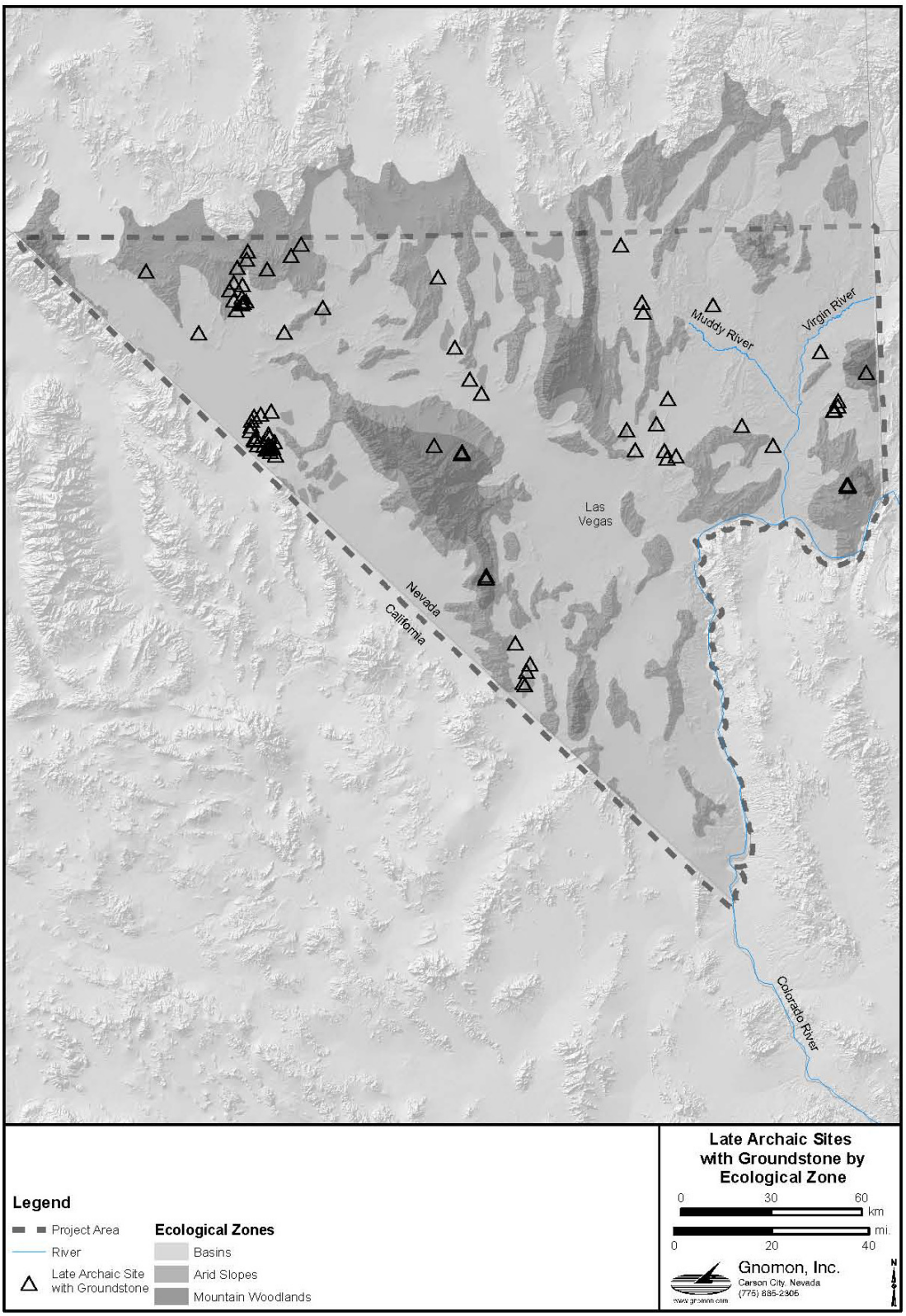


Figure 5.8. Distribution of Late Archaic sites with ground stone by ecological zone.

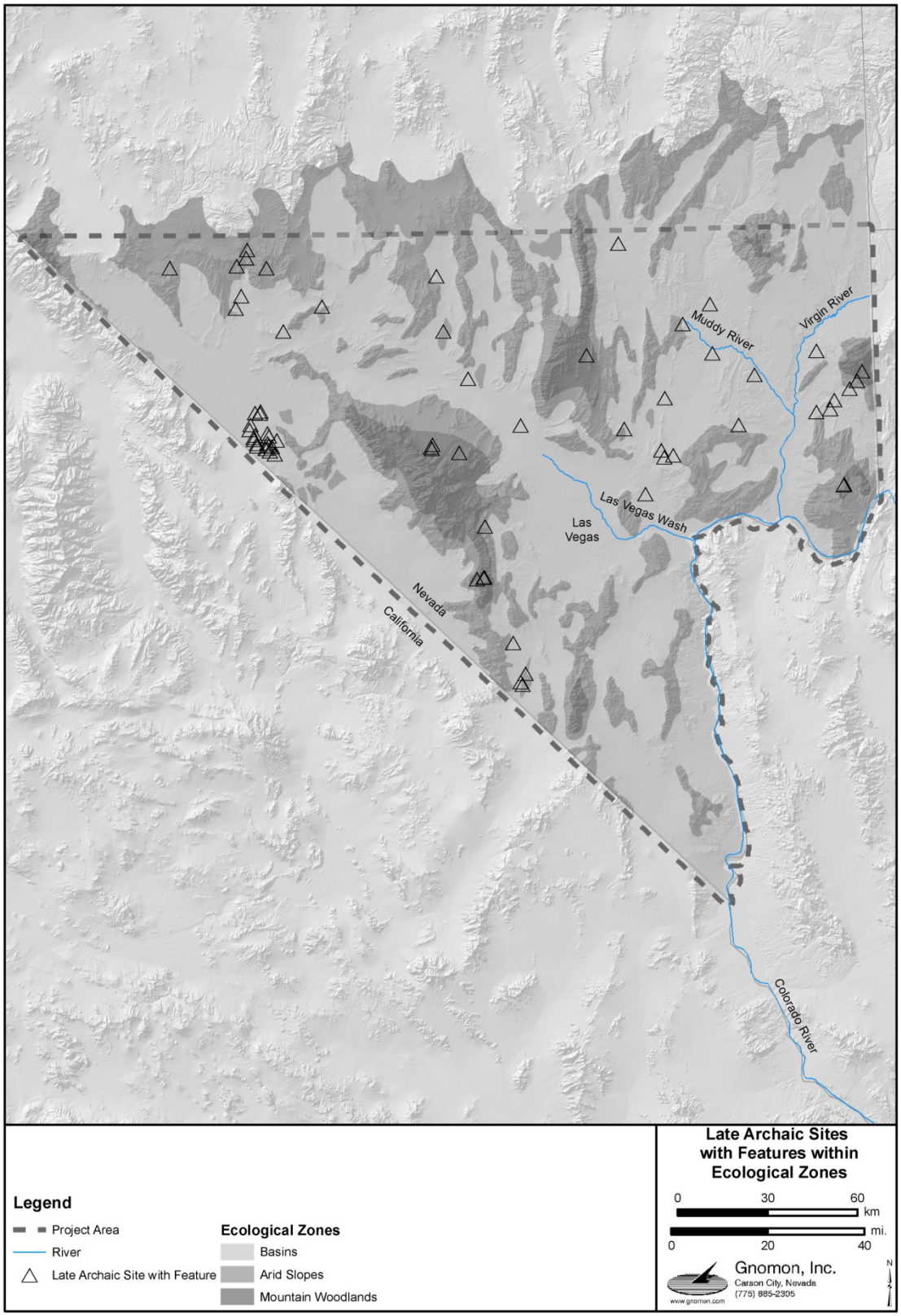


Figure 5.9. Late Archaic period sites with features.

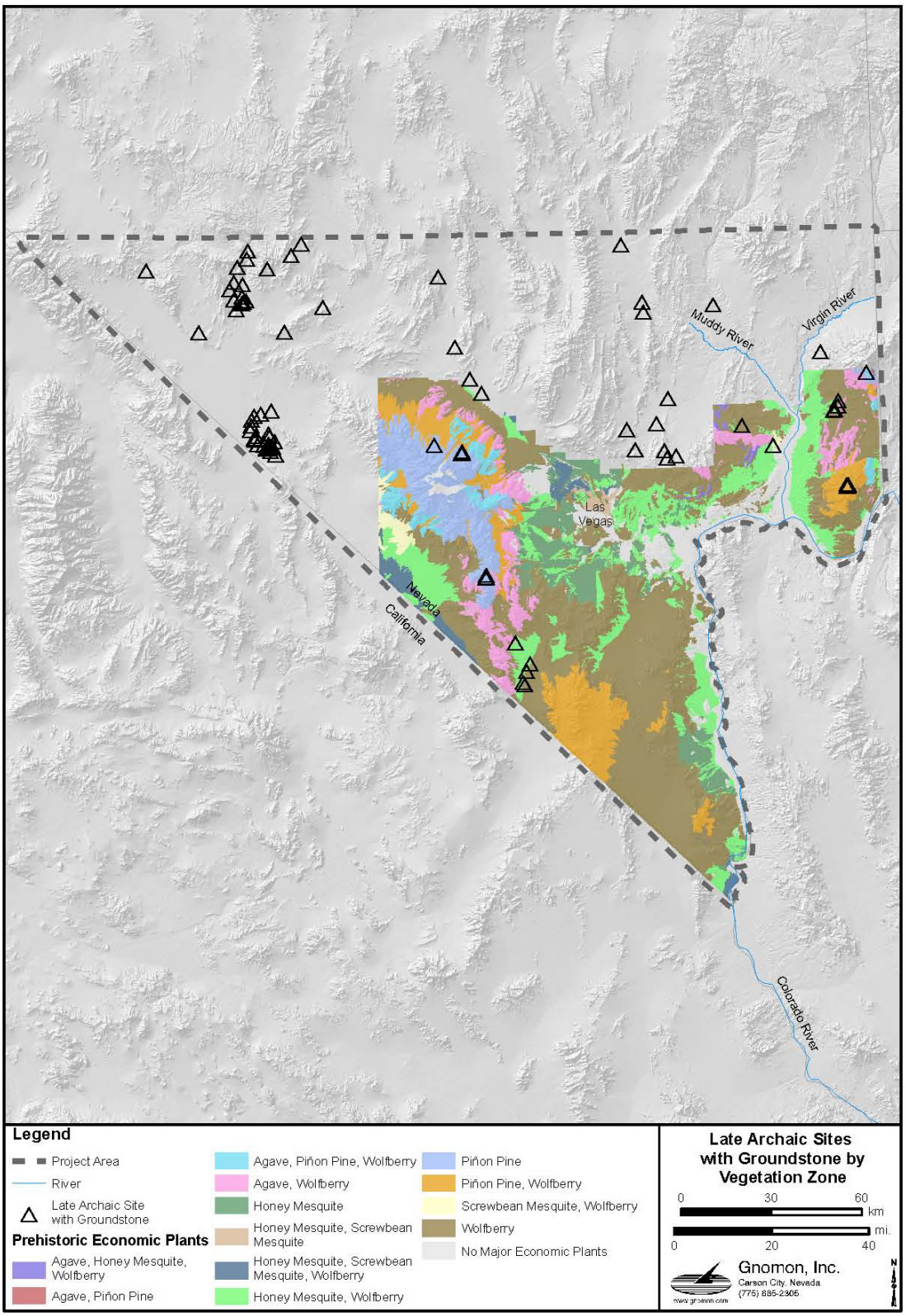


Figure 5.10. Late Archaic sites with ground stone by economic vegetation zone.

TERMINAL ARCHAIC (200 B.C–A.D. 200)

The Archaic period in southern Nevada ends between 200 B.C. and A.D. 200 with the introduction of maize farming, followed by the use of pithouses and, eventually, ceramics (see Chapter 6). The Terminal Archaic occupation is associated with the initial use of maize, resulting in a significant shift in adaptation from the generalized foraging activities documented during the Late Archaic period (Ahlstrom 2005, 2008b). Elko points continued to be used during the Terminal Archaic, but a substantial reduction in the use Gypsum points is apparent at this time.

SITES IN THE PROJECT AREA

The Terminal Archaic occupation of the project area is represented by a number of sites that show that substantial changes in Archaic period lifeways were occurring. Most of the investigated and reported sites are in the Las Vegas Valley, but Terminal Archaic components have been reported at several other multicomponent sites in the project area.

Western Region

A Terminal Archaic occupation has been documented at the Barnett site (26CK1769) in the Ash Meadows area. The site contained two hearths, three cache pits, and three burials, along with ground stone, stone tools, and six Humboldt points. Two radiocarbon dates from the features dated to 1950 and 1960 B.P. (Lyon et al. 2008).

Central Region

The most comprehensive data on this period come from the Las Vegas Valley along Las Vegas Wash (Ahlstrom 2005, 2008b). At the Larder site (26CK6146), 63 features were found, primarily storage pits dating to the Terminal Archaic (Ahlstrom 2008b). Ahlstrom (2008b) argues that the storage pits were excavated into the gypsum-rich deposits at the site because the gypsum served as a natural desiccant, and this led to long-term reuse of the site. The oldest date from the site is from a bowl-shaped storage pit (Feature 47) that yielded a maize cob dating to 2130±40 B.P. This represents the earliest maize in the study area. A second bowl-shaped storage pit (Feature 14) yielded maize pollen, prickly pear pollen, and a possible mesquite pod dating to 2160±40 B.P., providing supporting evidence for the use of maize during this time period. In all, seven storage pits and one hearth dated to the Terminal Archaic. The data reflect the use of a broad range of plant resources, including mesquite, maize, and cacti.

At the Three Kids site (26CK1474), the Terminal Archaic is represented by a midden deposit located 7 m below ground surface and dating to 2140±120 B.P. (Ahlstrom 2005). The site would have provided access to marsh resources and mesquite and may reflect a shift in focus to plant resources.

Four Terminal Archaic radiocarbon dates were obtained from deposits at the Burnt Rock Mound (26CK3601) located along the Eglington Escarpment (Appendix A). Elko points were recovered from one level with a radiocarbon date of 1930±60 B.P., but the limited excavation did not provide evidence of the nature of the Terminal Archaic period occupation (Seymour and Rager 2005).

Eastern Region

Excavations at the Roadside Roast site (26CK1091) along California Wash yielded several dates that fall within the Terminal Archaic period (Blair 1986). The site is a rockshelter with associated roasting pits. Although the bulk of the occupation dates to the Ceramic period, two dates (A.D. 130–570, 295 B.C.–A.D. 175) from the site indicate that its initial occupation dates to the Terminal Archaic period.

DISCUSSION

In 1982, Margaret Lyneis suggested that there were several pressing research issues associated with the Paleoindian and Archaic periods in southern Nevada. Some of those issues have been addressed by research conducted during the intervening years, but many have not. This section discusses the

progress made in refining our understanding of the Paleoindian and Archaic periods and the data gaps that need to be addressed with future research.

Chronology

One of Lyneis' initial questions concerned the chronological sequence and time markers associated with the Paleoindian and Archaic periods. Many radiocarbon dates have been collected since 1982 and these have helped refine the Archaic period chronology (Appendix A).

The chronology of the Paleoindian period in southern Nevada remains poorly documented due to a lack of stratified, well-dated contexts from Paleoindian occupations. The occupations are almost all dated solely using cross-dating of fluted points from other areas (especially southern Arizona). The single exception to this is Tule Springs, which yielded radiocarbon dates associated with stone tools dating to the Paleoindian period but lacked diagnostic artifacts. The same situation exists for the Early Archaic period. Despite the presence of stemmed points at numerous sites throughout the project area, no stemmed points have been found in association with well-dated deposits, and the dates for the Early Archaic period are based on cross-dating of stemmed points found in dated contexts elsewhere in the Great Basin and Mojave Desert. This lack of firm chronological control remains one of the most significant data gaps for the Paleoindian and Early Archaic periods.

Pinto points associated with radiocarbon dates have helped to refine the chronology for these point types in southern Nevada (Appendix A). Within the project area and elsewhere in the Mojave Desert, it appears that larger Pinto points were used earlier during the Middle Archaic period (ca 6000 B.P.) and that smaller Pinto points date later in the period. This should be investigated with future work, as the potential exists to further subdivide Middle Archaic occupations and provide a more fine-grained understanding of Middle Archaic occupation during the drying period of the Middle Holocene.

Gypsum and Humboldt Concave Base points have been found in association with material that has been radiocarbon dated from 3800 to 2200 B.P. These two point types appear to be relatively good time markers for the Late Archaic period in southern Nevada. Gypsum points may provide even finer chronological control, as the bulk of the Gypsum points are associated with materials that date between 3000 and 3800 B.P. Elko points were used during the Late Archaic period and into the Ceramic period, indicating that they may not be particularly good diagnostics of the Archaic period unless they are found with other materials suggesting an Archaic age.

Lyneis suggested that other diagnostic artifacts could be used to seriate surface lithic assemblages if time-sensitive changes in lithic technology could be discerned. Crescents have been found to be diagnostic of Early Archaic occupations in the northern Great Basin and Mojave Desert (Beck and Jones 2009), but although several crescents have been reported from sites in the project area (Lyon et al. 2008), they are rare and it is not clear if they are uniquely associated with Early Archaic occupations. Recent work on the California coast suggests that they may date to the Paleoindian period (Erlandson et al. 2011), so further work is needed to establish their association with Early Archaic components in the Mojave Desert. Domed and spurred end scrapers have been found in association with both stemmed points and Pinto points and may be diagnostic of the latter portion of the Early Archaic and Middle Archaic periods (Warren and Crabtree 1986). Large bifacial knives may also be associated with Pinto period occupations. None of these associations is clear cut, however, and this remains a topic that should be addressed with future research.

Lithic Technology

It is not currently possible to determine if "time-significant changes in patterns of lithic technology" (Lyneis 1982a:175) occurred during the Paleoindian and Archaic periods. This is due in large part to inconsistencies in the way that lithic assemblages are reported, as data on technological variables and raw materials are often not reported or are presented as qualitative rather than quantitative data. At present it is possible to say that obsidian use increased during the Late Archaic based on the reported data, but it is not clear why this occurred, nor is it clear if this occurred in concert with a reduction in the use of

other raw materials. A consistent method for reporting lithic variables would contribute greatly to our ability to discern any patterns and/or changes in lithic technology and raw material use.

Environmental Change

One of Lyneis' (1982a) key research questions for the southern Nevada region dealt with the "magnitude and chronology of environmental shifts" and their impact on Archaic period adaptations. Data on environmental changes within the project area are discussed in Chapter 2. These environmental data have been significantly refined over the past decades, allowing for interpretations of human-environment interaction across the Pleistocene-Holocene transition.

Three major climatic events shaped Archaic period adaptations in the project area. The first was the drying and warming trend marking the end of the Pleistocene that was associated with the extinction of Pleistocene megafauna throughout the Desert West. These climatic changes eventually resulted in the desiccation of the lakes that dotted the landscape during the Terminal Pleistocene/Early Holocene. The reduction in the availability of large game and shrinking of wetlands would have significantly impacted the subsistence and settlement regimes of Early Archaic groups. The site distribution data indicate that Paleoindian groups entered the region following well-defined game corridors and this occurred during a time when grasslands and lakes were still present. The presence of sites with stemmed points along lake shores indicates a focus on wetlands that apparently continued throughout the Early Archaic period but ended during the early portion of the Middle Archaic period.

The second major climatic event was another drying period during the Middle Holocene that is referred to as the "Altithermal." Although Antevs (1955) proposed that much of the Desert West was abandoned during this period, it appears instead that Middle Archaic groups in southern Nevada focused their occupations in well-watered areas such as springs and along stream beds, and they increased their exploitation of upland resources. The correlation of Pinto points with piñon in some portions of the project area indicates that piñon exploitation began during this period. The exact timing of piñon use should be addressed with future research, but it is possible that the continued use of southern Nevada during the Middle Holocene was tied in some way to the switch to exploitation of piñon.

The third climatic event that influenced Archaic period adaptations occurred at the end of the Middle Holocene drying period, as the climate ameliorated, springs recharged, wetlands increased and the availability of large game increased. This was apparently associated with a population increase in southern Nevada, given the proliferation of sites with Gypsum, Humboldt, and Elko series points. The wetter climate may also have facilitated the adoption of farming during the Terminal Archaic period.

Settlement Patterns, Settlement Systems, and Site Types

Lyneis' final research question concerned evolutionary change: Were long-term directional trends apparent in settlement patterns, community size, and population density? She included ritual and exchange under this rubric. This section focuses on what we have learned about settlement patterns and population density from recent work and what kinds of data are needed to further address these important research topics.

The interpretation of settlement patterns is affected by survey sample size and intensity. Some areas, such as the Nevada Test Site and the Las Vegas Valley, have received extensive survey, while others, such as the Southern Region of the project area, have seen only limited amounts of survey work. Thus, the patterns revealed in the analysis of site distributions may not be "real" and may be either further refined or changed as additional surveys are done. Despite these limitations, several long-term trends are visible in the site distributions; these appear to be related to both increasing population density and climatic change.

Paleoindian and Early Archaic occupations are rare; these are generally surface finds located either along game corridors (Paleoindian) or along lake shores and wetlands (Early Archaic). It is very likely that additional, deeply buried Paleoindian and Early Archaic sites are present in the project area. Because many of these sites are located along streams and lake shores, alluvial deposition has obscured

site visibility. The lack of stratified sites can be remedied if future work concentrates on trenching within alluvial deposits that are likely to contain Early Archaic deposits, based on the distributions noted here.

Middle Archaic sites are more widely distributed and more common in the project area than predicted by previous work in the Mojave Desert and by climatic models postulating extreme drying. It appears that Middle Archaic groups focused on areas with reliable water and abundant resources, and, as noted previously, may have started exploiting piñon. The number of sites with ground stone and thermal features increased substantially during the Middle Archaic period, indicating a shift to more generalized hunting and gathering activities and the increased exploitation of plant resources. Unfortunately, most of the Middle Archaic sites excavated in the project area lack subsistence data so it is not clear if the pattern indicated by the artifact assemblages is valid, and if it is, what plants were exploited. Excavations aimed at obtaining subsistence remains from Middle Archaic deposits can help clarify their subsistence practices and may enable researchers to determine if the widespread use of the project area is tied to seasonal forays across broad areas or seasonal rounds within well-defined territories.

Population density increased during the Late Archaic period, as indicated by both the number of recorded sites and the size and density of deposits at these sites. This appears to be tied to climatic amelioration and perhaps to increased efficiency at obtaining resources. Mortars appear during this time period and groups could have exploited both mesquite and oak with this new ground-stone technology. Agave roasting pits were also used during this period. The site locations indicate that piñon continued to be an important upland resource. Again, however, we lack solid subsistence data from many Late Archaic contexts. Although animal bone is often quantified in published reports, flotation and other paleobotanical data are under-represented. This, along with the focus on special-use sites, may give the false impression that Late Archaic groups were relying on the specialized procurement of large game. Systematic analysis of Late Archaic subsistence remains from Late Archaic period sites in multiple settings should shed additional light on Late Archaic foraging behavior. The site distributions and excavated remains point to hunting and gathering with a focus on specific resources such as piñon, oak, perhaps mesquite, and large game; these indicate that Late Archaic foragers were becoming more efficient at exploiting their environment. This inference needs to be fleshed out with additional data as the available data are not sufficient to unequivocally document this trend.

Part of the problem with assessing settlement systems is tied to the fact that the best-documented Late Archaic sites in the project area are special-use ritual cave sites. Although these provide excellent data on ritual practices, they do not shed light on day-to-day activities of Late Archaic groups. Many of the sites with evidence of Late Archaic domestic activities were excavated before modern techniques were commonly used and thus lack much of the stratigraphic and subsistence data needed to reconstruct these activities. Despite valiant efforts to obtain data from these previous excavations (e.g., Blair and Wedding 2001), we need additional data from sites excavated in stratigraphic levels with paleobotanical samples, faunal remains, and artifacts collected from well-defined contexts. Only then can we begin to accurately reconstruct the settlement patterns, demographic profile, and subsistence practices of these Archaic period groups.

The Terminal Archaic period represents one of the most interesting time periods in the Archaic period occupation of the project area, yet only a small number of Terminal Archaic sites have been investigated. This period witnessed the adoption of maize farming, which represents a substantial change in subsistence practices from previous generalized foraging activities. The adoption of maize has now been clearly documented in the Las Vegas Valley by ca 2000 B.P. It is likely, given the contexts in which the maize was found (in storage pits located along Las Vegas Wash) that it was adopted in other well-watered contexts within the project area. It appears that maize was simply added to the existing foraging diet, as little evidence for dramatic changes in occupational intensity, occupation duration, or technology are indicated until several hundred years later. Diehl (2005) has used the term “farmagers” to refer to early farmer-foragers in the Tucson Basin, and this is likely a similar scenario to that present in southern Nevada during the Terminal Archaic. Much more work needs to be done to examine the introduction of maize into this region, especially in terms of the reasons for the adoption, the mechanisms for the introduction, and to determine if responses to its introduction varied across the project area.

Exchange

As with lithic technology, few insights have been gained concerning Archaic period exchange systems since Lyneis' original study. Obsidian use increased during the Late Archaic period, but the modes of its procurement are poorly understood. It is possible that obsidian was exchanged for food or other perishable items. No other exotic materials have been reported from Archaic period sites with the exception of several shell beads, and these artifacts have not been reported in detail. It does not appear that extensive exchange systems were in operation during the Archaic period, which is surprising given the extent of later Ceramic-period exchange in the project area and the documentation of Late Archaic period exchange networks elsewhere in the Mojave Desert (Sutton 1996).

Ritual/Ceremonial Systems

This is one area where we have gained significant insights into the Late Archaic period, given the excavation and reporting of several special-use ritual cave sites. The best-documented site, Firebrand Cave, along with reanalysis of materials from Gypsum Cave, provides abundant evidence of Late Archaic period ritual activities. The recovery of ritually broken atlatls, split-twig figurines, a variety of other ritual paraphernalia, and offerings (e.g., a desiccated owl) at these caves reveals the wealth of materials associated with these activities. Interestingly, other than Stanton's Cave along the Colorado River in Arizona, these kinds of ritual activities have not been found in the Southwest, but instead appear to be a Great Basin-Mojave Desert phenomenon.

The ritual practices appear to date to a short period within the Late Archaic period, but it is likely that ritual behaviors like those found in these caves extended back to the Paleoindian period. Rock art was apparently an important component of these ritual behaviors (Chapter 8). Despite the solid documentation of these ritual practices, there is much that can be learned about these sites. How do they fit in with the overall settlement system? Additional documentation of sites around these *Page numbers in italics indicate illustrations.* ritual caves may provide information on the size of the groups using them and whether they were tied to specific territories. More detailed GIS studies of the landscape surrounding ritual caves may also provide insights into their role within Late Archaic society. Additional dating of materials, like the Early Archaic period basket at Gypsum Cave, may reveal the time depth for these ritual practices. Finally, ethnographic data can be used to make additional inferences about the ritual practices performed at these sites. Blair and Winslow (2006) discuss some of the possible ritual practices; the strength of their argument is that they do not limit their discussion to hunting rituals but instead see the ritual use as tied to broader cultural practices. These finds are perhaps the most significant development since Lyneis' initial overview and show that there is much yet to be learned about the Archaic period in this region.

CHAPTER 6
PUEBLOAN PERIOD (A.D. 200–1300)

Richard V.N. Ahlstrom and Heidi Roberts

The prehistoric Puebloan period corresponds to the interval from around A.D. 200 to 1300 during which a distinctly Puebloan archaeological culture can be recognized in southern Nevada. This phenomenon can be identified more specifically as the "Western Virgin Puebloan" archaeological culture, a label that carries meaning at three different spatial scales of analysis. At its broadest scale, the term refers to the cultural and historical ties that linked the southern Nevadans to other prehistoric *Puebloans,* whose homes were located as far to the east of southern Nevada as the Four Corners region of the southern Colorado Plateau and the Rio Grande Valley. At an intermediate scale, it recognizes the sharing of material-culture traits between the southern Nevada communities and other *Virgin* (or sometimes "Virgin Branch") Puebloan communities that were located at lesser distances to the northeast in the St. George Basin and to the east on the plateaus that are ranged to the north of the Grand Canyon. Finally, at the narrowest spatial scale, the name of the archaeological culture acknowledges the position of the southern Nevada communities at the *western* end of the Virgin and, thus, prehistoric Puebloan world.

The core area of Western Virgin Puebloan settlement was located in the lowlands of our Eastern Geographic Region, specifically along the central axes of the Moapa and Virgin river valleys. We know from the ruins of their settlements that the puebloans who inhabited this area built their homes on the terraces and toes of the alluvial fans that flank the floodplains of the Muddy and Virgin Rivers—particularly those along the Muddy River. We can infer as well that these people planted their crops of domesticated corn, beans, and squash on the nearby floodplain. The Western Virgin Puebloan phenomenon is most clearly defined within this relatively small strip of land, which extends for a distance of 50 to 60 miles along the two rivers—including a 5-mile stretch of the Virgin River in far northwestern Arizona—and typically measures no more than 2 to 3 miles wide.

This Puebloan core area accounts for a tiny fraction of southern Nevada. "Distinctly Puebloan" archaeological cultures do not characterize the rest of the region. Why then do we include a "Puebloan period" in a cultural chronology that applies to that entire region? First, the puebloan archaeological culture has provided what is by far the most temporally precise and well-defined chronology available for any temporally or spatially defined subdivision of Southern Nevada's prehistoric or Post-Puebloan cultural heritage. Second, the inclusion of this period in our chronology serves to acknowledge the importance of Puebloan culture to the prehistory of southern Nevada. Even more so, it highlights contemporary research questions that address the role of the bearers of that archaeological culture in the unfolding of that regional prehistory. Those research questions address not only the history of the region's Western Virgin Puebloan archaeological culture, but the influence of that archaeological culture and its bearers on the non-Puebloan groups that inhabited the broader Southern Nevada region, as well as the history of those groups *in their own right*, that is, beyond whatever influences they received from Puebloan communities.

Those influences operated in several ways, the details of which have yet to be worked out. One of these involves forays made by the Puebloan people themselves into upland areas adjacent to the Muddy and Virgin River core area for the purpose of exploiting resources such as game animals and agave. A second source of influence consists of the more permanent relocation of Puebloan peoples into more distant areas of Southern Nevada, including the Las Vegas Valley and Ash Meadows. A third kind of influence comes from the movement into these more distant areas not of the Puebloan people themselves, but of the distinctive gray ware pottery that they made. Since some of the best evidence we have for the movement of Puebloan people is provided by the presence of their pottery, disentangling these two sources of influence—migration vs. trade in pottery—can be problematic. It has proven most helpful in this regard to be able to demonstrate that the Puebloan-style pottery found at the Corn Creek site (Lyneis

2011a) in the northern Las Vegas Valley and at Ash Meadows (Lyneis 2011b) was made locally. This evidence greatly strengthens the inference that potters schooled in the Puebloan ceramic tradition were present at these locations. It also raises the possibility that the technology of pottery production spread to these distant areas independently of the Puebloan potters—or, a more likely scenario, that it involved the actual presence of only a small handful of Puebloan potters.

A fourth kind of influence relates to the movement of goods from or at least through the rest of southern Nevada to the communities of the Puebloan core area. We know from archaeological evidence that those goods included obsidian, marine shell, and turquoise, in each case in the form of raw material, finished artifacts, or both. Some of these items may have been traded for the previously mentioned gray ware pottery, but materials that are poorly preserved in the archaeological record such as salt, animal hides, and textiles may have been exchanged as well. This kind of interaction reflects influences moving in both directions, both from *and* to the communities in the Puebloan core area.

These interactions are important topics for ongoing and future research in southern Nevada. On the other hand, their existence should not be allowed to drive the regional research agenda. Also relevant for future research is another set of cultural influences originating from agricultural and pottery-making Patayan, or ancestral Yuman communities situated to the south along the Lower Colorado River. Finally, and perhaps most importantly, there are the local, non-Puebloan and non-Patayan prehistories of large swaths of the southern Nevada region that remain to be understood in detail. Here we note evidence suggesting that farming technology may have come to the Las Vegas Valley earlier than to the Moapa and Virgin river valleys *and* from a different source, located in southern Arizona.

SITE DATABASE

Figure 6.1 shows the distribution of sites in the archaeological site database with temporal components that can be assigned to the Puebloan period. Figures 6.2 and 6.3 provide close-up views of this distribution for the Eastern and Central Regions. The sites are plotted on the maps with symbols that indicate the kinds of chronological evidence that were used in dating them to this period. This included three kinds of evidence: (1) the presence in a site's surface artifact assemblage (or, when included in the IMACS tabulations, its subsurface or excavated assemblage) of one or more arrow points classified as Rose Spring, Eastgate Series, or Parowan, (2) the presence in the site's assemblage of "Puebloan" pottery including the categories of plain or painted gray ware, plain or painted white ware, corrugated gray ware/utilityware, and red or orangeware, and (3) the availability from a site of one or more two-sigma calibrated radiocarbon dates with means falling in the interval from A.D. 200 to A.D. 1300 (Figure 6.4). The majority of these date ranges are between 150 and 250 years long, which sets a limit on the overall temporal resolving power of this dataset. The trend line that has been added to the date distribution serves as a visual cue to stability or change in the number of dates that are available per unit of time. The slope of the trend line is quite straight, indicating that the dates are distributed more or less evenly through the Puebloan period.

The dating criteria described here are imperfect on several counts. The dart points that would be expected to occur on early (Basketmaker II) Western Virgin Puebloan sites are excluded from consideration, as are buff ware ceramics that first appeared during the Puebloan period but, importantly in the present context, continued to be used in the region well after A.D. 1300. These criteria may, then, lead to the exclusion of sites that date to the Puebloan period. The criterion based on the presence of corrugated pottery may, on the other hand, result in the inclusion of sites that post-date A.D. 1300—assuming that arguments for the persistence of this kind of surface treatment on gray ware (as opposed to brown ware) ceramics may have persisted into the Post-Puebloan period (Chapter 7). From a different perspective, the reliance on mean calibrated radiocarbon dates ignores information involving, for example, the relative precision of the individual dates (i.e., the length of their date ranges) and the materials that were dated (involving most importantly the distinction between wood vs. seeds or other

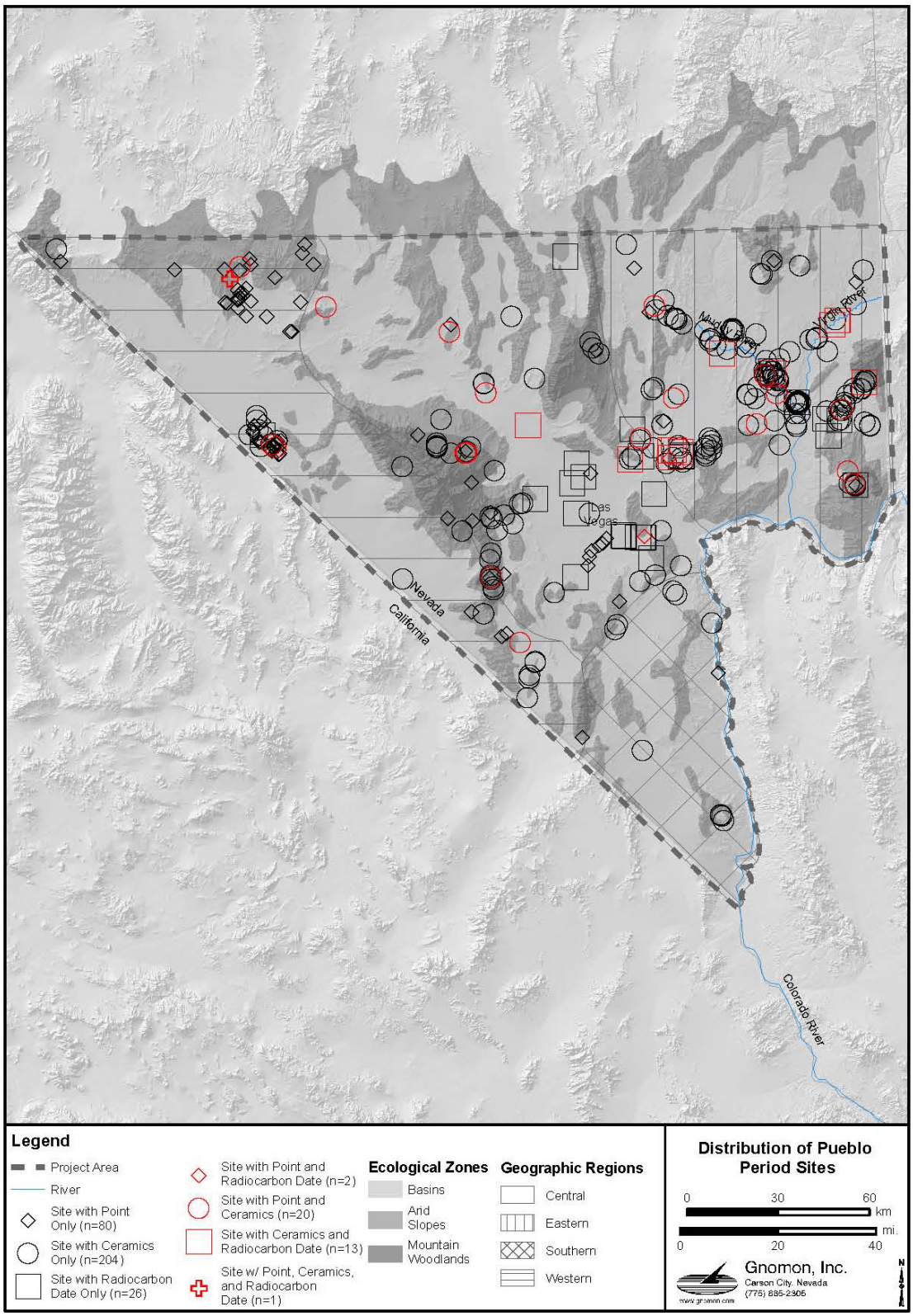


Figure 6.1. Map showing the distribution of Southern Nevada's Puebloan period sites, with dating criteria indicated.

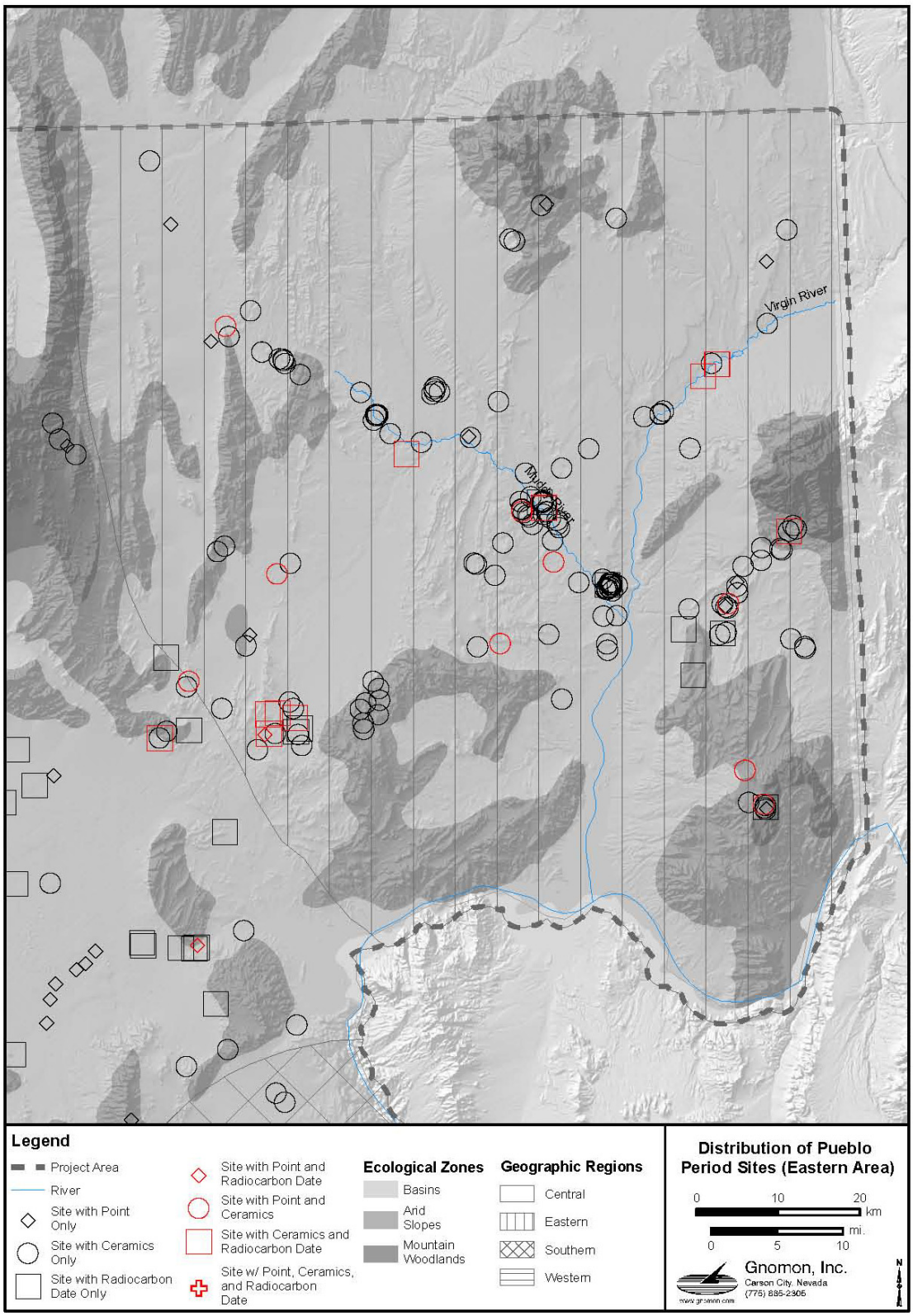


Figure 6.2. Map showing the distribution of Puebloan period sites in the Eastern Region, with dating criteria indicated.

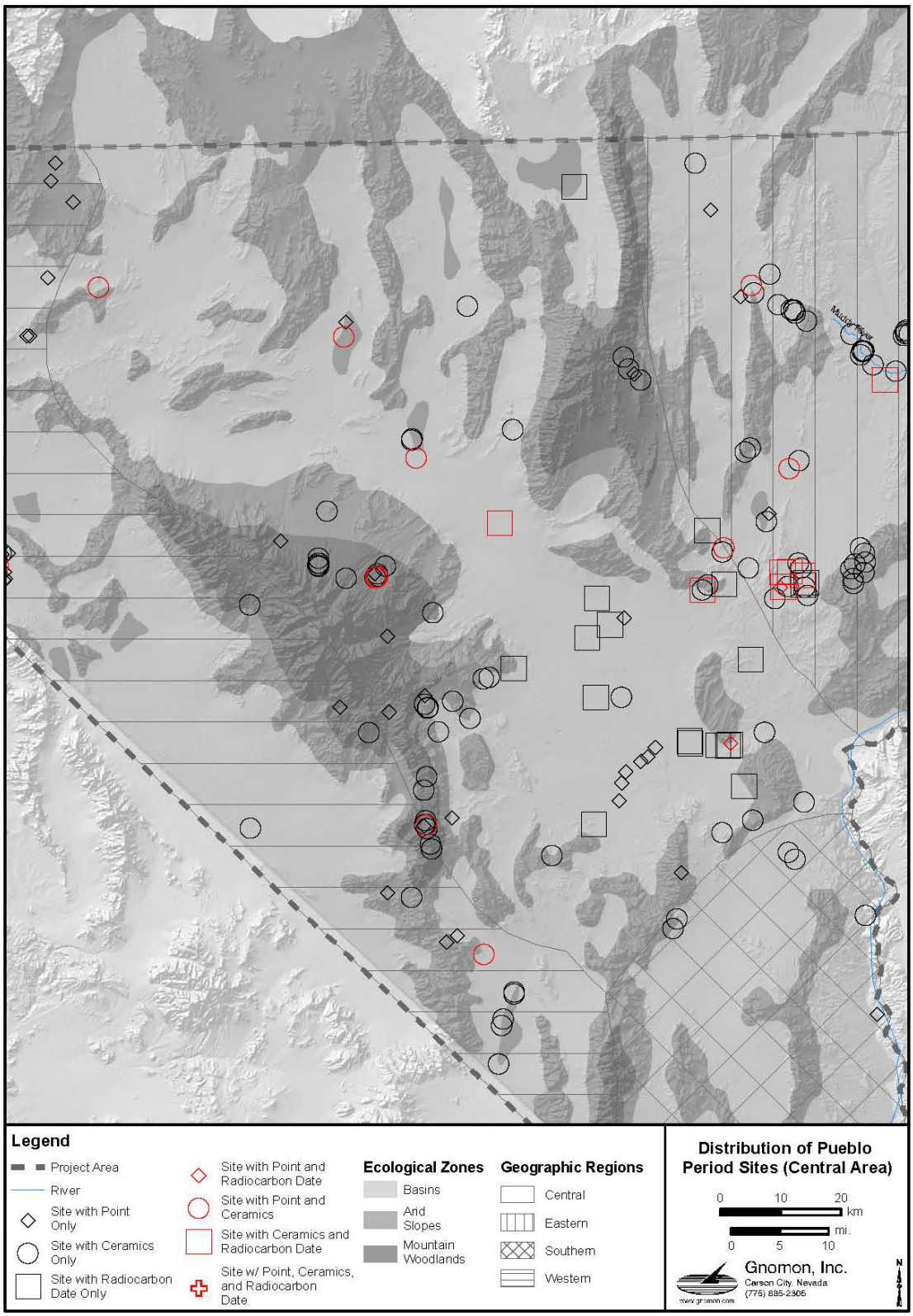


Figure 6.3. Map showing the distribution of Puebloan period sites in the Central Region, with dating criteria indicated.

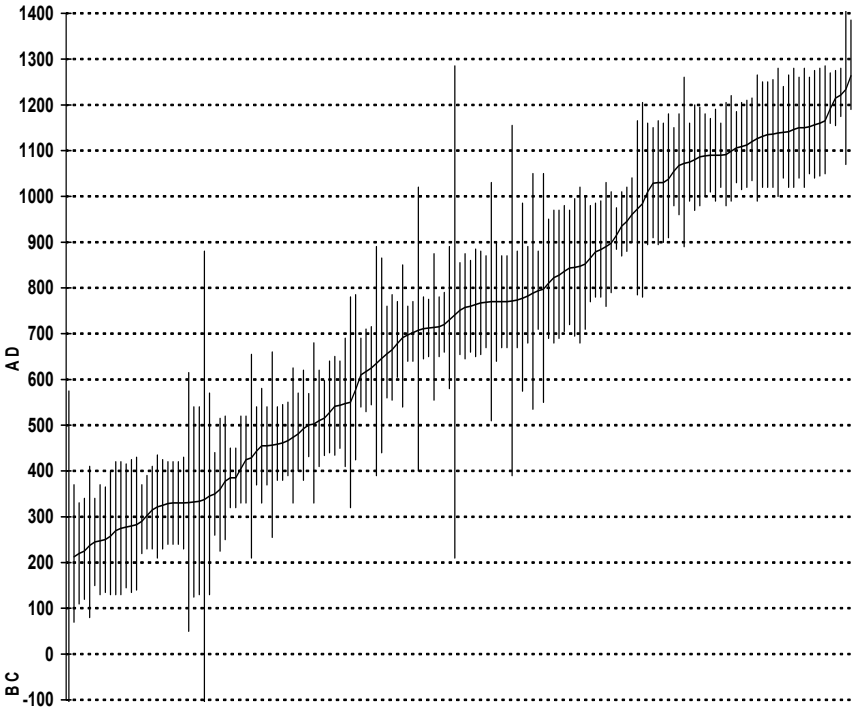


Figure 6.4. Puebloan period radiocarbon dates: two-sigma calibrated date ranges with moving-average trend line; date range midpoints between A.D. 200 and 1300.

"annual" plant products). In the case of dates from wood, there may be bias resulting from the inclusion of "old wood" in the analyzed sample. Finally, the use of individual dates as units of analysis ignores the potential significance for chronological interpretation of patterning in suites of dates from particular sites or features within sites. (This latter kind of evidence from multiple dates is, however, included in later discussions of data from excavated contexts.) In spite of these potential weaknesses, the criteria do provide a reasonably robust and easy-to-replicate means of assigning sites to the Puebloan period on the basis of the available evidence.

Application of the dating criteria has resulted in the assignment of 346 sites to the Puebloan period. As can be seen in Figures 6.1 through 6.3, these sites are distributed widely, though not evenly across southern Nevada. Proceeding from east to west, substantial clusters of recorded sites can be found in the Eastern Region in the Gold Butte–Virgin Mountains Area, along the Virgin and Muddy rivers, both above and below the confluence of these two streams, and in and around the Upper California Wash Area. In the Central Region, clusters of dated sites can be found in the southeastern quadrant of the Las Vegas Valley and on the northeastern and southeastern flanks of the Spring Mountains. In the Western Region, these clusters occur in the Ash Meadows and Yucca Mountain areas. For present purposes, we can make a distinction between "lowland areas," which include the central portions of the basins depicted in Figures 6.1 through 6.3, and "upland areas," comprising the arid slopes and mountain woodlands that are shown in the figures, as well as the adjacent fringes of the basins that are located well away from the central portions of those landforms. Given these criteria, we can group the site clusters identified on the Virgin and Muddy rivers, in the southeastern Las Vegas Valley, and at Ash Meadows as occurring in the lowlands, and the rest of the clusters, including those in the Gold Butte–Virgin Mountains and Upper California Wash areas, on the flanks of the Spring Mountains, and in the Yucca Mountain area, as being in the uplands. At the opposite extreme from the areas with substantial site clusters are the broad stretches of southern Nevada that are poorly represented in the record of recorded Puebloan period sites. These include the southern and, aside from a portion of the Mormon Mountains, the northern ends of the Eastern Region, most of the northern half of the Central Region, broad areas of the Western Region that are

located to the northwest of Ash Meadows and west and south of Yucca Mountain, and most of the Southern Region.

As previously noted, ceramic evidence, particularly involving the presence of gray ware and other Puebloan pottery, is an important factor in the identification of Puebloan period occupations at sites included in the Southern Nevada site database. Brown ware and buff ware pottery, on the other hand, are not considered reliable indicators of Puebloan period use—though, as previously noted, some of the buff ware pottery identified at sites in the region was certainly made, used, and discarded during this period. There is reason to suspect that these occurrences of buff ware date mostly after A.D. 1000 (Gilreath 2012 and Chapter 7 this volume). With these temporal considerations as a background, we can turn to Figure 6.5, which shows the distribution of sites with Puebloan pottery (including sherds typed as gray ware or white ware), with brown ware pottery (including Great Basin Brown Ware and Tizon Brown Ware), with buff ware pottery, or with combinations of these three ceramic categories. Mixed assemblages are common, with two or more of the three wares being present at 20 percent (n=66) of the sites.

Sites with gray ware ceramics (n=232) are most abundant in the Eastern Region, but there are also a number of examples broadly distributed across the Central Region, and a few each in the Western and Southern regions. Sites with brown ware (n=122) are less abundant than those with gray ware but are also broadly distributed across southern Nevada—with notable concentrations in the Western Region's Yucca Mountain and Ash Meadows Areas and, in the Central Region, on the northeastern and southern slopes of the Spring Mountains. Buff ware occurs on fewer sites (n=39) than either gray ware or buff ware, and, because the count of sites is smaller, spatial patterning is somewhat less apparent than for the other wares. The map does, however, show small clusterings of sites with buff ware along the Colorado River at the southern tip of the Southern Region and around the margins of the Las Vegas Valley, both in and adjacent to the Central Region. Other, more scattered occurrences are found within the Eastern Region. In broadest terms, this distribution is consistent with the idea that buff ware ceramics were moved up the Colorado River and then up its tributaries. This movement involved the transport of buff ware vessels as well as (though to an unknown extent), the movement of potters schooled in the making of pots within the buff ware ceramic tradition.

The site database includes information relating to a broad range of attributes aside from those already discussed that involve chronological indicators and ceramic wares. Two sets of these attributes, which are concerned with roasting pits and architectural features, are represented by particularly noteworthy spatial distributions. The evidence relating to roasting will be summarized later on, in the portion of the Discussion and Interpretation section dealing with the exploitation of upland sites. The distribution of Puebloan period sites with architectural attributes, including pithouses and single and multiple-room surface structures, is shown in Figure 6.6. To begin, it is necessary to point out several limitations in this dataset: The NVCRIS data on which the maps are based do not include three sites in the Las Vegas Valley where habitation structures, consisting primarily of shallow pithouses, have been excavated in the last decade. One of these sites is located in the north-central portion of the valley in the Las Vegas Springs preserve, and two are in the valley's southeastern corner in Clark County Wetlands Park. Also, although the map includes a location with pithouses (the Corn Creek site) in the northwestern portion of the valley, it does not indicate that a surface structure has also been excavated in this area—again, in the last 10 years.

The map and its underlying dataset also provide a useful, though somewhat flawed picture of the distribution of sites with pithouses and surface architecture that have been recorded along the Muddy and Virgin rivers in the Eastern Region. There are several caveats relating to the use of this dataset. First, because of the somewhat confused history of site recordation in this area, it is possible, if not likely, that some known sites are not included in the dataset and that some others are included more than once. Second, in the 1920s and 1930s, distinct clusters of architectural remains were recorded as numbered "houses," which have come down to us today as sites. Some groupings of these houses cover a small enough area to be recorded today—that is, according to contemporary practice—as single sites. This means that the mapped site units may not be comparable to one another. Third and most specifically, the dataset does not include any of the sites that are known to occur along the Virgin River downstream from

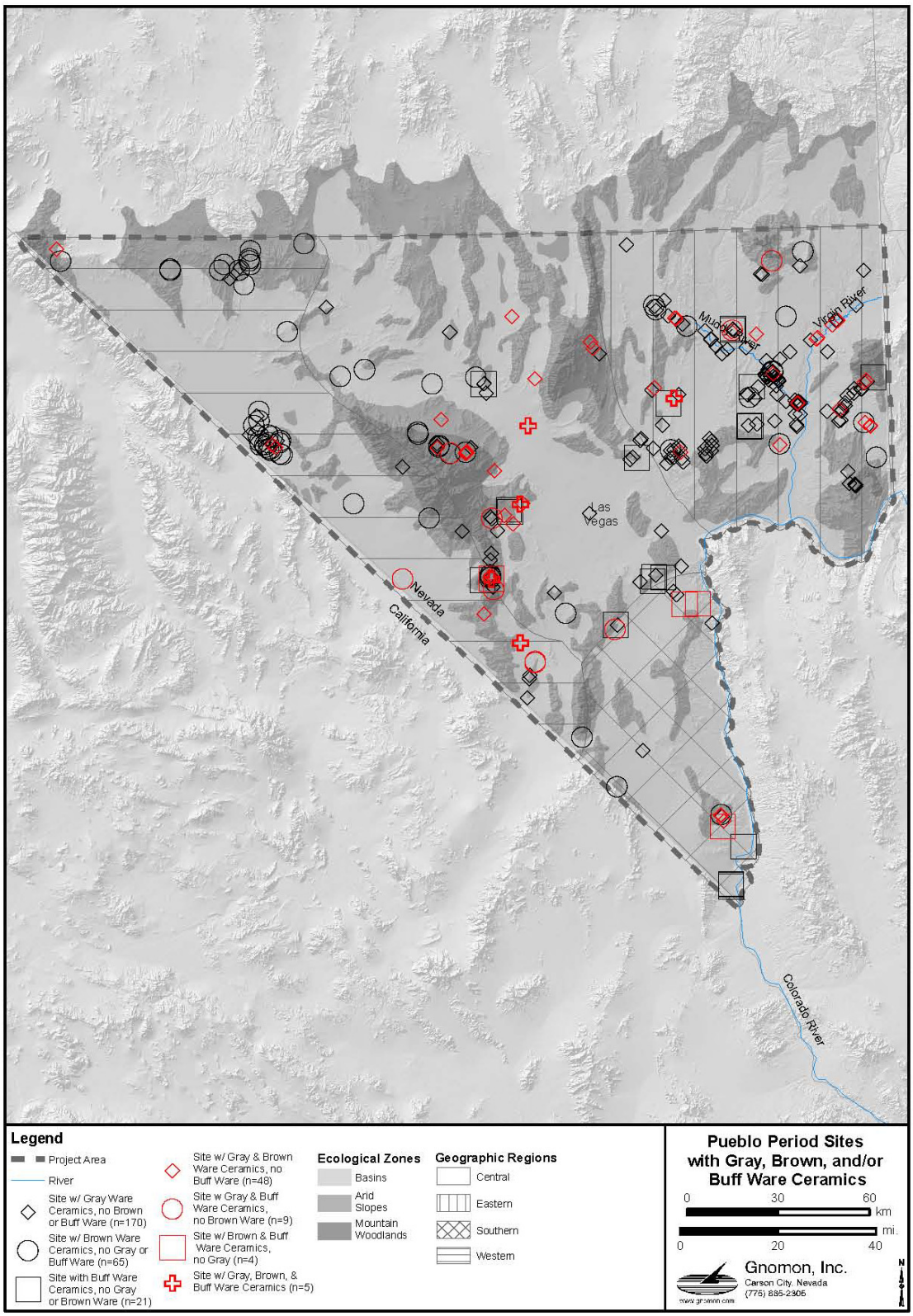


Figure 6.5. Map showing the distribution of Southern Nevada sites with gray ware (and white ware), brown ware, and buff ware pottery.

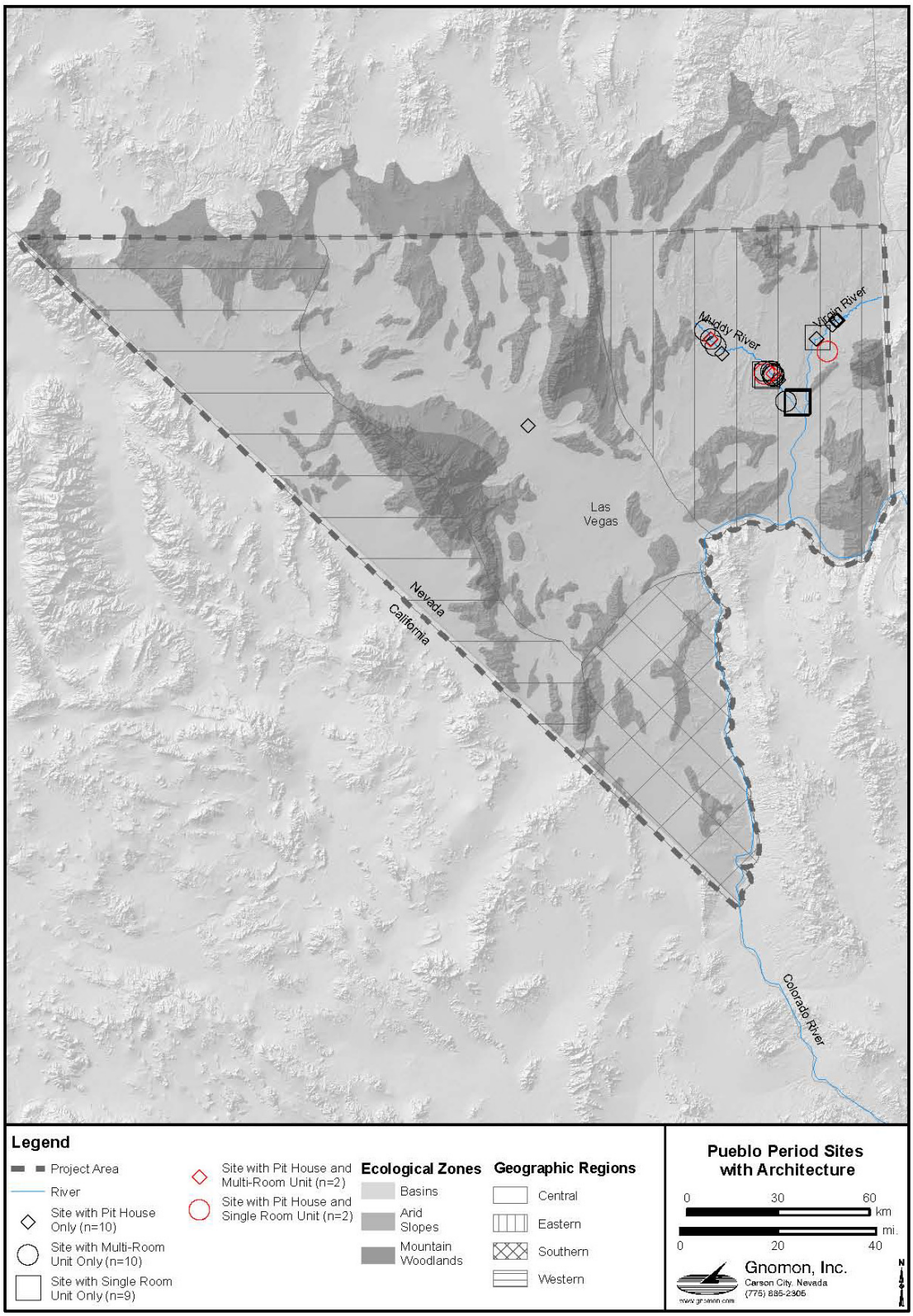


Figure 6.6. Map showing the distribution of Puebloan period sites with pithouses and single-room or multi-room surface structures.

its confluence with the Muddy River (Shutler 1961:Plate 7). These limitations not withstanding, the mapped data provide some indication of the distribution of Puebloan period architectural remains along the two rivers.

To clarify that evidence, Figure 6.7 focuses on the Eastern Region. Several of the details shown on this map appear to be valid or at least potentially valid. They include (1) the spatial separation between site groupings in the Upper and Lower Moapa valleys created by the gap in recorded architectural sites in the area known as "the Narrows," (2) the presence of numbers of sites in the two areas of the Lower Moapa Valley shown on the map, (3) the presence of recorded sites along the Virgin River about 15 miles upstream from its confluence with the Muddy River, and (4) the relatively low frequency of sites—though perhaps not the total absence shown in the figure—downstream from that clustering of sites as far as the Virgin River's confluence with the Muddy River. The existence of a gap in the distribution of sites in the Lower Moapa Valley as substantial as the one shown on the map is open to question.

EXCAVATED AND TESTED SITES

The history of systematic archaeological excavation in southern Nevada stretches back more than 90 years, to the mid-1920s (Chapter 3). The earliest work of this kind dealt in particular with sites of the Puebloan period and, specifically, with Virgin puebloan sites located in the Moapa Valley. This first episode of controlled, subsurface exploration continued until 1941. In the beginning, the research was directed by Mark R. Harrington and sponsored by the Heye Foundation of the Museum of the American Indian and the Southwest Museum, but, in response to the construction of Hoover Dam and the creation of Lake Mead, was later supported by the federal government through the Civilian Conservation Corps (CCC), the National Park Service, and the U.S. Bureau of Reclamation. The Museum of the American Indian and Southwest Museum cannot be said to have had a perfect record in publishing the results of their excavations in the Moapa Valley. Nevertheless, it was the involvement of the CCC and, later on, the Second World War that were most responsible for the incomplete analysis and reporting of the results of this first episode of archaeological excavation. Surviving data from the investigations have recently been compiled by Harry et al. (2008) as "The Lost City Finder's Guide." Field notes from the individual site or "house" excavations that are included in that document are summarized in Appendix E. As that summary indicates, excavation maps, which represent a core feature of archaeological documentation, are currently missing for a large proportion of the excavated sites or "houses."

Following a two-decade hiatus, archaeological research began again in the Moapa and, to a lesser extent, Virgin River valleys (Chapter 3). In the 1960s, the Museum of Northern Arizona conducted excavations along on the Virgin River in far northwestern Arizona in association with the construction of Interstate 15; results of this work were not published until a few years ago (Wade 2009). That research aside, some of the earliest investigations of the recent era were conducted by archaeologists from the University of Nevada, Las Vegas, including Claude Warren and Margaret Lyneis. The research projects that these archaeologists undertook in the area from the 1970s through the 1990s depended on the labor of field-school students and volunteers and received minimal support from government agencies. It was not until the 1990s that the Moapa and Virgin river valleys were introduced to substantial research projects involving the kinds of government involvement that have come to characterize American archaeology since the 1960s. That involvement includes the awarding of grants and contracts by federal and state agencies to carry out archaeological studies but, even more so, takes the form of legislative and regulatory mandates to protect the nation's cultural resources. The research conducted in the area since 1970s, whether by university entities or private contracting firms has included new excavations, as well as the preparation of overview documents and the analysis of collections and data that were recovered during the excavations of the 1920s to 1930s.

The post-1970 period has also been responsible for most of the archaeological excavations that have been conducted on Puebloan period sites located outside the Moapa and Virgin river valleys, which is to say, over the vast majority of the southern Nevada region (Chapter 3). A disproportionate share of this work has taken place during the last two decades. These investigations have been supported primarily

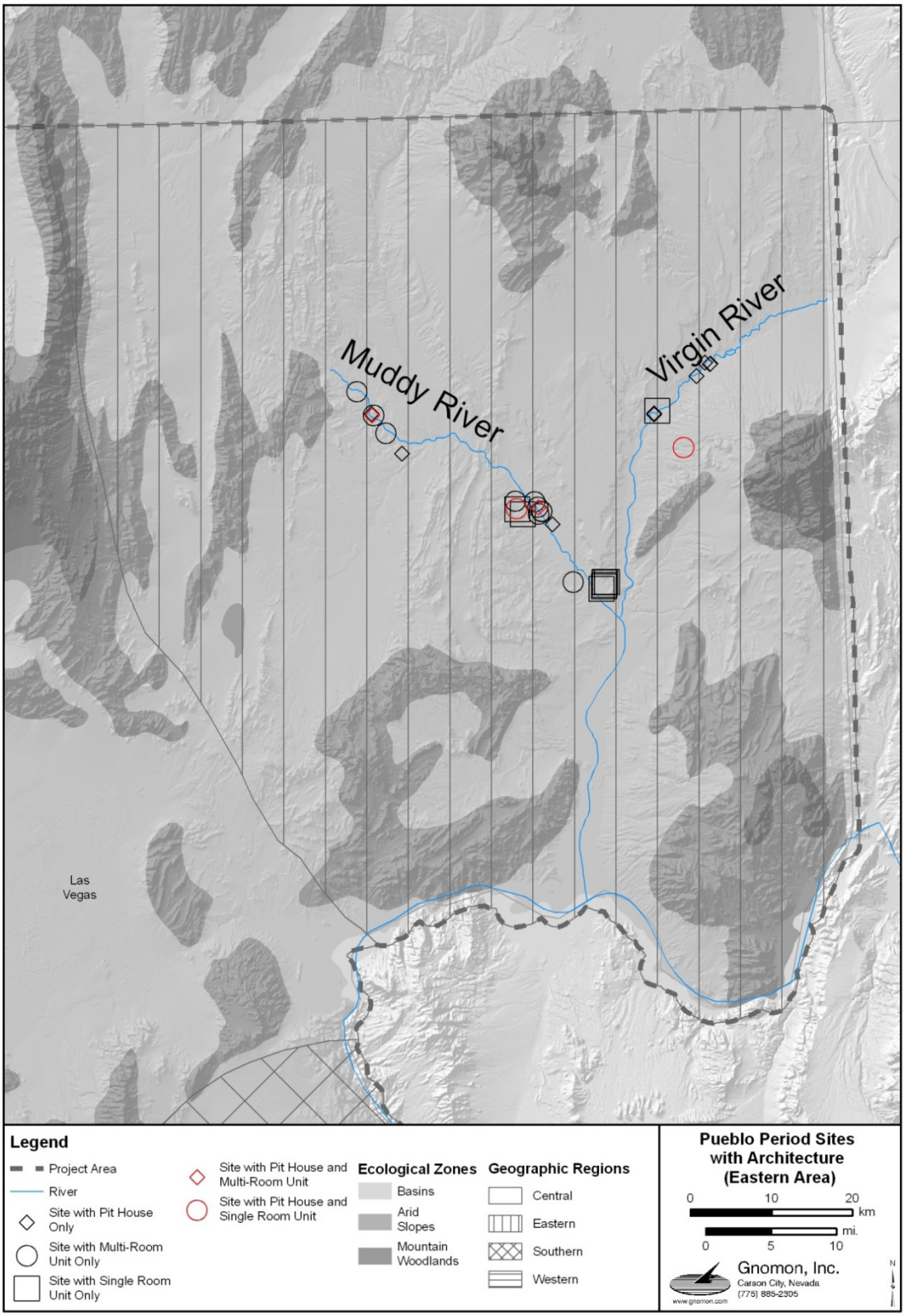


Figure 6.7. Map showing the distribution of Puebloan period sites in the Eastern Region with pithouses and single-room or multi-room surface structures.

by contracts issued by government entities and private companies to university programs or archaeological consulting firms to comply with laws and regulations on the treatment of cultural resources.

Eastern Region

MOAPA AND VIRGIN RIVER VALLEYS

Most excavations of western Virgin Puebloan sites in the Moapa and Virgin valleys have uncovered remains dating to only one or, in some cases, two of the periods into which archaeologists have been able to divide the area's Puebloan occupation. In the case of sites with more than a single temporal component, it has generally been possible to assign substantial portions of the excavated contexts to one or another of the periods represented. This predominance of sites with single or relatively discrete dual components is the basis for our organizing the following discussion of the area's excavated data by period rather than by site. The periods in question include Late Basketmaker II, Basketmaker III, Pueblo I, and Early, Middle, and Late Pueblo II (Table 6.1).

Table 6.1. A Basketmaker-Pueblo Sequence in Southern Nevada with Approximate Dates, with Key Ceramic Characteristics and Representative Sites.

Period	Dates	Ceramic Characteristics	Sites	
Pueblo III	A.D. 1200–1300	At least 50% corrugated utility ware; Shinarump Red Ware	Mesa House; Adam 2; Yamashita 5 South	Steve Perkins (late)
Late Pueblo II	A.D. 1150–1200			
Middle Pueblo II	A.D. 1050–1150	<10% corrugated; Tsegi Orange Ware	Main Ridge; Yamashita 5 North; Yamashita 3 Courtyard	
Early Pueblo II	A.D. 1000–1050	<10% corrugated; San Juan Red Ware	Yamashita 2	
Pueblo I	A.D. 800–1000	no corrugated	Yamashita 3 South	Black Dog Mesa (Locus 4); Steve Perkins (early); House 102; Cliff's Edge
Basketmaker III	A.D. 500–800	Plain and decorated gray wares		
Late Basketmaker II	A.D. 1–500	Preceramic	Black Dog Cave; Black Dog Mesa, (Locus 4); Yamashita cists; Yamashita 1 (pit structure)	

Source: Modified from Appendix Table D.1.

Late Basketmaker II (A.D. 1–500)

Data from excavated contexts reveal a Basketmaker II period that was characterized by a series of traits that include pithouse architecture, dart points, the farming of domesticated maize, as well as beans and squash, a lack of ceramic containers, and, as the period's name indicates, basketry—including the production of baskets, sandals, and other objects that are woven in the manner of baskets. The bulk of this evidence can be dated most confidently to the interval after A.D. 200—consistent with our beginning date for the Puebloan period—though some of it certainly pertains instead to the preceding two centuries—hence the dating of Late Basketmaker II to the interval of A.D. 1 to 500.

Black Dog Mesa Archaeological Complex

The most complete Basketmaker II assemblages by far have come from the Black Dog Mesa Archaeological Complex in the Upper Moapa Valley. The site complex includes two primary loci, Black Dog Cave and the adjacent Black Dog Mesa. Excavations were conducted in both areas during 2000 and 2001 by crews from the Harry Reid Center (HRC) at the University of Nevada, Las Vegas (Winslow 2009; Winslow and Blair 2003). HRC also analyzed and reported on data from excavations that were conducted in Black Dog Cave in 1942 under the joint sponsorship of the Southwest Museum and the State of Nevada (Winslow and Blair 2003).

Black Dog Mesa, Locus 4. Excavations conducted by HRC in Locus 4 on Black Dog Mesa uncovered the remains of five pit structures—interpreted here as pithouses—and a number of extramural features, including eight storage pits, two hearths, two roasting pits, and two ramadas or "arbors." The pithouses in particular warrant extended discussion because they are among the few Basketmaker II and Basketmaker III habitations in the Moapa and Virgin valleys that have been thoroughly investigated using modern archaeological methods, because HRC's detailed report on the excavations has seen only limited distribution to date, and because three of the structures burned, producing valuable assemblages of charred botanical remains. Three of the five pithouses can be dated to the site's Basketmaker II temporal component, and some of the extramural features were certainly in use during this interval as well. Feature 40, an extramural roasting pit, is particularly worthy of mention first, because a sample of charcoal recovered from its fill produced a radiocarbon date of A.D. 135–425 indicating that the feature was indeed used during the Basketmaker II period and, second, because it provided evidence of two cultigens, maize (in the form of four charred cupule and kernel fragments) and beans (in the form of a charred probable cotyledon fragment).

The three Basketmaker II pithouses, Features 8, 9, and 11, are all circular and have central hearths (offset slightly to east or southeast of dead center). They are all close to the same size, with diameters varying from 3.0 to 3.5 m. The details are not entirely clear, but the house pits would appear to have ranged mostly between about 0.50 and 1.00 m in depth below the contemporary ground surface. Feature 8 was excavated into a sloping ground surface and, as a result, its house pit was only about 35 cm deep on the structure's down-slope side. The individual structures vary in several ways. Feature 9 appears to have had four primary roof support posts. Feature 8 may have as well, though only two "large" postholes were identified, both set against the eastern and southeastern sides of the house pit. There was an arc of smaller postholes set just within the earthen walls on the opposing sides of the structure, but the role that posts placed within these holes might have played in supporting the superstructure is unclear. The third pithouse, Feature 11, contained no interior postholes—though two "groupings" of cobbles located against the walls of the house pit may have supported roof posts. A few postholes were also identified just outside the house pit, though again their role in supporting a superstructure is unclear.

The treatment of pit walls and hearths also varied among the pithouses. The walls in two of the structures, Features 9 and 11, were lined with slabs—which in both cases had been plastered over—whereas the wall of Feature 8's pit was not. As for the hearths, the one in Feature 9 was completely lined with cobbles that were plastered in place, whereas the others incorporated only one (Feature 8) or two (Feature 11) stones each. In all three cases, the tops of the stones rose above the level of the adjacent floor surface, suggesting that they may have had the shared purpose of acting as deflectors to protect the fire within from the normal patterns of airflow, or draft, within the structure.

The structures also varied with respect to what we can refer to generically as "extensions" emanating from the southeastern quadrants of their house pits. Feature 8 had a stepped entry in this location, and Feature 11 possessed an extension with a stepped floor that was interpreted by the excavators as a ventilator. This feature may, in fact, have been a stepped entryway, but if its purpose was indeed to provide a draft for the structure's firepit, as the excavators propose, it is important to note that there is unlikely to be any direct historical connection between this feature and the ventilators observed in pit structures located to the east on the Colorado Plateau. For one thing, those features typically incorporate a horizontal tunnel with a relatively level floor that is connected to a vertical shaft. More importantly, these ventilators first appear in pithouses that were constructed in the early eighth century, or more than 20 years after Black Dog Mesa's Basketmaker II period occupation. The third pithouse, Feature 9, did not preserve any evidence of side entryway, ventilator, or other similar feature.

Aside from the previously described hearths, postholes, and possible post supports, the floors of the three pithouses were almost entirely devoid of floor features. Feature 9 did contain a small (26-cm diameter) pit on its northwestern side that was filled with clean sand, and Feature 11 a small (13-cm diameter) post-hole-like pit a few centimeters southwest of its hearth that was also filled with clean sand. The excavators interpreted this feature as a sipapu, or symbolic and ritual entryway from the lower world that people had inhabited before they entered this one. This interpretation is consistent with other possible

evidence of ceremonial activity that was identified in Feature 9 including the presence of hematite in small lumps, as well as on the walls of the house pit and on artifacts found in the structure. Other characteristics of the pithouse, particularly the presence of the possible ventilator, set this structure apart from other excavated pithouses of the same period. Based on this suite of evidence, the excavators identify Feature 11 as a kiva, or specialized puebloan ceremonial structure.

This identification can be questioned on several grounds. To begin with, most archaeologists working in the Southwest today would be reluctant to label any structure predating A.D. 900 as a kiva. The presence of evidence for ceremonial activity in Feature 11 is indeed significant; the question, however, is whether there is also evidence indicating a reduction in the degree to which the structure was used for "normal" domestic activity. Describing the balance between ceremonial and domestic activity in a structure is no easy task, and it is important to note that, among the Hopi at least, kivas have continued to be used by men for what are essentially domestic activities to the present day. The effort to make these functional distinctions is nevertheless worthwhile, and considered on that scale, Feature 11 looks too much like a house and too little like a specialized ceremonial structure to warrant labeling as a kiva. The presence of a possible ventilator is also an intriguing aspect of Feature 11's design, but given the variability in the occurrence and nature of entries and, later, ventilators on Virgin puebloan pit structures, there is at present little basis for relating this feature to ceremonial activities that may have taken place within this structure.

In a similar vein, the excavators argue that Feature 8 was a possible work room or resource-processing area for the community, based on the presence of a large and varied floor artifact assemblage that included "several large metates, manos, awls, punches, gorges, agaves knifes and large quantities of plant, animal, and mineral remains" (Winslow 2009:562). Comparable assemblages are, however, relatively common in burned pithouses that have been excavated in Puebloan areas to the east and are likely to represent the inventory of movable objects that a household had on-hand in the structure at the time of its destruction. These are not necessarily active "use assemblages," but may include objects placed in the structure for safe-keeping during warm-weather times when the household spent most of its time outdoors.

Pithouse Feature 8 was destroyed by fire and, as a result, contained charred remains of its superstructure, including segments of beams of ash and willow or cottonwood as well as closing material of grass. These construction materials would have been found in the local environment. No doubt because it burned, Feature 8 produced some of the best evidence of cultigens from Basketmaker II contexts. This included a number of charred whole or fragmentary maize cupules, kernels, and cobs, as well as several pieces of squash, pumpkin, or gourd (*Cucurbita*) rind. Additional evidence for the presence of maize came in the form of pollen identified in a wash sample taken from a metate's grinding surface. Radiocarbon dates were obtained from a sample of charred maize and from three samples of charcoal or charred material that came from Feature 8's superstructure. (These and other dates from Black Dog Mesa Archaeological Complex, listed in Appendix Table A.16, are discussed below.) Unlike Feature 8, Feature 11 produced only minimal evidence of burning, in the form of two charred, fragmentary sections of what were presumably roof beams that were found on the floor of the pithouse as well as some small deposits of charcoal and ash in the fill overlying the floor. A sample taken from one of the beams was radiocarbon dated, as was a sample of charcoal recovered from the structure's hearth. The third pithouse, Feature 9, did not burn. The pithouse did, however, provide two samples that were radiocarbon dated; one of these consisted of charred material collected from the structure's floor and the other of charcoal and ash from its hearth. The hearth fill also contained one charred fragment each of a maize cupule and kernel, as well as a single charred fragment of a bean (*Phaseolus*) cotyledon. In all likelihood, both this pithouse and Feature 11 were dismantled following their abandonment for the purpose of obtaining reusable construction material. In the case of Feature 11, a couple of unwanted or inaccessible beams and, possibly, other construction elements may have been set on fire after the superstructure had been abandoned to facilitate the filling-in of the house pit—this would have prevented the collapsed roofing material from providing a refuge for rodents, snakes, and other unwanted critters.

Black Dog Cave. The second site area in the Black Dog Mesa Archaeological Complex that was excavated by HRC in 2000 and 2001 was Black Dog Cave. Comparably extensive excavations were carried out in the cave in 1942 (Harrington 1942). Although use of the cave may have begun before and definitely continued after the Late Basketmaker II period, a substantial portion of the cultural features and deposits that were uncovered date to this interval. The feature is not simply a deep rockshelter but a true cave that takes the form of a passageway—straight over most of its length, but with a gentle right-hand curve near its beginning and sharp left-hand turn toward its end—that is about 37 m long, 4-6 m wide over most of its length, and 1-2+ m high. Starting at the entrance, the cave includes two widenings, labeled Rooms 1 and 2, a relatively narrow, low-roofed "crawl through," and finally two more widenings referred to as Rooms 3 and 4. Thirty-four small storage features were excavated in the cave in 1942 and another seven in 2000 and 2001. These included earthen-walled pits, some with et al. without linings of grass or other plant materials, slab-walled pits, and slab-walled cists with more or less free-standing walls. Excavation of the fill within these storage features as well as the general cave fill yielded a wealth of perishable and nonperishable artifacts. As part of its project, HRC analyzed all of the artifacts obtained during its excavations and a portion of those recovered in 1942. (There is some ambiguity in the relationship between the two datasets, because HRC did not tie the subdatum from the 1942 excavations into their site grid.)

The analyzed collection comprised 45 pieces of coiled basketry, 37 pieces of twined basketry, 63 miscellaneous basketry items, 5 fragments of woven plain-weave fabric, 720 lengths of cordage (including 106 from a minimum of 2 or 3 fur blankets and 1 feather blanket), 13 spindle whorls made from unfired clay (several preserving fragments of the wooden spindle—in one case with cotton fibers attached), 8 complete or fragmentary twined sandals, 7 plain-weave sandals, three crooks or planting sticks, a small wooden mortar(?), 67 typeable projectile points (including both dart and arrow points), 3 wooden arrow bunts; 51 pieces of dart and arrow shafts, a bow fragment, two S-shaped sticks, 1 agave knife (consisting of a flaked-stone blade attached to a wooden handle), 582 potsherds, 3 figurines (two clay and one stone) and 21 figurine pieces (19 clay and 2 stone), 248 beads (229 shell, 9 bone, 9 stone, and 1 turquoise), 20 rings and ornaments (8 turquoise, 6 shell, 5 bone, and 1 sinew), 51 complete or partial bifaces, 6 unifaces, 16 cores, 737 pieces of debitage, 5 manos, pieces of 1 this work has taken place during the last two decades. These investigations have been supported primarily by contracts issued by government entities and private companies to university programs or archaeological consulting firms to comply with laws and regulations on the treatment of cultural resources. slab and 3 basin metates, 7,773 plant specimens, and 1,163 faunal specimens.

Among the plant remains were hundreds of specimens of maize (cobs, kernels, stems, pieces of husk and florescence, as well as 6 "cobs on sticks," 15 maize-cob "gaming pieces," a maize-cob "dart," and several braided maize stems and coiled maize husks), 1,229 specimens of pumpkin, squash, or gourd (*Cucurbita*), 4 of beans (*Phaseolus*), and 1 of cotton fiber. Also examined were quantities of Indian hemp (*Apocynum*) fiber (weighing 92.91 grams or 3.2 ounces); pine nut shells (represented by 30 collections-reference numbers); mesquite (presumably mostly pods and seeds, 64 reference numbers); and agave quids and yucca including fiber and whole leaves (40 reference numbers). Analyzed faunal remains include animal hides and fur (identified as deer, desert bighorn, and rabbit—represented by 57 reference numbers), as well as 2 small leather bags or pouches, 6 bone awls and 2 needles (one with yucca thread attached), 5 notched desert-bighorn-scapula tools, a possible lithic flaking tool, a sinew-wrapped bird-bone whistle, 11 round-to-oval bone pieces with resin attached that may have served as gaming pieces or as decorations to be attached to other objects, and 9 specimens consisting of loose strands of human hair.

This artifact assemblage is important for several reasons. First, it adds substantially to the small count of large assemblages of perishable Basketmaker II artifacts. Second, together with the excavated storage features, it provides a rich and nuanced record of the material-culture side of life during the Basketmaker II period. Third, its perishable components in particular include evidence that supports the identification of a specifically Basketmaker II archaeological culture in southern Nevada (as discussed below). And fourth, those perishable materials have made possible the radiocarbon dating of the site's Basketmaker II and later periods of use. Twenty-two samples from Black Dog Cave have been

radiocarbon dated (Appendix A). Eighteen of the corresponding two-sigma calibrated date ranges fall entirely or mostly in the Basketmaker II period (A.D. 1–500), and another two overlap the end of that period to a substantial degree. These 20 dates come from a variety of materials including maize cobs (n=5), Basketmaker-style sandals (n=3), figure-8 style sandals (n=2), a gourd rind (n=1), fragments of basketry (n=2); pieces of woven textile (n=2); wooden tool handles (n=2), an S-shaped sticks (n=1), miscellaneous charcoal (n=1), and a piece from a bow (n=1). The implications of these dates for the history of Black Dog Cave's occupation are discussed next.

Radiocarbon Dates from Black Dog Mesa and Black Dog Cave. Eight radiocarbon dates were obtained from the three Basketmaker II pithouses, Features 8, 9, and 11, that were excavated on Black Dog Mesa (Appendix Table A.16). The striking characteristic of these dates is their statistical equivalency. A straightforward way of documenting this equivalency involves two simple observations: first, the conventional radiocarbon ages determined for samples from Features 8 and 9 overlap to a substantial degree at one standard error, and second, those from Feature 11 overlap the others as well at two standard errors. A ninth radiocarbon date, obtained from charcoal in the fill of an extramural roasting pit, Feature 40, also fits this pattern.

The nine dates from the three pithouses and the roasting pit have a combined calibrated two-sigma date range of A.D. 130 to 620. The greatest degree of overlap in the date ranges is between about A.D. 240 and 420, and this interval can be thought of as representing a reasonable "best date" for Black Dog Mesa's excavated Basketmaker II temporal component. This is also the two-sigma calibrated date range determined for the one sample in the group that consisted of "annual" plant remains—maize—and that should, on that basis, be among the most accurate dates in the group.

Twenty of Black Dog Cave's 22 radiocarbon dates fall entirely or substantially in the Basketmaker II period. The latest of these dates came from a piece of a bow; its calibrated date range of A.D. 440–640 overlaps the end of the Basketmaker II period, though its midpoint of A.D. 540 falls outside that period. This dating is appropriate, since the introduction of the bow-and-arrow, which has been previously dated to around A.D. 500 has been considered a technological marker for the transition from Basketmaker II to Basketmaker III. Setting this date aside, the overall Basketmaker II date distribution indicates that Black Dog Cave was in use from ca. A.D. 200 (and quite possibly A.D. 150 or even A.D. 100) to the end of the period. The even distribution in the midpoints of the date ranges indicates that the cave was used repeatedly through this interval; furthermore, although the number of dates—at the available levels of resolution—is too few to demonstrate that the cave was in continuous use over this interval, the data are certainly consistent with this interpretation.

The radiocarbon dates obtained from the mesa and cave portions of the Black Dog Mesa Archaeological Complex support slightly different though compatible interpretations of the site's history during the Basketmaker II period. Dates from three excavated houses located on Black Dog Mesa point to an occupation span of A.D. 240 to 420, which is somewhat shorter than the interval of A.D. 100/200 to A.D. 500 indicated for the use of Black Dog Cave. The difference in the lengths of the two intervals can be explained with reference to the samples of dated objects and archaeological contexts on which they are based. The "mesa dates" come from three pithouses that individually were probably in existence for less than 20 years. These structures are just three of a much larger number of unexcavated pithouses that are known to be present on the mesa, and, although some of those structures almost certainly date to the Basketmaker III period, we can also be confident that a good number were in use during Basketmaker II times. Even in the absence of comparative data from Black Dog Cave, there would be little basis for interpreting the dates from the three structures as spanning the site's entire Basketmaker II occupation. In contrast, the "cave dates" represent a sample of objects drawn from the entire population of potentially datable artifacts and botanical specimens recovered from Black Dog Cave. These dates might therefore be expected to provide a more accurate representation of the cave's entire interval of use during Basketmaker II times. That the dates from this context provide an earlier beginning and later ending date than those from the mesa indicate that this is indeed the case.

Other Sites

In her report on the excavations that HRC conducted in Locus 4 on Black Dog Mesa, Winslow (2009:614–626) summarizes the available data on additional pithouses and pithouse sites that have been identified in the Moapa Valley. Her inventory includes 42 sites with evidence of definite or probable pit structures. A few of the sites are characterized as "pre-ceramic" and may, therefore, date to the Basketmaker II period. Others are described as Basketmaker III, Pueblo I, or even Pueblo II in age, presumably at least in part based on the kinds of potsherds noted in the associated surface artifact assemblages (surface architectural evidence may have played a role in these assignments as well). Though lacking in detail, these site records do indicate that "pithouse sites" were at one time common in the Moapa Valley.

Winslow (2009) also summarizes the mostly sketchy information that is available on a small number of pithouses that were excavated in the valley prior to the HRC's Black Dog Mesa and Black Dog Cave investigations. This includes three pithouses located on or near Black Dog Mesa. One of these structures was excavated in the early 1940s (?) by Bradley Stuart. (This is Stuart's Pithouse No. 1, Black Dog Mesa and HRC's Locus 4, Feature 14, Black Dog Mesa Archaeological Complex). The recovery of two dart points from the structure's floor, together the absence of potsherds from the structure itself and from an associated refuse dump, suggests that the pithouse is Basketmaker II in age. Stuart mapped and described the structure as measuring 3.4 m in diameter, and as having a rectangular hearth lined on three sides with stones, a passage entryway on its southeast side, and 12 postholes set against the pit wall at the back of an encircling bench (Winslow 2009:614–617). Aside from the bench, the attributes of this pithouse are generally consistent with those of the structures excavated at the site by the HRC, and even that feature can be explained within the context of the architectural variability displayed by those other structures.

Also worth mentioning are excavations conducted in the 1920s and 1930s at a grouping of three sites, House Ruins 108 to 110, located on the Virgin River about a mile upstream from its confluence with the Muddy River (Harrington 1937c; Harry et al 2008; Shutler 1961:13, Plate 23). The sites lie on the edge of a 20-foot-high mesa that overlooks the Virgin River from the east. Four more-or-less circular pit structures, with diameters ranging from approximately 3 to 6 m, were uncovered at this locality. The walls of the house pits were apparently unaltered. The largest of the structures, House 108, had a central (offset to the south) hearth. The two smallest structures, with diameters of about 3 to 3.5 m, were located about 1.5 m apart and together made up House 10. The small size of these pit structures, their placement close to one another and the fact that they may have lacked hearths suggests that they may have served as storage units, perhaps for the inhabitants of Houses 108 or 109. No ceramic artifacts were discovered during the excavation of the four pit structures, nor were any noted on the surface in their vicinity, suggesting that they date as a group to the Baskemaker II period. A possible Basketmaker II pithouse has also been identified farther upstream on the Virgin River, at the Cliff's Edge site in far northwestern Arizona. The structure is circular, measures 3.8 m in diameter, and has standing slabs lining the base of its walls (Jenkins 1981).

More recent (post-1990) excavations conducted by Margaret Lyneis at the Yamashita sites in the Lower Moapa Valley uncovered a structure and several pit features that are Basketmaker II in age. (The Yamashita sites are discussed in greater detail below, in the context of the Pueblo II period.) Excavation of the portion of a pit structure at the Yamashita 1 site that had not been destroyed by gravel mining produced few architectural details, but did provide two radiocarbon dates from probable construction materials. The dated samples consisted of charcoal collected from near the charred remnant of a cottonwood post and of burned pieces of arrowweed that were found just above a layer of charcoal that covered the structure's floor. The two dates were statistically indistinguishable and pointed to a construction date for the pithouse between A.D. 150 and 330. Eleven buried cists were discovered to the north of Yamashita 1, in the area of the Yamashita 2, 3, and 4 sites. Three of these features yielded radiocarbon dates (one per feature): two of these were from samples of charred maize and one was from a sample of charcoal. These three dates are statistically equivalent to one another *and* to the two dates

obtained from the pithouse at Yamashita 1. The two maize dates indicate that the features from which they came were in use between A.D. 120 and A.D. 365. The charcoal date from the third feature extends this date range for the group of three dated features to A.D. 420.

Basketmaker III (A.D. 500-800) and Pueblo I (A.D. 800–1000)

Data are available from fewer excavated contexts dating to the Basketmaker III and Pueblo I periods than from the preceding Basketmaker II and succeeding Pueblo II periods. The largest and most coherent body of radiocarbon dated evidence comes from Black Dog Mesa.

Black Dog Mesa, Locus 4

In 2000 and 2001, the HRC excavated two Basketmaker III–Pueblo I pit structures, Features 10 and 12, in Locus 4 on Black Dog Mesa. Feature 12 resembles the nearby Basketmaker II pithouses in its circular shape, pit depth of 40 to 80 cm, central hearth, and east-facing ramp entry. Like two of the earlier structures, it lacks a clear pattern of roof-support postholes—though one floor pit that might be a posthole is present. It is somewhat larger than the earlier structures, however, with an average diameter of about 4.8 m. It also differs in the number and variety of floor features that are present—including a possible "ash bin" adjacent to the hearth and three pits with clean sandy fill located near to one another and to the northwest of the hearth. A few charred maize kernels and cupules were recovered from two of the sand-filled pits. Features of this kind are commonly found in contemporaneous (i.e., Basketmaker III) Virgin puebloan pithouses that are located on the plateaus that lie to the north of the Grand Canyon. The pithouse also differed from the earlier structures in that at least a portion of the wall of the house pit was lined with stacked, horizontal wood strips and branches that were probably woven together to some degree and that may have been plastered over. This wainscoting did not extend into the entryway, which was at least partially lined instead with cobbles mortared in place. Feature 12 had burned, as indicated by the presence of the remains of charred roof timbers and other roofing materials on the floor. Only a handful of artifacts could be identified as having been on the floor, suggesting that the structure had been cleaned out before the fire.

The second pithouse, Feature 10, differed in several ways from Feature 12, as well as from the older, Basketmaker II pithouses that were uncovered in Locus 4. It was roughly oval rather than circular, had an irregular bench that extended around most if not all of its circumference, and, with the inclusion of that feature, measured almost 6 m north-south by 6 m east-west—making it substantially larger even than Feature 12. Portions at least of the surface of the bench and wall behind it were floored and lined with slabs. Feature 10 also differed from the other pithouses in lacking the remains of a hearth—though a feature of this kind may originally have been present. The only floor feature that was identified in the structure was an adobe-lined bin. Like Feature 12, Feature 10 had an eastern ramp entry, and its superstructure was destroyed by fire. Burned roof beams, closing material, and roof mud or clay were encountered above the structure's floor, and a variety of artifacts and botanical specimens were found on or just above it. The artifacts included carbonized basketry with maize attached, an S-shaped stick, "several large metates, a possible grilling stone, manos, several projectile points, several ceramic storage jars and bowls primarily Logandale Gray, ceramic figurines, [and] polished colored stones" (Winslow 2009:586). Charred plant remains included numerous amaranth (*Amaranthus*), tansy mustard (*Descurainia*), and distinctive but unclassified Type C seeds, numerous maize kernels and cupules, nine maize cobs and cob fragments—including six cobs that had been stacked together with the kernels on—and both a rind fragment and seed of pumpkin, squash, or gourd (*Cucurbita*). Most of these remains came from the structure's northwest quadrant, and the evidence suggests that this area had been used for food storage, including maize "on the cob" and, at the least, amaranth, tansy mustard, and Type C seeds in one or more of the ceramic vessels whose broken pieces were also found in this part of the structure.

The dating of pithouse Features 10 and 12 is based on evidence from artifacts and radiocarbon dates. Feature 12's small floor artifact assemblage included just two gray ware potsherds; another four were recovered in the 25-cm-thick layer of fill that lay directly on top of the floor. The presence of these potsherds would suggest that the structure was inhabited after the introduction of pottery making in this

region, or after ca. A.D. 500. Three samples from Feature 12—two taken from charred roof beams and one consisting of charcoal from the structure's hearth, were submitted for radiocarbon dating. The post-500 date suggested by the ceramic evidence was confirmed by the date obtained from the hearth sample, which has a two-sigma calibrated range of A.D. 640 to 770. The two dates from the roof beams are substantially earlier, with a combined, "most likely" (or slightly less than two-sigma) range of A.D. 320 to 540. The earliness of these dates, relative to the hearth date and ceramic evidence, is probably a function of the "old wood effect"—which could result from the sampling of old or inner wood from the dated beams or from the sampling of beams that had been reused from much earlier structures on the site and, therefore, were themselves old. Here we can note that two of the three Basketmaker II pithouses that the HRC excavated in Locus 4 had been dismantled following their abandonment, providing beams for reuse in later structures. Both potential sources of "old wood" may have contributed to the earliness of the dates from the charred roof beams.

It is clear from the recovery of several broken ceramic vessels on its floor that pithouse Feature 10 dates to the post-A.D. 500 ceramic period. More specific chronological evidence comes from a luminescence date on Logandale Gray (A.D. 535±302) and a suite of eight radiocarbon dates, including two dates from definite or probable structural elements (fragments of a roof beam and a common reed), two dates from one (or possibly two?) artifacts (an S-shaped stick or sticks), three dates from definite or probable stored foodstuffs (including two of maize and one of charred material from the inside surface of a gray ware potsherd), and one date from a composite sample consisting of charred maize adhering to a piece of basketry. In principle, one would expect the most accurate dates for the occupation of the pithouse to come from annual plant materials that would have had a restricted period of use—that is, from the two maize samples. The dates from these samples are statistically equivalent to one another, and they are also the two most recent dates in the group. The dates have a combined, two-sigma calibrated range of A.D. 770 to 1010, which would place the use of Feature 10 at the very end of the Basketmaker III period (A.D. 500–800) or, more likely, during the Pueblo I period (A.D. 800–1000). The two dates obtained from the construction materials, which are also statistically equivalent to one another, have a combined range of A.D. 690 to 970, which, though slightly earlier than the combined "maize date" of A.D. 770 to 1010, is perfectly compatible with it. The date from the composite basketry-and-maize sample, of A.D. 655 to 855, is earlier still, though it does overlap the early end of the "maize date." The remaining three dates are more problematic. They form a statistically equivalent set with a combined date range of A.D. 605 to 780, which is simply too early for the dating of pithouse Feature 10 as indicated by the maize dates. The position taken here is that the dates in question probably come from heirlooms—an S-shaped stick or sticks and a pot (or potsherd?) with burned stuff in it. By this reasoning, the basket component of the combined basketry-and-maize may also have represented an heirloom, whose presence "pushed" the sample's date earlier in time than one would have expected from a sample consisting of maize alone. Finally, if Feature 10 does indeed date between A.D. 770 and A.D. 1010, it follows that this structure's uselife may not have overlapped that of Feature 12—the use of which is place between A.D. 640 and 770 (on the basis of the admittedly limited radiocarbon evidence).

Other Sites

Additional, limited evidence on the Basketmaker III and Pueblo I periods comes from the Cliffs Edge site, located on the Virgin River in the northwestern corner of Arizona (Jenkins 1981), and the Steve Perkins site, Yamashita 3 site, and House 102, all found in the Lower Moapa Valley. In 1989, Keith Myhrer completed a draft report on excavations at the Steve Perkins site—in which he had not participated—that had been carried out at the site almost two decades earlier. Myhrer assigned four pit structures to the site's "early occupation." He interpreted two of these as habitations and two as storage structures. The most informative of these structures is a large, circular pithouse, Structure V, with a diameter of 6.4 to 6.5 m and a depth of 1.3 m. This pithouse had a hearth (offset from the center of the structure toward the southeast), a small, nondescript pit feature in its floor, and eight postholes, presumably for roof-support posts, set at fairly regular intervals around the walls of the house pit. Myhrer dated the site's early occupation to about A.D. 650–700, based in considerable measure on a radiocarbon

date obtained from a piece of charcoal recovered from Structure V's hearth, but also on the design styles of decorated ceramics found in deposits that could be assigned to this period of occupation. A re-examination of these two kinds of evidence suggests that this date is both too precise and, on average, too early for this temporal component. Both of these interpretations are supported by the cited radiocarbon date and, specifically, by its two sigma calibrated range of A.D. 645 to 875. Conclusions based on the ceramic data are less concrete, but the data do suggest that the early period of occupation continued well after A.D. 700. The tell-tale evidence consists of a small collection of potsherds (n=60) with designs that can be assigned to a specific design style. The majority of these sherds, 67 percent, have Black Mesa style designs. It would be a mistake to expect a one-to-one typological and chronological correlation between pottery designs observed in the Moapa Valley and the Kayenta Puebloan region (more than 100 miles to the east), where the pottery type associated with the named design style, Black Mesa Black-on-white, is commonly found. Some degree of connection is, however, implicit in the use of this label on pottery found in the Moapa Valley. We can note, therefore, that Black Mesa Black-on-white is typically dated in its "homeland" as occurring after A.D. 950. How much interpretive weight should be placed on this ceramic evidence is unclear. The combined radiocarbon and ceramic evidence do, however, suggest that a broad, Late Basketmaker III-to-Mid-Pueblo I date of A.D. 650 to 950 is most appropriate for the early occupation of the Steve Perkins site.

The "South" portion of the Yamashita 3 site, which Lyneis (Appendix D; personal communication 2011) interprets as probably dating to the Pueblo I period, comprises an alignment of small contiguous storage features and, about a meter southeast of that unit, a small pit structure (Appendix Figures D.8 and D.9). The storage features were probably constructed as "reach-in" bins.

House 102 (or DD:11:111) was excavated in the 1920s and 1930s and is important, first, because of the scope of those investigation and, second, for the fact that at least some records from this work, including an overall site map, have survived (Harry et al. 2008). Although House 102 has not formally been dated, the complete lack of corrugated ceramics in its large ceramic assemblage, together with the arrangement of the architectural features (described below), indicates a Basketmaker III–Pueblo I date for the site. Descriptive data from the excavations can be found in an unpublished "Foreman's Progress Report" (Harry et al. 2008) and in Appendix E; a map of the site is included as Appendix Figure E.16.

A single large (6–8 m diameter), roughly circular, 1-m deep pithouse (Room 4; Appendix Figure E.17) with a central hearth and no reported evidence of an entryway was uncovered at House 102; as were 13 smaller, mostly circular structures that are probably served as habitations; another mostly circular 26 structures of similar size that lacked hearths and probably served as storage facilities; and 17 small "bins" that were almost certainly used for storage. A few of the architectural features occur in a northwest-to-southeast-trending line located to the south of the large pithouse, and some others form a cluster of features that extends outward to the east from this structure, but many appear to be arranged in a ring around it. As noted, most of the architectural features are circular, and almost all are detached from one another. The primary exception to the latter "rule" involves two contiguous, rectangular features that may have been storage features. There is only a little evidence for the super-positioning of structures and features at the site. It is probably significant, therefore, that the two contiguous rooms were built over an earlier circular structure—in fact, there was a sequence of two such structures. This chronological sequence may represent the appearance, at this site at least, of a new architectural style involving the construction of contiguous lines of more-or-less rectangular storage and habitation rooms, the norm in the following Pueblo II period.

Along with the architectural remains, 115 burials were uncovered at the site. Several of these interments were accompanied by varied and, in some cases, large assemblages of burial goods. Data on most of these burials and the artifacts that they contained were tabulated by Shutler (1961:Tables 25-27). Many of the burials were probably not removed by the excavators but instead left in the ground. Human remains that were uncovered during excavation of the "Lost City" sites typically began to deteriorate immediately upon exposure, probably because of the salts that they had absorbed from the local, salty soil. This effect may have been compounded in the case of House 102 because the exposed burials were left in place for some weeks awaiting Harrington's inspection (Pat Hicks, personal communication 2011).

The records and any surviving collections from the excavations conducted at House 102 warrant additional investigation and, in some form or other, publication.

Pueblo II (A.D. 1000–1200) and Pueblo III (A.D. 1200–1300)

Sites of the combined Pueblo II and Pueblo III periods have been subjected to the most excavation of any temporally distinct group of sites in the Moapa and Virgin river valleys. The preference for excavating sites dating to this interval has, to a considerable extent, been a function of the surface visibility of their characteristic architectural remains. The desirability of the sites' artifact assemblages, relating in particular to intact ceramic vessels, has also played a role in the preferential selection. These factors aside, it is also clear that population levels peaked during Pueblo II to Pueblo III times, meaning that more people were there at that time to produce extensive archaeological deposits. With some crucial exceptions, the excavations conducted on sites dating to the Pueblo II and Pueblo III periods have remained unreported or, at the least, seriously underreported. On the positive side, there is a compilation of data from the excavations conducted in the 1920s and 1930s that was prepared several decades later by Richard Shutler (1961), with input from Mark Harrington. Shutler's monograph provides a wealth of detail on many of the excavated sites, though by no means as complete as the information one would find in a "site report." No attempt will be made to summarize those findings here.

In 2009, MNA published William Wade's report on excavations conducted from 1964 to1966 at sites located along the Virgin River in far northwestern Arizona. Wade's original 1967 manuscript was edited and otherwise prepared for publication by David Purcell. The project was carried out in preparation for construction of Interstate Highway 15. The largest and most important of the sites, NA9058, was found to include the remains of 21 pithouses, 22 storage cists, and a number of other features. The site's ceramic assemblage included large numbers of corrugated potsherds and smaller, though still considerable, numbers of painted sherds with "Sosi-style" decoration. Together, these two categories of ceramic evidence indicate that the site saw extensive use during the combined Pueblo II-Pueblo III periods. A more detailed analysis and assessment of the data presented in Wade's report is beyond the scope of the present study.

Main Ridge

Two sites or site localities have produced the bulk of what can be considered as "modern" archaeological data from Pueblo II contexts. They are the Main Ridge Community and the Yamashita sites, both of which are in the Lower Moapa Valley. In the case of Main Ridge, the relevant excavations were conducted primarily, though not entirely, during the 1920s and 1930s. Data from these "old" excavations have been reintroduced into the modern era by Margaret Lyneis through her analyses of records from the original excavations as well as the surviving artifact collections. Main Ridge is part of the broader construct of "Lost City," encompassing archaeological remains spread along a 16-mile stretch of the Muddy River in the Lower Moapa Valley, its southern end located at the confluence of the Muddy River with the Virgin River (Shutler 1961:6).

Lyneis's (1986a, 1992a, 1992b) Main Ridge studies have focused on site layout and architecture, burials, and ceramics. The implications for Western Virgin Puebloan social history are discussed in Lyneis (1992b). The understanding of ceramic evidence from Main Ridge and other Western Virgin Puebloan sites is discussed in Chapter 5. As for architectural evidence, the Main Ridge Community shows a preferred site layout—modified by the exigencies of the site's location on a number of long, narrow ridge fingers—that is documented as well in Shutler's (1961) earlier report. This layout is characterized by a straight or curving alignment of surface rooms, one room deep, that in many cases included a single habitation structure, often located at one end of the room alignment, but for the rest consisted of what appear to have been storage units. The habitation rooms are identified as such based on the presence of a hearth and the rooms' relatively large size. Storage rooms, by way of contrast, tend to be small, do not generally include hearths, and sometimes have rock-paved floors. These at least are the "ideal" conditions of site layout and functional interpretation. Actual layouts vary considerably from the stated pattern, and the identification of room function can present problems, particularly for the many structures that are

intermediate in size between the larger habitation rooms and the smallest storage structures (Lyneis 1992a:20-25). The surviving remnants of these walls were constructed of alternating courses of mud and stone—a pattern also documented by Shutler (1961) at other Lost City sites.

One important dataset that Lyneis could not resurrect from the old excavations at Main Ridge consists of plant remains that would reflect the subsistence practices of the site's inhabitants. Here we should note that Shutler (1961) does occasionally refer to maize cobs and the remains of other cultigens that were recovered during the Lost City excavations of the 1920s and 1930s. This evidence was important to the excavators, and remains important to us today, as documentation of the practice of farming by the residents of Lost City. It does not, however, represent the kind of systematic evidence that is generally obtained through the extraction of pollen and charred plant remains from soil samples and that can serve as the basis for modern analyses and interpretations of prehistoric subsistence. A small but significant sample of this kind of evidence has recently been obtained from Main Ridge.

In 2006, Karen Harry (2008a; Harry and Watson 2010) directed the UNLV archaeological field school in a project involving mapping, small-scale excavation, and condition assessment of Main Ridge. Excavation involved the digging in two of the sites house units of 13 shovel tests and of 20 test units ranging in size from 1 x 1 m to 2 x 2 m and in depth from 5 to 38 cm and, in one case, 88 cm. The excavations demonstrated that some localized buried intact cultural deposits are still present on portions of the site that are located above the highest water level attained by Lake Mead during its history. Substantial areas within the site (as well as the nearby House 46) have suffered greatly from lying beneath the surface or along the shoreline of the lake. Seven pollen and eight macrofloral samples were analyzed from House 20. Together these samples produced an unusually rich record of cultivated plants: among the 15 analyzed samples, evidence of maize was found in 13, of squash in 6, and of beans in 3. The inhabitants of House 20 were clearly much involved in the cultivation of these three crops. The exploitation of a variety of wild plants was also documented, including cattails, prickly pear cactus, Cheno-ams (specifically amaranth, saltbush, and goosefoot), tansy mustard, and grasses. The units excavated in House 40 also yielded faunal remains including those of desert bighorn, rabbits and hares (jackrabbits), birds, and desert tortoise.

The Steve Perkins and Yamashita Sites

As mentioned previously in the context of Basketmaker III–Pueblo I period investigations, Keith Myhrer (1989) prepared a draft report on excavations that had been conducted a number of years earlier at the Steve Perkins site. This site's "late" or Pueblo II period occupation included an alignment of seven roughly rectangular, cobble-slab-and-adobe-walled storage rooms connected at the west end to an oval, post-outlined structure with a hearth, interpreted as a living room, and, several meters from that, a second room of similar construction that lacked a hearth but may nevertheless have been a living room. Some 30 m to the south, a second similar unit consisting of a bent-at-both-ends alignment of four or five cobble-and-adobe-walled storage rooms that was also connected (or adjacent) at its west end to an oval, post-outlined structure with a hearth that was also a living room; and, another 10 m south of that, a rather large (2.6-3.0 m diameter), oval, post-outlined structure with two hearths that represented a third living room.

Between 1989 and 1997, Dr. Margaret Lyneis of the University of Nevada Las Vegas directed combined field-school and volunteer excavations at the Yamashita sites, located on the east side of the Muddy River between the towns of Overton and Logandale. A formal report on these excavations is in preparation, and so a brief summary is presented here as Appendix D. Four of the sites, Yamashita 2, 3, 5N and 5S, had substantial Pueblo II components. The Courtyard unit at Yamashita 3 is noteworthy here for the similarity of its layout (Figure 6.8) to that just described for the Steve Perkins site. It too had an alignment—in this case more arcing than bent—of storage rooms with a hearth-bearing living room attached to its west end.

Mesa House

Two other sites, in addition to Yamashita 5S (Table 6.1), have produced archaeological remains dating to the Late Pueblo II–Pueblo III period. They are Adam 2 (Lyneis et al. 1989) and Mesa House. The most complete body of excavated evidence relating to this period comes from Mesa House, which

was excavated in 1929 (Hayden 1930). The site is located in the Lower Moapa Valley, on the west bank of the Muddy River atop a terrace remnant or "headland" that rises 36 m (120 feet) above the adjacent valley floor and Muddy River floodplain. Excavation was quite thorough, at least from the perspective of uncovering architectural features, though extramural areas appear to have received less attention. The site includes a central plaza or courtyard ringed by single alignments of living and storage rooms—with one living room for each set of storage rooms. The "living rooms" are larger than the storage rooms and contain hearths (Figure 6.9). Also present are an additional storage-room and living-room unit that is not part of the plaza arrangement, as well as several dozen other structures, scattered or in groupings that are not so distinct as those that define the central plaza.

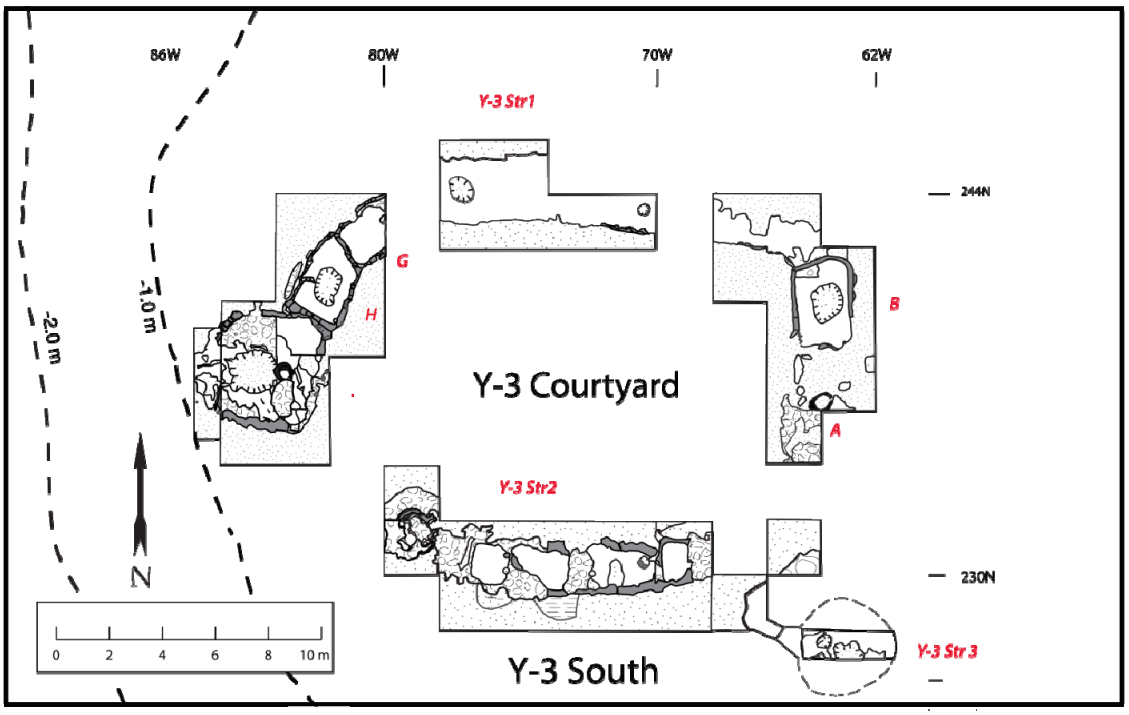


Figure 6.8. Map of architectural units at the Yamashita 3 site (see Appendix D).

The largest of the living rooms, Room 9, contained a grave that provided an unusual amount of information on funerary ritual. The burial pit had been excavated through the structure's floor. Within the pit were the skeletal remains of an adult female(?) and a child that were accompanied by a few pieces of blanket wrapping and cord and a variety of burial goods. The latter included 24 arrow points, 12 turquoise pendants, two haliotis shell pendants, a hafted stone knife, pieces of a turtle carapace (originally a cup?), two cane gambling dice, and food remains (squash and mesquite seeds, pine nut shells, and squash rind). The bodies and grave goods were placed in the pit and

> the excavated earth replaced. Before completing the interment two clubs of antler and eight arrow points were placed in the grave and the rest of the earth replaced…. The grave was then carefully mounded and a fire kindled on the top. In this fire offerings of food and objects were placed and the fire maintained for some time. When the time of maintaining this fire had lapsed, water from a large corrugated olla [found broken and partially burned in the structure fill] was thrown upon it and the olla shattered at that time. A torch was then applied to the dried roof material on the inside. As the roof supports gave away the whole roof with its covering of adobe crashed to the floor leaving the room in smoldering ruins [Schellbach 1930].

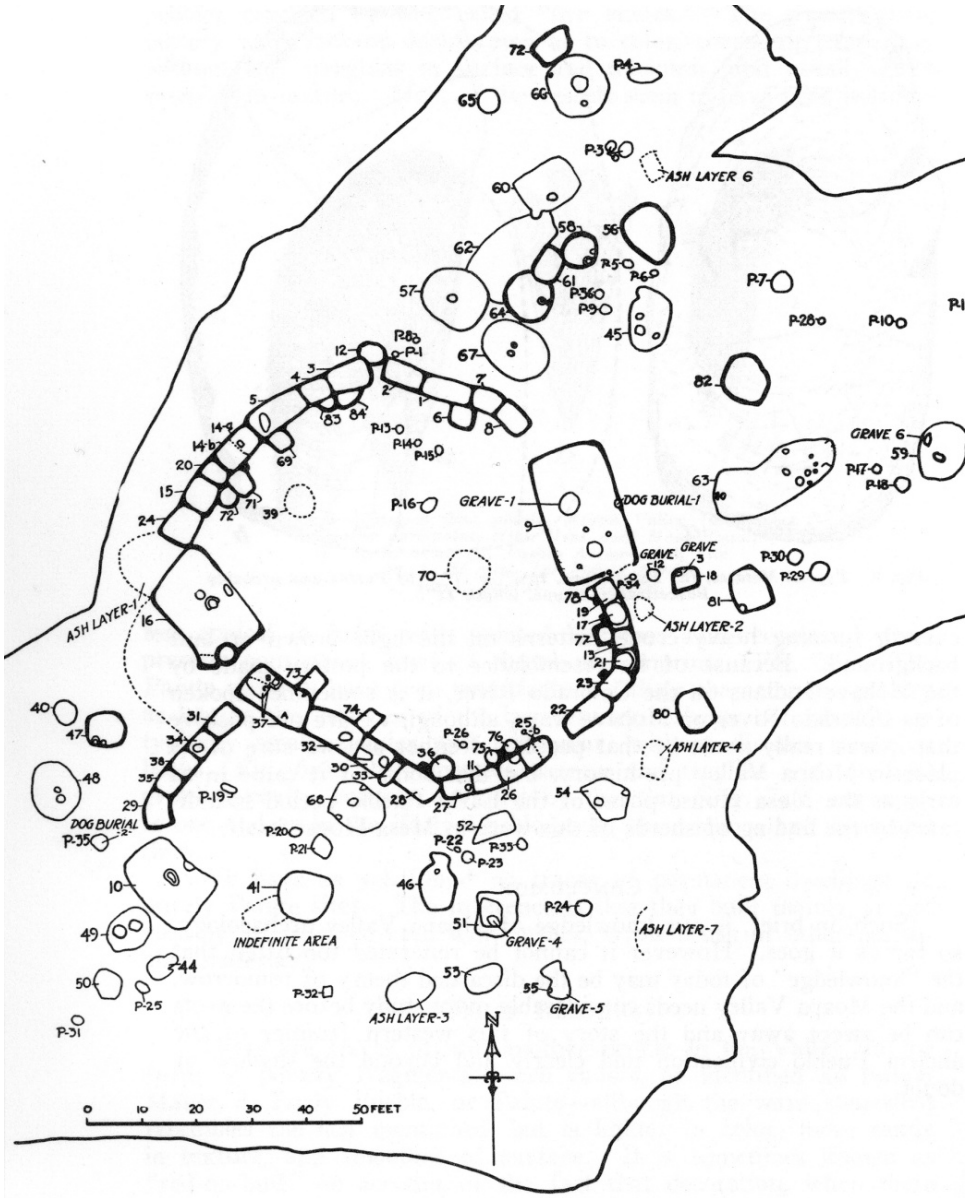


Figure 6.9. Mesa House (from Hayden 1930).

Hayden's (1930) report provides a wealth of details on the construction of lower walls and the arrangement of walls and hearths. Little could be inferred, however, concerning the construction of the upper portions of the walls or, except in the room with the previously described burial, the roofs of the structures. Noteworthy architectural details include (1) the presence of what appears to be an "entry step" set against the inner wall in a number of the living rooms—which does not appear to be at all common at the other, earlier sites that have been excavated; (2) the identification of at least one pithouse or semi-subterranean earthlodge style structure among the other more pueblo-like structures; and (3) the evidence of burning found in most living rooms—typically a layer of ash on the floor that does not appear to be a result of catastrophic burning of an inhabited pueblo, or even the thorough destruction of an abandoned settlement. Mesa House was excavated long before pollen and flotation analysis became standard practice in archaeology, though occasional finds relating to roofing materials or subsistence resources are noted in the report.

UPLANDS

It is clear from even a cursory examination of the archaeological record that the people who inhabited Southern Nevada during the Puebloan period made use of the region's upland resources. These "upland" areas include the arid slope and mountain woodland ecological zones depicted in Figure 6.1, as well as adjacent portions of the basin zone. Two areas have produced most of the evidence from excavated contexts relating to the exploitation of upland resources by Puebloan groups. These are the Upper California Wash locality and the Gold Butte–Virgin Mountains area, both of which are located in the Eastern Region. Upper California Wash is located along the southwestern edge of the Eastern Region, about 25 miles west of the Virgin River below its confluence with the Muddy River. Two survey and excavation projects conducted in this area in the 1970s to early 1980s produced valuable datasets relating to site settings, ceramic and, to some extent, flaked stone artifacts, predominant feature types, and radiocarbon dates, but little in the way of botanical or faunal evidence (Blair 1986; Brooks et al. 1975). The Gold Butte-Virgin Mountains Area is located at the eastern edge of the Eastern Region, between 5 and 20+ miles east and southeast of the Virgin River along its entire course through the region. Two projects are responsible for most of the excavated evidence from this area as well. One conducted in the early 1980s yielded the same kinds of data as the more-or-less contemporaneous projects in the Upper California Wash locality (Ellis et al. 1982). The second, dating to the interval from 2006 to 2010, produced those categories of evidence as well, but also made important new contributions in the recovery and analysis of plant and animal remains, as well as in the technological analysis of ceramic vessels and flaked stone artifacts and the sourcing of the obsidian that was used to make some of the flaked stone tools (McGuire et al. 2010). The findings of these projects from the Upper California Wash and Gold Butte–Virgin Mountain Areas are best discussed in the aggregate and, so, will be considered in the Discussion and Interpretation section at the end of this chapter.

Central Region

There have been two major developments over the last decade in the archaeology of the Central Region and, specifically, of the Las Vegas Valley during the Puebloan period. The first of these consists of a considerable increase in the quantity and quality of evidence for the presence of habitation structures dating to this interval and the second of the first credible evidence of prehistoric farming in the valley. Both of these datasets have been obtained through subsurface investigations involving both the testing and small-scale excavation of sites. Most of this evidence has come from the Corn Creek site (Roberts and Lyon 2011), located toward the far northwestern end of the Las Vegas Valley; from the Las Vegas Springs Preserve, situated in the west-central portion of the valley; and from the Three Kids, Larder, and Scorpion Knoll sites (Ahlstrom 2005; Ahlstrom 2008b), all of which are located in the far southeastern corner of the valley within the bounds of Clark County Wetlands Park. Table 6.2 provides summary data on the five Puebloan period habitation structures that were excavated or tested in the Las Vegas Valley during the first decade of the A.D. 2000s. Also listed is sixth structure, located several miles northeast of the Valley at the Windy site, that was excavated in the 1970s (Brooks et al. 1975).

SITES IN CLARK COUNTY WETLANDS PARK

In 2005, HRA published a report on its analysis of records and artifacts from excavations that had been conducted in the 1970s by the Las Vegas Wash Archaeological Project (Ahlstrom 2005). The sites involved were 26CK1126, 1138, 1139, 1282, and 1474. Three of the sites, 26CK1139, 1282, and 1474, produced substantial amounts of evidence dating to the Puebloan period.

In 2003, archaeologists with HRA excavated the remains of a circular pithouse at the Three Kids site (26CK1282 and 26CK1474) in Clark County Wetlands Park. The structure was buried about a meter below the historic floodplain of Las Vegas Wash. Its shallow (25–30 cm deep) house pit had a diameter of 3.6 to 3.9 m and included a central hearth (offset to the southeast) and evidence of a southeastern entryway (Figure 6.10). Among the structure's contents were two arrow points but no potsherds. A number of pollen samples were collected from the floor to test for the presence of pollen from maize or

possibly other cultigens; no such evidence was encountered. A radiocarbon date obtained from a sample of charred seeds had a two-sigma calibrated range of A.D. 410 to 600. In addition to its "pride of place" as the first habitation structure to be excavated and thoroughly reported in the Las Vegas Valley, the Three Kids pithouse is significant for two reasons. Broadly speaking, the structure dates to the time when the bow-and-arrow and pottery are thought to have been introduced to southern Nevada. It is noteworthy that the pithouse produced evidence of the first of these innovations but not the second. Also, even though the structure is preceded and followed in time by evidence of maize farming from the Larder–Scorpion Knoll site locality, which is located several miles upstream from the Three Kids site, it would appear that the structure's inhabitants were not engaged in farming. This finding fits an interpretation of farming as a "sometime thing" among the people who lived along Las Vegas Wash in the early Puebloan period.

Table 6.2. Summary of Habitation Features Identified in and Near the Las Vegas Valley

Radiocarbon Date Range	Site	Summary	References
A.D. 410–600	Three Kids Site (26CK1282)	Shallow (25–30 cm), round pit structure (4 m diameter), hearth, probable ramp entry, poles around inside perimeter, two Rose Spring arrow points, cremation burial, no ceramics, no maize, marsh plants and wild seeds, metates	Ahlstrom (2005)
A.D. 410–690	Windy Site	Oval to subrectangular surface structure with lower rock walls, extramural hearth, two Rose Spring arrow points, and no pottery	Brooks et al. (1975:181–189)
A.D. 530–710	Corn Creek Site (26CK2605)	Circular (?) pit structure, locally made Logandale Gray pottery, marshy setting, wild seeds processed (tested only)	Roberts et al. (2003a, 2003b, 2007)
A.D. 700–1000	Scorpion Knoll (26CK6147)	Two round pit structures, Moapa Gray pottery, maize pollen, wild seeds processed, small artifact assemblage, other features included storage and roasting pits (tested only) (Figure 6.11)	Ahlstrom (2008b)
A.D. 680–980	Las Vegas Springs Preserve (26CK949)	Round informal pit structure, North Creek Gray and Moapa Gray pottery, extramural hearths present, maize, cucurbita, wild seeds processed	Roberts and Seymour (2006)
A.D. 670–870	Corn Creek Site (26CK2605)	Round ephemeral habitation (3 m diameter), locally made Logandale Gray pottery, Parowan/Eastgate Basal-notched arrow points, bifaces, and other tools (Figure 6.12)	Roberts and Lyon (2011)

Note: No details are available on two possible pit structures identified at 26CK1474 during excavations conducted in the 1970s (Ahlstrom 2005:362).

In 2005 and 2006, HRA carried out tests excavations at the Larder and Scorpion Knoll sites, which are located in the southeastern corner of the Las Vegas Valley, about 100 m apart on the northeast bank of Las Vegas Wash. Backhoe testing of the Larder site led to the discovery of 60 pit features including 4 thermal features and 56 storage pits, Based on that sample, it is estimated that between 500 and 800 similar storage pits are probably present on the site (Ahlstrom 2008a). No evidence of habitation structures was uncovered. A suite of 11 radiocarbon dates from the same number of storage pits produced a combined, two-sigma calibrated date range that extends from approximately 350 B.C. to A.D. 1600 (Ahlstrom 2008b:Table 4.3). The date distribution is not continuous, but includes a strong cluster of ranges between 350 B.C. and A.D. 250, single ranges of A.D. 650–750 and 900–1050, and a weak

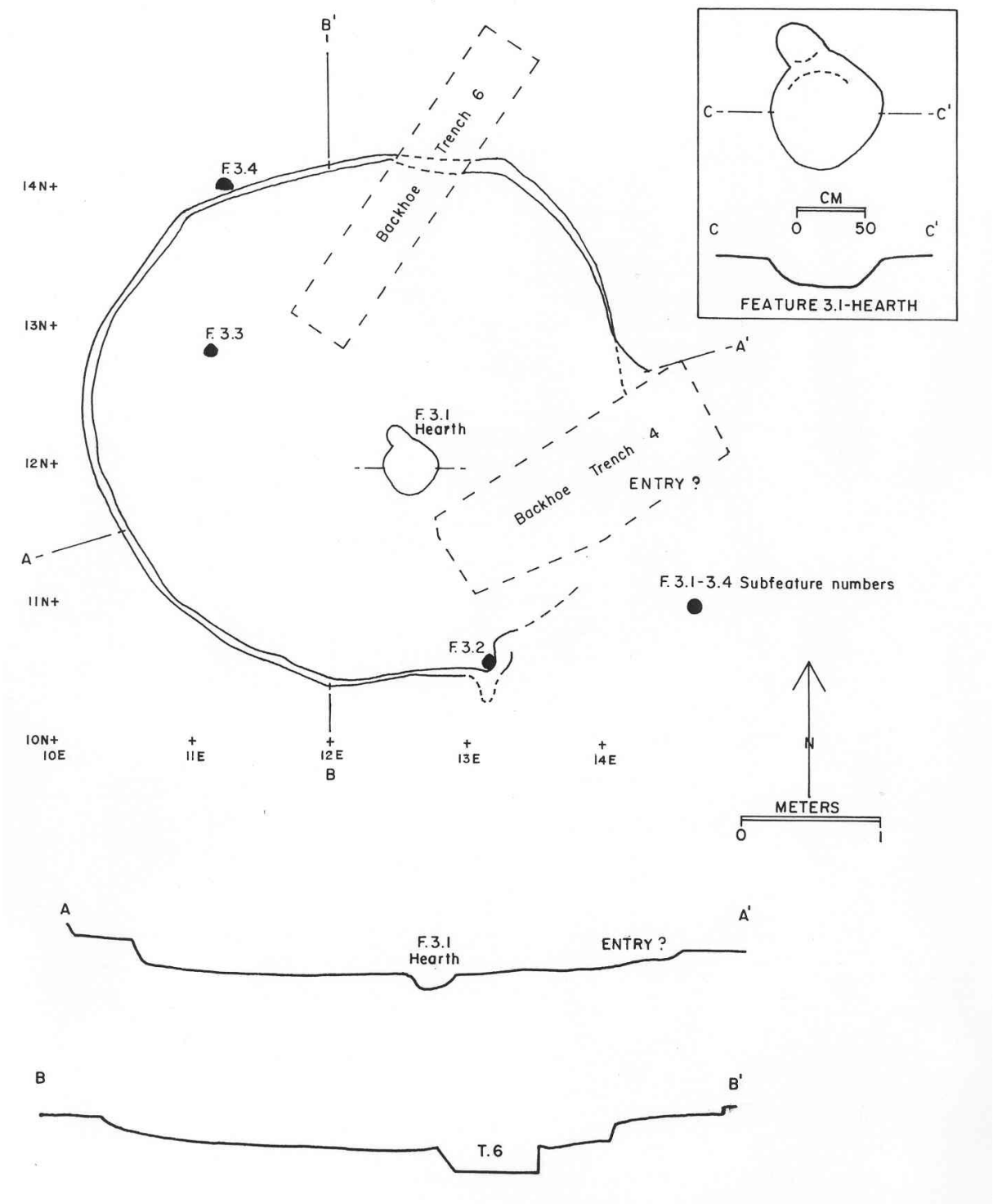


Figure 6.10. Plan and profile drawings of the excavated pithouse at the Three Kids site (Ahlstrom 2005:Figure 12.7).

cluster of ranges between A.D. 1400 and 1600. Based on the evidence from testing, HRA interpreted the Larder site as an open-air "cache site" that was used repeatedly over a period of at least 1700 years. The Larder site's role as a "persistent place" can be explained in three ways. First, the site was located near to two resources—mesquite trees and floodplains—that were exploited on a long-term basis by the people

who occupied this portion of the Las Vegas Valley. The mesquite trees provided edible seed pods, and areas of floodplain were suitable for small-scale farming. During the part of the time the site was being used, it appears that a "sand sheet" was being actively deposited over the site's surface. This active depositional environment would have facilitated the hiding or camouflaging of storage pits after they had been filled, which appears to have been an important consideration for groups with relatively dispersed patterns of settlement. Finally and most significantly, the surface of the site was underlain by sediment rich in the mineral gypsum. The presence of this natural desiccant would have decreased the rate of loss of buried foodstuffs to rotting, which was another important consideration in the use of this storage technique (Ahlstrom 2005).

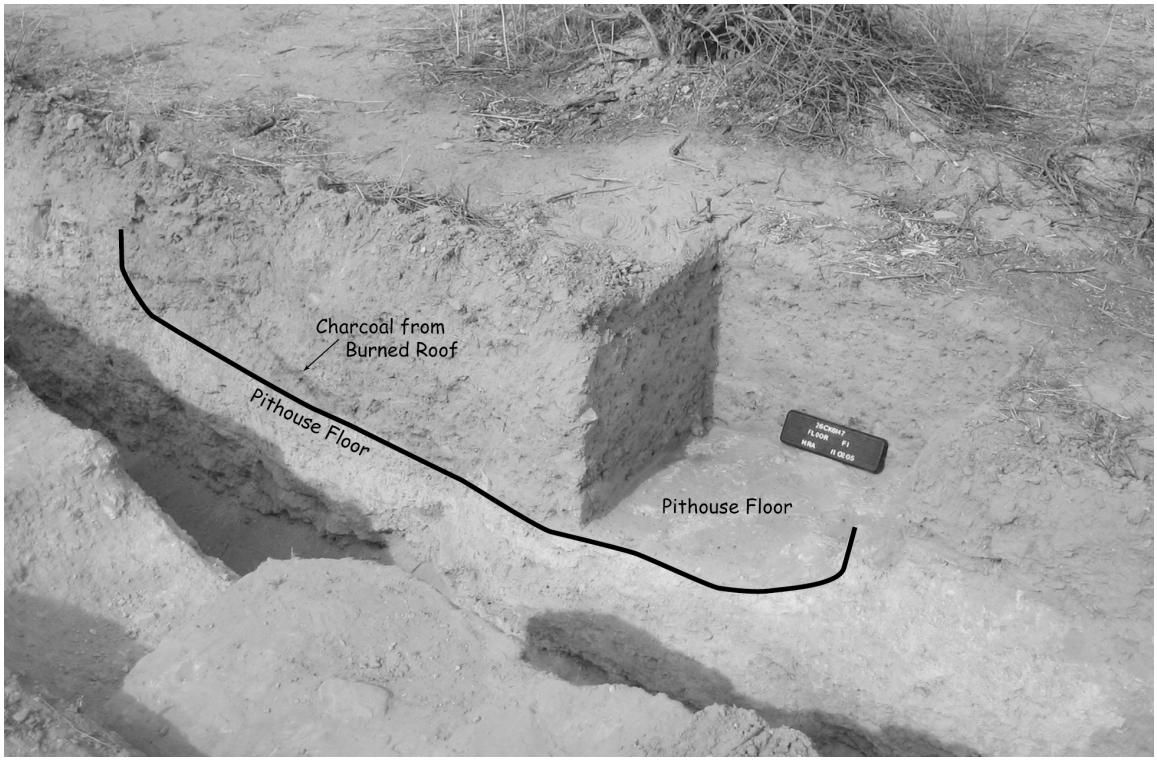


Figure 6.11. Photograph of a partially excavated pit structure at the Scorpion Knoll site (Roberts et al. 2008:Figure 10).

Testing at the nearby Scorpion Knoll site uncovered two ephemeral habitation structures (Figure 6.11), a third, possible ephemeral habitation structure, a roasting pit, and three storage pits similar to those at the Larder site. Hearths were not identified in any of the structures, though this may be due to the fact they were only partially excavated. Four dates from Scorpion Knoll place the occupation of this site between A.D. 700 and A.D. 1000, or around the middle of the interval during which the Larder site was in use. HRA interpreted this site as a possible "field house" that was used during one or perhaps two brief intervals. Although the occasional maize kernel or cob had previously been reported from sites in the Las Vegas Valley, the Larder and Scorpion Knoll sites produced the first substantial evidence of prehistoric farming in this area. That evidence is reviewed below in the Discussion and Interpretation section.

CORN CREEK DUNES

At the Corn Creek Dunes site north of Las Vegas, HRA recently excavated a small habitation complex with a calibrated date range from three radiocarbon dates of A.D. 720 to 880 (Roberts and Lyon 2011). The complex included the remains of a well-defined habitation structure, as well as a block of adobe-like material that may have been the remnants of a second structure destroyed by the surface erosion that characterizes the site area. The well-defined structure was shallow—less than 20 cm deep—

and measured 2.3 m in diameter (Figure 6.12). It was constructed of mesquite poles arranged in a circular pattern. The structure's unprepared floor consisted of natural gravel, and the only interior floor feature was a small warming hearth. The feature's fill contained a large and varied artifact assemblage that included 3,749 pieces of debitage, 21 tools including two Parowan Basal Notch points from the floor of the feature, and 87 potsherds. The sherds represent jars of locally made Logandale Gray, which Lyneis (2011a) has dubbed the Corn Creek Variety of this pottery type. The ceramic assemblage recovered from the fill of the feature was dominated by Logandale Gray; however, two sherds of Great Basin Brown Ware pottery and one of North Creek Gray were also recovered from near the floor of the structure.

Figure 6.12. Photograph of an ephemeral surface habitation structure excavated at the Corn Creek site; dimensions = 2.5 m left-to-right by 2.0 m front-to-back (Roberts and Lyon 2011:Figure 4.17).

Horticultural activities are suggested by the presence of maize pollen recovered from the vicinity of the adobe fragment and maize kernels recovered from the fill of the pithouse. While maize appears to have been grown and processed, wild plants are still important and included mesquite pods, hedgehog cactus fruit, and charred chenopod (possibly *Atriplex*), thornberry, and alkali sacaton seeds. Faunal remains indicate that rabbits and artiodactyls were cooked.

SHELTERED SITES

In addition to the sites just discussed, there are others that have provided evidence relating to aspects of Puebloan period settlement-subsistence systems that do not include the construction of recognizable habitation structures or farming activity (Ahlstrom 2005:54-58). Five of these sites, 26CK4440, Garrett's Shelter, the Mended Basket site, 26CK1139, and 26CK4908, are located in and adjacent to small rockshelters that appear in each case to have been used for short-term habitation or camping. These visits occurred more than once over intervals that overlap the Puebloan and Post-Puebloan periods. The sites are described in some detail in Chapter 7, which discusses the Post-Puebloan period. Our primary goal in mentioning them here is to indicate how and why the sites are considered to include a Puebloan period temporal component.

Site 26CK4440 and Garrett's Shelter are located in the Apex Area at the northern edge of the Las Vegas Valley (Ahlstrom 2005:55; York et al. 1992). The excavation of 26CK4440 revealed four hearth or charcoal-stain features as well as small flaked stone, ground stone, and ceramic assemblages. The latter consisted almost entirely of Virgin Puebloan types which, together with a single radiocarbon date, are the basis for dating a portion of the site's occupation to the Puebloan period. Three other radiocarbon dates relate to its use during the Post-Puebloan period. Garrett's Shelter contained a small set of weakly stratified deposits along with four small thermal features (hearths and roasting pits), three other small pit features, and a rock alignment (Ahlstrom and Roberts 2001c). Deposition of the earliest of the site's four stratigraphic units (Stratum 4) began during the Puebloan period, but the rest of the site, including most or all of the features, appears to date to the Post-Puebloan period.

The Mended Basket site (26CK4038) is in the southwestern corner of the Las Vegas Valley (Blair and Seymour 1998). Three of this site's seven radiocarbon dates fall squarely within the Puebloan period, and a fourth straddles the boundary between that and the Post-Puebloan period. The remaining dates lie entirely within the latter interval. The site was found to contain five shallow informal hearths and a slab-lined cist. Two of the hearths and the cist produced one Puebloan period date each, indicating the importance of this interval in the site's occupational history. Site 26CK1139 lies in the southeastern corner of the Las Vegas Valley, adjacent to Las Vegas Wash and within the boundaries of Clark County Wetlands Park (Ahlstrom 2005). A suite of 13 radiocarbon dates suggests that the site was visited on a number of occasions over the interval from ca. A.D. 1100 to 1900. Although three of the radiocarbon date ranges lie within the Puebloan period, the totality of the evidence suggests that 26CK1139's "major period" of use as during the Post-Puebloan period.

Site 26CK4908 is located on the western side of the Las Vegas Valley, at the base of the Spring Mountains. This site differed from those just described in that, along with a small rockshelter, it included three large roasting-pit features. (Characteristics of this feature type are discussed below, in a section on the Exploitation of Upland Resources.) The site dates primarily to the Post-Puebloan period; however, one of the roasting pits produced a radiocarbon date suggesting that it was in use during the Puebloan period, specifically between the sixth and eighth centuries.

Two additional sites, Gypsum Cave and Flaherty Rockshelter (described in Chapters 5 and 7), occupied substantially larger rockshelters than the sites just discussed. The occupational ranges of both sites began before and continued after the Puebloan period. Gypsum Cave lies near the boundary between the Central and Eastern regions. This site's Late Archaic period occupation has received the most attention from archaeologists (Gilreath 2009; Harrington 1933). A small collection of potsherds and a newly determined (Gilreath 2012) set of five radiocarbon dates (three obtained from maize cobs and two from cotton cordage) show that the site was also used on more than one occasion during the Puebloan period (Gilreath 2012). Flaherty Rockshelter is located several miles north of the Apex Area and the Las Vegas Valley. Eighteen radiocarbon dates obtained from the site had a combined two-sigma calibrated range of 4220 B.C.–A.D. 1650 (Blair and Wedding 2001; findings summarized by Ahlstrom and Roberts 2001a:200–203). The bulk of the evidence from the site appears to relate to its use during the Late Archaic period. Three of the radiocarbon ranges do, however, fall in the Puebloan period, and small collections of puebloan potsherds and Rosegate and (less convincingly) Cottonwood arrow points indicate Puebloan period use of the site as well.

Western Region

As compared to the Eastern and Central Regions, most of the Western Region has hosted relatively little archaeological fieldwork involving either survey or excavation. As Figure 6.1 shows, Puebloan period sites have been identified primarily in the Yucca Mountain and Ash Meadows areas of the Western Region. Sites in the former area have been assigned to this period primarily on the basis of projectile-point data. The sites in this area consist mostly of artifact scatters in open settings. Much of the region's limited research effort has been focused on Ash Meadows. Sites in this area have been assigned to the Puebloan period on the basis of projectile points, ceramics, or both.

Mechanical trenching conducted by Mehringer and Warren (1976; Muto et al. 1976) at Ash Meadows revealed stratified deposits of sand and peat that included evidence for human activity that took place before, during, and after the Puebloan period. The archaeological data recovered from this and other contexts were limited in nature and involved observations on the presence and distribution of artifacts, the documentation of several pit features including one or two hearths and three burial pits, and a handful of radiocarbon dates. One of the latter, from a charcoal lens that may have been a hearth, fell in the Puebloan period. Additional evidence on the Puebloan period has come from HRA's recent surface survey and, specifically, from the analysis of artifacts collected from the recorded sites (Lyon et al. 2008). The assemblage included 56 arrow points (Rose Spring and related types, Cottonwood Triangular, and Parowan) that most likely date to the Puebloan period. Margaret Lyneis assigned the most of the collected potsherds to one of three ceramic traditions: Great Basin Brown Ware (n=206), paddle-and-anvil thinned (more or less equivalent to "Patayan"; n=81), and Puebloan (including gray, white, and corrugated wares; n=72). The most significant finding of Lyneis's analysis is that the majority of the Puebloan sherds (n=56) were made from local materials, indicating the presence in the area of potters schooled in the Puebloan ceramic tradition. Lyneis dates the assemblage of Puebloan pottery as a whole to the period from around A.D. 1050 to 1200. The remaining, nonlocal puebloan sherds are presumably from vessels that were made in the Moapa Valley. These vessels represent an assemblage that "is skewed when compared to Moapa Valley assemblages: red ware and white ware vessels are over-represented compared to utility ware. Perhaps the plan was to produce utility ware after their arrival" (Appendix I).

Southern Region

Few archaeological sites in the Southern Region have been excavated or even tested. Two sites that are relevant to the prehistory of this region and that have seen substantial amounts of excavation are Willow Beach and Catclaw Cave (Wright 1954). Both are located along the Colorado River in Black Canyon, 10 to 15 miles south of Hoover Dam on the river's east bank, in Arizona. Excavations were conducted at Willow Beach on several occasions between 1936 and 1950 (Chapter 7) and at Catclaw Cave in the late 1940s (Wright 1954). Both sites appear to have been used on a number of occasions for what was probably short-term camping.

Willow Beach is a deeply stratified, open campsite that is located on a terrace adjacent to the Colorado River. The site was occupied sporadically from the Archaic to the Post-Puebloan periods. No radiocarbon dates have been processed from artifacts recovered during these excavations, and therefore the chronological reconstructions undertaken by Albert Schroeder (1961) are based entirely on stratigraphic relationships among diagnostic artifacts. The latter include "typed" projectile points and potsherds. Layer C and, probably, Layer B, would appear to date at least in part to the Puebloan period. Layer C, the earliest ceramic horizon, was dominated by a local plainware and Puebloan pottery, including Lino Gray and Boulder Gray; projectile points were primarily of the Elko Corner-notched, Rose Springs, and Gypsum types (Schroeder 1961: Figure 12). The artifact assemblage from Layer B was dominated by Pyramid Gray pottery; projectile points were primarily of the Parowan/Eastgate and Rose Springs types. The site provided little information in the way of subsistence except for faunal remains, which included predominantly large animals in the Archaic levels and smaller animals in the ceramic levels. Gordon Baldwin (1948:76), who conducted excavations at Willow Beach in 1948, commented on the abundance of animal bone at this site relative to others that he had investigated in preparation for the construction of David Dam and creation of Lake Mohave. This, and a second observation that there was little arable land in the section of Black Canyon where the site was located, led Baldwin (1948:76) to suggest that Willow Beach "was probably a hunting rather than an agricultural camp." Though certainly worthy of consideration, this inference is weakened by the fact that the means for collecting evidence on the exploitation of plants, both wild and domesticated, that are standard practice today were not available to Baldwin in 1948 or to Schroeder when he conducted an additional round of excavations at the site in 1950. Those means include the recovery and analysis of plant pollen and macrofossils from archaeological soil samples.

It is possible that a "burned hut" whose remains were uncovered at the site was built and used during Puebloan period—though a Post-Puebloan period date seems more likely for this structure (Chapter 7). The presence of this shelter suggests that there was at least one episode of longer-than-short-term residence at Willow Beach.

The recent dating of perishable artifacts from Catclaw Cave suggests that this site was occupied most intensively after A.D. 1300, or during the Post-Puebloan period (Chapter 7; Gilreath 2012:50-64, Table 17). The six dates that support this interpretation came from three pieces of string or cordage and three basketry fragments. Although consistent with this dating, the site's predominantly buff ware ceramic assemblage could indicate that Catclaw Cave was also visited during the Puebloan period. Additional evidence suggesting that Catclaw Cave was occupied before A.D. 1300 includes a radiocarbon date in the A.D. 900s to 1000s from a Figure-8 sandal and the presence at the site of several Rose Spring and other related types of arrow points (Gilreath 2012:54).

Baldwin's 1948 investigations at Willow Beach were part of a larger effort to recover archaeological data from sites that would be destroyed by the creation of Lake Mohave behind Davis Dam. That project had begun in 1943 with the archaeological survey of portions of the area that would be impacted by the new reservoir (Baldwin 1943). The 1948 fieldwork included the excavation of trenches or smaller test units at about 13 sites. Artifacts were collected from the surface of most if not all of these sites, as well as from some other sites that were not tested. Most of the sites where excavations were conducted were located on the Arizona side of the Colorado River. They represent the same population of sites as those located in Nevada, however, and both sets are equally relevant to the understanding of the Puebloan period in the Southern Region. (It is important to note that both the Arizona *and* Nevada sites were numbered according to the system maintained by the Arizona State Museum as being located in the "Arizona F" quadrangle.) These lower Colorado River sites present a challenge for the chronological framework that we are employing in this study because, in the absence of radiocarbon dates, it is difficult to determine whether they were occupied during the Puebloan or Post-Puebloan period. None of the sites, with the exception of Willow Beach, contained the kind of stratified archaeological deposits that could help in overcoming this problem.

Baldwin's (1948) investigations yielded large collections of artifacts, but only limited evidence of cultural features. The artifacts included numerous potsherds of buff ware and brown ware that represented the indigenous Patayan pottery-making tradition, much smaller numbers of sherds from nonlocal puebloan pottery, arrow points and other flaked-stone tools, mortars, pestles, metates, and manos. Cultural features included a compacted surface that had possibly been the floor of an ephemeral structure, an unspecified number of rock-ringed features (one or more of these features have been observed at a dozen sites) that were also interpreted as the remains of ephemeral structures, and several hearths or firepits. We will have more to say about the significance of these and other findings from the Davis Dam research in the Discussion and Interpretation section.

DISCUSSION AND INTERPRETATION

Chronology

Puebloan period radiocarbon dates from archaeological contexts within southern Nevada may be distributed evenly through time (Figure 6.4), but the same cannot be said of their distribution through space. This is to a considerable degree simply a function of the concentration of archaeological effort at particular locations and on particular kinds of sites within the region. The sample of radiocarbon-dated contexts will increase as additional excavations are conducted, but in ways that mirror the biases that exist within the process by which sites are selected for excavation. Though unavoidable, this source of bias in the radiocarbon record can be mitigated. Even within the sample of excavated sites, an effort can be made to obtain dates from as wide a range of archaeological contexts as possible. Also, if and when opportunities arise, chronology building should be identified as a basic goal of archaeological research. Attempts can also be made to expand the breadth of the radiocarbon-date record by identifying, locating,

and dating samples from "old" excavations (for successful examples of this approach, see Ahlstrom 2005 and Gilreath 2012). Also worth repeating here is the archaeological truism that, whatever the nature of the sample of excavated sites, there is generally value in obtaining as many radiocarbon samples as practicable, so long as the dated samples come from controlled contexts. It is difficult to think of an archaeological research topic relating to the prehistory of southern Nevada for which one can claim the existence of a wholly adequate sample of radiocarbon dates. There is also, of course, value to be had in improving the ability to date types and other categories of material culture, involving in particular though not exclusively projectile points and potsherds. By the same token, the best possible use should be made of evidence from stratified archaeological contexts, on the relatively rare occasions when such contexts are encountered.

DATING AND ASSESSING THE PATAYAN ARCHAEOLOGICAL CULTURE

As mentioned earlier, sites belonging to Patayan archaeological culture can date to one or both of the Puebloan and Post-Puebloan periods, and it can be difficult to assign sites or components of sites to one period or the other. The dating of Rose Spring, Eastgate Series, and Parowan points to the Puebloan period and Desert Side-Notched points to the Post-Puebloan period does provide a basis for drawing a temporal distinction between sites. These dating criteria are, however, far from perfect, first, because of known or suspected temporal overlaps in the production and use of the two sets of projectile-point types and, second, because of the small numbers of "typable" points that are observed on many sites. In light of these limitations, the use of projectile points for dating seems most appropriate for use on populations of sites, such as those recorded on survey, where the goal is to identify broad patterns in the temporal and spatial distribution of archaeological datasets. The data were used in just this way to assign the sites that are plotted in Figure 6.1 to the Puebloan period. The approach is less satisfactory when applied to individual sites, such as those that have produced evidence through excavation, where the goal is to understand what happened at a particular location during a particular interval in the past.

The use of Patayan ceramic evidence to differentiate the two periods is also problematic, as exemplified by the sites along the lower Colorado River that were investigated by Baldwin (1943, 1948). The ceramic assemblages from these sites consisted primarily of buff ware types that are not well dated. Baldwin was, however, able to extract potentially useful chronological evidence from the nonlocal Puebloan pottery that was found at a number of sites. The presence of this pottery either indicates or, depending on the number of potsherds involved, at least suggests that a site was occupied during the Puebloan period, that is, before A.D. 1300. The presence at AZ F:16:22 of several puebloan potsherds that could be assigned to tree-ring dated pottery types indicated to Baldwin (1948:47) that the site "was occupied from about A.D. 800 to 900 to some time in the twelfth century." In the case of AZ F:16:14, it was the absence of intrusive Puebloan or Hohokam sherds that led Baldwin (1948:20) to infer that the site may have been occupied "after the general abandonment and consolidation of the Pueblo area, during the period between A.D. 1300 and 1600." The site in question produced a fairly large ceramic assemblage (totaling 2,425 sherds), lending support to Baldwin's use of negative evidence to arrive at an occupation date. In general, however, it should be recognized that sites lacking in Puebloan pottery, particularly those with small ceramic assemblages, may well have been inhabited before A.D. 1300, whereas sites that possess this kind of pottery may well have been inhabited both before *and* after that date.

We know, then, that the Patayan ceramic tradition came into existence prior to A.D. 1300, but when this event occurred is difficult to say. Site 26CK1139 occupies a small rockshelter located adjacent to Las Vegas Wash in the southeastern corner of the Las Vegas Valley. Radiocarbon dates and other, weakly stratified evidence suggest that the site was visited a number of times between A.D. 1100 and 1900. Patayan buff ware ceramics were probably in use at the site from the beginning of this interval (Ahlstrom 2005). Data from other sites in the valley, including the Berger and Basic sites, are generally consistent with the idea that Patayan ceramics had appeared in the valley by A.D. 1100, if not A.D. 1000 (Ahlstrom 2005:55-59). Evidence from Catclaw Cave, located about 20 miles southeast of the Las Vegas Valley on the Colorado River, is also consistent with this interpretation. Much of the nonlocal Puebloan pottery that Baldwin (1948:45, 79, 89) recovered from Patayan sites on the lower Colorado River—

particularly types such as Sosi Black-on-white, Tusayan Corrugated, and Tusayan Black-on-red—also indicates that the associated Patayan buff ware pottery was probably in use by A.D. 1000. Other Puebloan pottery types identified by Baldwin (1948:45, 79, 89)—including Black Mesa Black-on-white and in particular Deadmans Black-on-red—suggest an earlier date, perhaps as early as A.D. 800. The Southern Paiute, Mohave, and Hualapai consultants for the Hoover Dam Bridge Bypass Project noted that Willow Beach and Cottonwood Island were important places to gather and trade and socialize—suggesting that the mixed ceramic assemblages have some time depth (Pat Hicks personal communication, 2012). Unfortunately, Cottonwood Island wasn't inventoried before it was inundated by Lake Mohave.

A final piece of chronological evidence comes from Willow Beach site and, specifically, from the lowest and, hence, earliest "ceramic zone" that Schroeder (1961) identified on the basis of his excavations at the site. This zone, corresponding to Layer C in Trench V, produced a ceramic assemblage consisting entirely of nonlocal pottery types. Schroeder (1961:46) described the assemblage, or at least the better part of it, as belonging "to a Basketmaker III cultural status." The best-dated of the pottery types represented is Lino Black-on-gray, which appears to have been most commonly produced between A.D. 600 and 900. The implications of this stratified evidence are, first, that the people who lived at Willow Beach obtained pottery through trade before beginning to make their own and, second, that this technological innovation occurred sometime after A.D. 600. Though perhaps correct, these inferences need to be confirmed with data from other sites before being given much credence.

Although there is some basis for drawing a distinction between the Puebloan and Post-Puebloan periods, the bulk of the archaeological evidence collected along the lower Colorado River can best be thought of as applying to a broad ceramic period that combines the two. The scarcity of good temporal markers contributes to the impression that Patayan lifeways changed little following the adoption of maize farming and pottery making. This point of view is further enhanced by the scarcity of evidence relating to domestic structures and subsistence practices (involving, for example, the relative importance of wild vs. domesticated plant foods), either of which could have changed over time. The appearance of stability in Patayan lifeways during the Puebloan and Post-Puebloan periods, though quite possibly incorrect, is difficult to contradict on the basis of archaeological evidence. What, then, do the relatively old excavation and surface data collected by Baldwin (1943, 1948), Wright (1954), and Schroeder (1961) tell us about Patayan lifeways during this time? To begin with, all of the sites investigated appear to have produced assemblages of buff ware and brown ware pottery that do, in fact, represent a distinct Patayan archaeological culture.

Though some of the vessels represented by the sherd collections bore painted decoration, most were plain. As for subsistence practices, it would appear that no archaeological evidence for the cultivation of maize or other domesticates was recovered. The sites described by Baldwin were typically located on or adjacent to low-lying flats or terraces that would presumably have been suitable for floodwater farming—though whether or to want extent the flats were in fact used for this activity is impossible to prove. Small numbers of mortars and pestles made of basalt (or "malpai" in Baldwin's terms) were commonly found on the investigated sites. This tool set is particularly well suited to the processing of mesquite pods. Metates (of both the basin and slab varieties) were typically recovered as well. These implements could have been used for grinding wild plant seeds or maize kernels and probably served both functions. The arrow points that were commonly found at the sites suggest that hunting was an activity of some importance.

Firepits or hearths have been identified at a couple of the sites located along the lower Colorado River where excavations have been conducted (Baldwin 1948:30, 72; Schroeder 1961). The presence of these features is consistent with the interpretation that the sites were used at least for short-term camping. Evidence for longer-term use consists primarily of the large and varied artifact assemblages that have been identified at some sites. To what extent these assemblages are the result of repeated rather than intensive use of the sites is difficult to say. Almost the only evidence of habitation structures encountered at the sites consists of rock rings that Baldwin (1948:56) interpreted as "the remains of the temporary shelters erected during the annual flood season when the people were forced to retreat to higher ground." Excavations conducted in similar (on the surface) features located on Las Vegas Wash in the southeastern

corner of the Las Vegas Valley indicated that several were indeed the remains of ephemeral structures. Finding refuge from annual floods would not have been an issue in this case, and these structures have been interpreted as shelters possibly used on a short-term basis while mesquite pods were being collected in the vicinity. Patayan ceramics are common in this portion of the Las Vegas Valley—more common than in its central and northern areas—and associating these structures with Patayan architectural practices is therefore reasonable. The only other evidence of habitations includes the remains of a burned hut found at the Willow Beach site (Baldwin 1948:70-71; Schroeder 1961:66-67) and a possible structure floor described by Baldwin (1948:12-14) at a site located further downstream along the Colorado River (AZ F:16:14). It seems likely that the scarcity at Patayan sites located in southern Nevada as well as farther south in California and Arizona is at least in part a function of their destruction by the annual overbank flooding that characterizes the lower Colorado River. It is also notable, however, that a number of hearths or firepits were identified during the different excavations conducted at Willow Beach as well as at other sites along the river. Their discovery, combined with the scarcity of structural remains and with the nature of the remains that have been identified, suggests that whatever habitations may have been present in the river's flood zone, they did not, in archaeological terms, amount to much.

Baldwin's (1948:95) report on excavations conducted along the lower Colorado River includes a section on the archaeological investigations in "that portion of Lake Mead lying within the western Grand Canyon. The entire area lies upstream from Nevada, within the state of Arizona. Baldwin interpreted a number of the sites in this area as Patayan in origin. Some of these contained rock-ringed features like those described from the lower Colorado River and Las Vegas Wash. Some others included large roasting-pit features that were presumably used for roasting agave, though other foods may have been cooked in them as well. The point about these sites that is relevant to the current discussion is the implication that "Patayans," which is to say bearers of the Patayan archaeological culture, were present at least at times along the entire length of the Colorado River where it forms the eastern and southeastern boundary of southern Nevada. From this position, both these people and their material products—specifically their ceramic vessels—would have been poised to work their way further into the region.

Subsistence

AN AGRICULTURALLY BASED "BASKETMAKER II" IN SOUTHERN NEVADA?

The Early Agricultural period in the Moapa Valley, also referred to as the Moapa phase, has traditionally been identified as a regional variant of Basketmaker II, which was initially defined based on evidence recovered in the Southwest's Four Corners region at the opposite end of southern Utah from southern Nevada (Lyneis 1995). Several questions need to be addressed in assessing the validity of this assignment and, more generally, in determining the "place" of the Western Virgin Puebloan archaeological culture in Southwestern prehistory. First, is the Moapa phase truly an exemplar of the Early Agricultural period—that is, does it cover a period of time between the introduction of the two technological innovations of maize farming and pottery making? Based on the existence of spatial variation in archaeological remains that have been called Basketmaker II, Matson (1991) has argued that the term is best considered as applying not to a cultural or ethnic group but to a stage of cultural development. In his view, the shared defining characteristic of this stage of development is "the reliance on maize horticulture" (Matson 1991:123). In her article "The Virgin Anasazi, Far Western Puebloans" published in 1995, Margaret Lyneis (1995:123) reviewed the "sketchy evidence for a maize-based Basketmaker II period west of Cave du Pont," which is located near Kanab, Utah, noting that it "needs the confirmation of modern, well-reported excavation."

In the decade-and-a-half since the publication of Lyneis's paper, substantial evidence of maize cultivation during "Basketmaker II times" has been recovered from sites in the Moapa Valley. That evidence, which consists of radiocarbon dates obtained directly from samples of maize, is summarized in Table 6.3. The dated samples come from Black Dog Mesa and Black Dog Cave in the Upper Moapa Valley and the Yamashita 2 site in the Lower Moapa Valley. An additional dated sample comes from Dart Shaft Shelter, located in the uplands lying to the east of the Virgin River Valley (the Gold Butte–Virgin

Mountains Area). Taken together, the dates indicate that maize was being cultivated in the Moapa and Virgin river valleys by the A.D. 200s and, quite probably, by the A.D. 100s. The data also indicate that maize was an important component of local subsistence during the Late Basketmaker II period, though whether people actually *relied* on maize horticulture during this period is difficult to say. The level of residential stability represented by the pithouses excavated on Black Dog Mesa, as well as elsewhere in the Moapa Valley does not prove the existence of this reliance, but is certainly consistent with it.

Table 6.3. Basketmaker II Period Radiocarbon Dates on Maize from the Moapa Valley and Gold Butte–Virgin Mountains Area

	Sample Data			Radiocarbon Data		
Site	Sample	Provenience	Material	Age (B.P.)	Cal Date	Ref.
Black Dog Cave (26CK5686)	AA25317S	Pit 31	Maize cob fragment	1710±45	A.D. 232-425	a
"	AA25318	Pit 31	Maize cob fragment	1735±45	A.D.144-147, 171-193, 211-415	a
"	5-1174-35-70; Beta-146243	Unit 4 South, Stratum 3	Maize cob	1820±60	A.D. 70-370	b
"	5-1174-51-28; Beta-146244	Feature 8A, Surface to 30 cm	Maize cob	1670±50	A.D. 250-460, 480-520	b
"	5-1174-51-29; Beta-146245	Feature 8A, Surface to 30 cm	Maize cob	1910±40	A.D. 20-220	b
Black Dog Mesa (26CK5686)	5-1174-733-33; Beta-157786	Feature 8, Level 5, (100-125 cm), floor, 1986N 2041E	Carbonized maize	1700±40	A.D. 240-420	c
Yamashita 2 (26CK 6445)	A229-3423; Beta-170578	198N82W; 150-160 cm; Cist 5	Burned maize fragment	1780±40	A.D. 135-365	d
"	A229-2173; Beta-170575	220N84W; 170-180 cm; Cist 6	Burned maize cob	1800±40	A.D. 120-340	d
Dart Shaft Shelter (26CK8047)	8047-5	Rockshelter 5 (surface)	Maize cob	1820±40	A.D. 85-259, 284-289, 291-322	e

Key to References: a = Lyneis 1999; b = Winslow and Blair 2003:Tables 34 and 37; c = Winslow 2009; d = Lyneis 2004; e = McGuire et al. 2010:Tables 12 and 13.

This interpretation of early farming in the Moapa Valley raises another issue concerning the "cultural" relationship between southern Nevada and the Four Corners region during Basketmaker II times. Matson (1991:211-216) argues that Basketmaker II maize cultivation was dependent on floodwater farming; according to Lyneis (1995:208), however, "the Moapa Valley is too far west to receive dependable summer rainfall that would bring maize to maturity." Farming in this region would have depended instead on water obtained from the Muddy and Virgin Rivers—either diverted to the fields intentionally or, in a variation on the floodwater idea, carried to the fields by spring floods that overtopped the river's banks. The latter possibility has been suggested for the Virgin River in particular (Jenkins 1981), which is more prone to flooding than the Muddy River.

The best evidence involving cultural relationships between southern Nevada and the Four Corners Region during Basketmaker II times comes from Black Dog Cave, specifically that site's basketry and sandal assemblage. As stated by Winslow and Blair (2003),

> The 86 basketry specimens described and discussed here do not constitute one of the largest or best controlled basketry collections ever recovered from an archaeological site. However, the assemblage does represent the western most collection of Basketmaker period basketry to date. Radiocarbon dating of many of the recovered specimens clearly

> indicates that those submitted were manufactured well within the Basketmaker II period. Comparative analysis of the collection with specimens from the San Juan–Kayenta region were found to be "typical" of the Basketmaker basketry tradition...and we are confident in stating an overall 80 percent correlation in technology, form, and design to basketry recovered from the Basketmaker core area. Although fragmentary, all of the Black Dog Cave coiled pieces and many of the twined specimens exhibit overwhelming similarities to basketry recovered from sites in Sayodneechee Canyon and Marsh Pass, northeastern Arizona…as well as those recovered from the Prayer Rock District…. What this actually means, at this early descriptive phase in southern Nevada Basketmaker culture, we do not know. One thing, however, that is certain is [that] the basketry recovered clearly suggests migration into southern Nevada from the core area with continued community ties to the east [Winslow and Blair 2003:241].

The point that's missing from the analysis is a systematic comparison between the Black Dog Cave assemblage and basketry from the Great Basin. The Black Dog Cave material may be similar to that from Basketmaker II sites in the San Juan–Kayenta region, but is it commensurately different from that made in the Great Basin during the same time period?

Also relevant in this context is Winslow and Blair's interpretation of the 14 sandals and sandal fragments that were recovered from the site during the excavations of the 1940s. They characterize the twined-sandal assemblage, consisting of three whole specimens and four or five fragments, as "clearly Basketmaker II in type and style" (Winslow and Blair 2003:315). This evidence from baskets and sandals supports the identification of the local Moapa phase as a regional variant of the Basketmaker II archaeological culture and, in particular, its western variant. This interpretation does not, however, find support in Blair and Winslow's (2003) analysis of five plain-weave sandals that were also recovered from Black Dog Cave. They note that sandals of this kind "are referred to regionally as Figure-8 style and are typically abundant in Great Basin collections" (Winslow and Blair 2003:316). These sandals are not, in other words, Basketmaker II in style. These artifacts do, however, appear to date to more or less the same period as the Basketmaker II-style twined sandals, suggesting the presence of other, non-Basketmaker II influences on the site's inhabitants.

FARMING ON LAS VEGAS WASH

Evidence of prehistoric maize farming in the Las Vegas Valley comes primarily from the Larder and Scorpion Knoll sites, which are located in the southeastern corner of the Las Vegas Valley, about 100 m apart on the northeast bank of Las Vegas Wash. The long-term use of the Larder–Scorpion Knoll site locality—from as early as 350 B.C. to as late as A.D. 1600—warrants its identification as a "persistent place" on the prehistoric landscape of the Las Vegas Valley. A "persistent activity" that was identified at these sites was maize farming, probably on an occasional and small-scale basis. Evidence for this activity comes from 11 radiocarbon-dated contexts that produced maize pollen or, in one case, charred maize kernels. Each of the dates comes from a different archaeological feature, including eight storage pits, two habitation structures, and one roasting pit. All of the storage pits are at the Larder site, whereas the two habitations and the roasting pit are at Scorpion Knoll. The maize data are of variable quality, with the strongest cases involving radiocarbon dates from annual plant parts—either maize cob fragments or mesquite seeds found in close physical and behavioral association with maize pollen—and the weakest ones involving dates from wood or unidentified charred material that, although it came from the same feature as the maize evidence, may not have been directly associated with the feature's use. The dataset as a whole supports the identification of five periods, spread over an interval of between 1500 and 1900 years, during which maize farming was practiced in the vicinity of the Larder and Scorpion Knoll sites. Those periods are A.D. 1400–1600, A.D. 900–1050, A.D. 650–950, 100 B.C.–A.D. 250, and 350–50 B.C. (Ahlstrom 2008a).

Few things in archaeology have shorter "use lives" than the currently accepted "earliest date" of some prehistoric phenomenon. It is worth noting, nevertheless, that at least for now the earliest evidence for farming in the southeastern corner of the Las Vegas Valley pre-dates that from the Moapa Valley by from one to two centuries. This dating invites speculation that farming technology may have come to the Las Vegas Valley *not* across the Colorado Plateau from ancestral Puebloan communities located to the east and northeast, but up the Lower Colorado and Gila Rivers from Hohokam communities in south-central and southern Arizona.

EXPLOITATION OF UPLAND RESOURCES

Gaining a true understanding of human activity in the upland portions of the project area during the Puebloan period presents three challenges to the archaeologist: first, to reliably date the individual upland sites and site components to the Puebloan period and, preferably, to one or another portion of that period; second, to identify the activities, subsistence or otherwise, that were being performed at these locations and, to the extent possible, the season or seasons of the year that those activities encompassed; and third, to say something useful about the people who were visiting the sites and carrying out the identified activities and, in particular, to assess their "Puebloan" vs. "non-Puebloan" identities.

As previously discussed, the dating of sites to the Puebloan period is based on three sets of criteria, involving the evidence of arrow points, ceramics, and radiocarbon dates. The first two kinds of data are available from upland sites that have been recorded on survey, whereas radiocarbon dates come almost exclusively from tested or excavated contexts within sites. Several categories of evidence including flaked stone tools and debitage, ceramic artifacts, features of various types, and plant and animal remains can assist in identifying the activities that were carried out at upland sites. Analyses of flaked stone artifacts can distinguish activities associated with the procurement of lithic raw materials from the maintenance of tool kits and, potentially, identify the activities, such as hunting, around which those tool kits were organized. Several factors complicate the application of this kind of activity analysis in upland settings. The first of these is the typically small size of the artifact assemblages recovered from upland sites—resulting from the small size of the site assemblages themselves but also from the relatively small scale of the surface investigations and excavations that were often conducted at the sites. Faunal remains and flaked stone assemblages representative of hunting gear can provide evidence for the pursuit of game animals—see, for example, Blair's (1986) interpretation of the Ishi Comin' site (26CK1095) in the Upper California Wash Area. Given the typically small size of the assemblages of these tell-tale materials that are found on upland sites, it may be difficult to argue that this was an important or continuing activity at or near the location where the materials were found. Ceramic artifacts could similarly provide evidence of the intensity and timing of activity at a site, though it would be most helpful in this regard to know if the observed potsherds came to the site as part of particular kinds of whole vessels—for example, in the form of jars that might have been used to transport water to a site during dry seasons of the year—or as pieces of pots that were used as tools, for example in the collecting or parching of seeds or the roasting of other plant foods. Little if any such evidence is available, again because of the small size of the recovered artifact assemblages, but also the limited scope of most projects carried out in upland areas.

Second, there was the failure of some, mostly older projects to systematically collect and analyze plant and animal specimens recovered during excavation. Third, there is the fact that, even when such analyses are conducted, many soil samples obtained from one important class of upland feature, the large roasting pit or "agave oven," fail to produce definitive evidence of the agave hearts or other food sources that they were used to process. A recent project in the Gold Butte Area has begun to overcome these limitations in the data, first, by comparing assemblages across populations of sites and, second, by recovering diagnostic plant remains from roasting pits and other excavated contexts (McGuire et al. 2010).

The cooking of foods is indicated at many recorded upland sites by the presence of large roasting features, which can be inferred on the basis of excavated data to have resulted from the repeated use and cleaning out of roasting pits. These features often include a single roasting pit for each debris pile, though

this is not always the case. This is true, for example, of some feature complexes that include two or more overlapping roasting pits and associated debris piles—for a well-documented example, see Pits 3 and 4 at the Agave Ovens site (26CK1991) in the Gold Butte Area (McGuire et al. 2010). These stratified sites can provide especially valuable chronological data relating to the longevity of roasting activity at a particular location. Such stratification is not, of course, required to obtain useful chronological evidence, since roasting pits by their very nature are likely to provide charred materials suitable for radiocarbon dating. Because of their size, distinctive formal characteristics, and surface visibility, roasting pits can be characterized as robust sources of evidence relating to past activities on a site. Their primary limitation in this regard has been the difficulty in extracting and identifying evidence of the kinds of plant materials that were processed in the pits. It is generally assumed, on the basis of widespread ethnographic evidence, that the large features of this kind were used for the roasting of agave (Ellis et al. 1982:56). Although well-founded, this assumption begs the question as to whether animal products or other plants may have been processed in these features as well. Such variability in use may, in fact, characterize the smaller roasting pits, that is, those with combined pit-and-debris diameters of less than a meter or two. It is currently impossible to say on the basis of archaeological evidence. Given the traditional difficulty in recovering botanical remains from roasting pits, it is encouraging to report that Far Western Anthropological Research Group's recent project in the Gold Butte Area was able to recover substantial quantities of charred agave-stem-fragments from the previously mentioned Pits 3 and 4 at the Agave Ovens site (McGuire et al. 2010).

Along with providing dating evidence, ceramic artifacts may also tell us something about the people who used an upland site. There is every reason to suspect that sites with large gray ware ceramic assemblages located in upland areas adjacent to lowlands with Puebloan habitation sites were used for gathering or processing wild plants and animals by the Puebloans. We are speaking here specifically of sites in upland areas that flank the Moapa and Virgin River Valleys. Smaller assemblages from sites in more distant locations—for example in the Central Region—are more difficult to interpret in this manner. The pots from which the sherds came may have been obtained through trade. They may also have been brought to the site in the form of potsherds rather than as part of whole vessels. Large potsherds might, for example, have been used as trays for parching seeds or as protective covers in pit roasting or other forms of cooking. We do, however, have compelling evidence from the Corn Creek site and from the Ash Meadows area that pottery was locally made in the Central and Western regions during the Puebloan period (Lyneis 2011a, 2011b).

Having addressed these general issues, we can turn to the two areas that have produced the most extensive bodies of evidence from excavated contexts relating to the exploitation of upland resources during the Puebloan period. These are the Upper California Wash locality and the Gold Butte–Virgin Mountains area. Table 6.4 summarizes data from excavated sites that have produced good to reasonably good evidence relating to the Puebloan period. These data (and other evidence not included in the tabulations) support several observations about the exploitation of upland areas during this time. Eight sites on Upper California Wash and another eight in the Gold Butte–Virgin Mountains Area can be dated, at least in part, to this interval. The majority of sites (at least 12) also possess earlier or later temporal components (and in two cases both), indicating persistence over time in the use of these specific site locations. Much of this continuity involves the use of large roasting pits. Turning to the Puebloan period itself, the precise dating of sites within this interval is problematic for two reasons. First, the calibrated radiocarbon date ranges are broad—generally more than two centuries and often considerably more. Second most of the dates come from firewood, which may introduce an early bias to the dates because of the "old wood effect." The exceptions to this pattern come from Firebrand Cave: four of this site's five Puebloan period dates are from artifacts, including three basketry samples and a "spirit stick." These artifacts could also have produced dates that are "early" relative to their actual presence in the cave if they had been kept in use for a long time, resulting in an "heirloom effect" on their radiocarbon dates analogous to the "old-wood effect."What seems to be an example of this heirloom effect involving radiocarbon dates from pithouse Feature 10 on Black Dog Mesa was described earlier.

In spite of these limitations, radiocarbon dates from the upland sites included in Table 6.4, when combined with ceramic evidence from those same locations, provide evidence in support of a partial distinction between early and late periods of occupation. The ceramic evidence consists of variability in the proportion of corrugated ceramics in relation to all Puebloan pottery recovered from a site. The ceramic assemblages fall into two distinct groups, with percentages of corrugated ceramics that fall below 5 percent or exceed 25 percent. It is generally believed that the idea of corrugation arrived in southern Nevada around A.D. 1050, and it seems likely that, as in other areas of the Puebloan world, this innovation spread rapidly among local potters. In spite of its obvious appeal, corrugation did not replace the traditional, "smooth" finishing of plain ware vessels, nor was it combined, except on the rarest occasions, with the use of painted decoration. There also appear to have been limits to the rapidity with which technique of corrugation was adopted for use on utility vessels. Margaret Lyneis's (Appendix I) data indicate that percentages of corrugated pottery remained below 10 percent between A.D. 1050 and 1150, rising to 50 percent and more during the following century. Whatever its exact rate, the fairly rapid adoption of corrugation is probably at least partly responsible for the distinct break—between 5 and 25 percent—in the distribution of percentages of corrugated pottery from our sample of upland sites. Based on all of these considerations, we would argue, first, that sites with more than 25 percent corrugated ceramics were occupied (at least in part) after A.D. 1050 and, second, that sites with less than 5 percent corrugated ceramics were occupied (at least in part) before that date. Our confidence in the latter inference is conditioned by the size of the ceramic collection, since a small assemblage of potsherds and, by implication, ceramic vessels that post-dates A.D. 1050 and, in particular, dates between A.D. 1050 and 1150 might not include many corrugated examples.

With these caveats in mind, we can interpret the ceramic data summarized in Table 6.4 as indicating that some of the listed sites were occupied before A.D. 1050 and some after that date. In spite of their limitations, the radiocarbon dates included in the table also allow the differentiation of site occupations that occurred before and after A.D. 1050. In some cases, the two sets of data agree: for example, in dating the Puebloan period occupation of the Ishi Comin' site (26CK1095) as pre-A.D. 1050 and that of the Rattlesnake site (26CK1081) as post-A.D. 1050. Other cases are more complex, such as 26CK3064, which has a pre-A.D. 1050 radiocarbon date and a post-A.D. 1050 ceramic date. Although both datasets are small—consisting of just one radiocarbon date and of a ceramic assemblage that includes just 11 corrugated sherds in an assemblage of 27 Puebloan sherds—it is reasonable to suspect that the site was, in fact, visited during both intervals. More important than the dating of individual sites, however, is the clear indication that upland resources in both the Upper California Wash and Gold Butte–Virgin Mountains areas were being utilized during both the pre- and post A.D. 1050 portions of the Puebloan period. Based on data that they collected in the Gold Butte Area, McGuire et al. 2010) carry this chronological argument one step further, arguing that the intensification in agriculture after A.D. 950 led to scheduling conflicts that were responsible for a decline in the pit-roasting of agave in upland settings by Puebloan people.

The ceramic dating of sites to the earlier interval extends back to only A.D. 500, which is the approximate date when ceramics first appeared in southern Nevada. It is worth noting, therefore, that several of the sites listed in Table 6.4 have radiocarbon dates that fall entirely or substantially between A.D. 200 and 500, indicating the use of upland areas during this early, pre-ceramic portion of the Puebloan period as well. A number of dates from the two areas extend this record of upland activity back into the Terminal Archaic period.

Figure 6.13 shows the distribution of Puebloan period sites with roasting pits, consisting primarily of feature complexes that combine a central pit feature and a surrounding, typically mounded deposit of fire-affected rock produced by multiple roasting events. This debris consists of burned or fire-affected rock and, beneath the ground surface, sediment mixed with charcoal from the fuel that was consumed in the roasting process. The charred remains of the food items that were being cooked in the pit occur in far lesser quantity, if at all. Two factors appear to have had the greatest influence in determining the locations of sites with roasting pits. The first of these consists of the presence of agave plants, which

Table 6.4. Summary of Selected Eastern Region Upland Sites with Evidence of Puebloan Period Use

				Ceramics							
		Physical Attributes		Puebloan Gray/ White/Utility Ware		Corrugated Puebloan Gray/Utility Ware		Puebloan Period Radiocarbon Dates			
Area	Site: 26CK__ (Name)	Rock-shelter(s)	Roasting Pit(s)	Count	Percent of all pottery	Count	Percent of Puebloan Gray/White/ Utility Ware	Date Range (A.D.)	Association	Other Temporal Components	References; Notes
Upper California Wash	1081 (Rattlesnake)	1	1			71	42%	1000–1280; 1020–1280	Site; roasting pit	Post-Puebloan	Brooks et al. (1975)
"	1083 (Burial)	1	1 or 2 (1 small)	30	79%	11	37%	–	Roasting pit	Post-Puebloan	Blair (1986); Brooks et al. (1975)
"	1086	0	0					410–690	Hearth and habitation structure	Archaic?	Brooks et al. (1975)
"	1088 (Pestisite)	3	1	207	83%	56	27%	50–615; 320–780; 890–1260	Rockshelter; rockshelter; roasting pit	Post-Puebloan	Blair (1986)
"	1091 (Roadside Roast)	1	1	193	90%	67	35%	130–570	Rockshelter	Archaic	Blair (1986)
"	1095 (Ishi Comin?)	1	3	148	90%	6	4%	540–850; 510–1030	Roasting pit; hearth		Blair (1986)
"	1112 (Tranquility)	3	1			0	0%	760–1030	Roasting pit	Archaic	Brooks et al. (1975)
"	1309 (Metate)	1		44	28%	0	0%	390–1155	Rockshelter	Post-Puebloan	Blair (1986)
Gold Butte/ Virgin Mtns.	1991 (Agave Ovens)		3	30	28%	0	0%	680–970; 1030–1185	Roasting pit; roasting pit	Post-Puebloan	McGuire et al. (2010); agave in roasting pit; late date from “old wood”?
"	3064		3	27	14%	11	41%	555–785	Roasting pit	Post-Puebloan	Ellis et al. (1982)
"	3091							780–985	Roasting pit?		McGuire et al. (2010)
"	3201 (Collapsed Rockshelter)	several		146	89%	3	1%	1035–1215	Rockshelter	Archaic; Post-Puebloan	McGuire et al. (2010); tortoise and artiodactyl remains

				Ceramics							
		Physical Attributes		Puebloan Gray/ White/Utility Ware		Corrugated Puebloan Gray/Utility Ware		Puebloan Period Radiocarbon Dates			
Area	Site: 26CK__ (Name)	Rock-shelter(s)	Roasting Pit(s)	Count	Percent of all pottery	Count	Percent of Puebloan Gray/White/ Utility Ware	Date Range (A.D.)	Association	Other Temporal Components	References; Notes
"	5434 (Firebrand Cave)	cave						130–540; 225–515; 330–680; 545–715; 440–865	Site	Archaic	Blair and Winslow (2006)
"	6080/6081 (Ian's Rockshelter)			Site: 214	28%	6	3%	210–435	Large, rock-lined hearth	Archaic; Post-Puebloan	McGuire et al. (2010); tortoise, lagomorph and artiodactyl remains
				small hearth: 66	52%	?	?				small hearth: piñon nutshell and goosefoot seeds
	7951							780–990	Roasting pit		McGuire et al. (2010)
	7994										
	8170			79	88%	?	?	1175–1280	Roasting pit?		McGuire et al. (2010); puebloan count includes 1 Tsegi Orange Ware

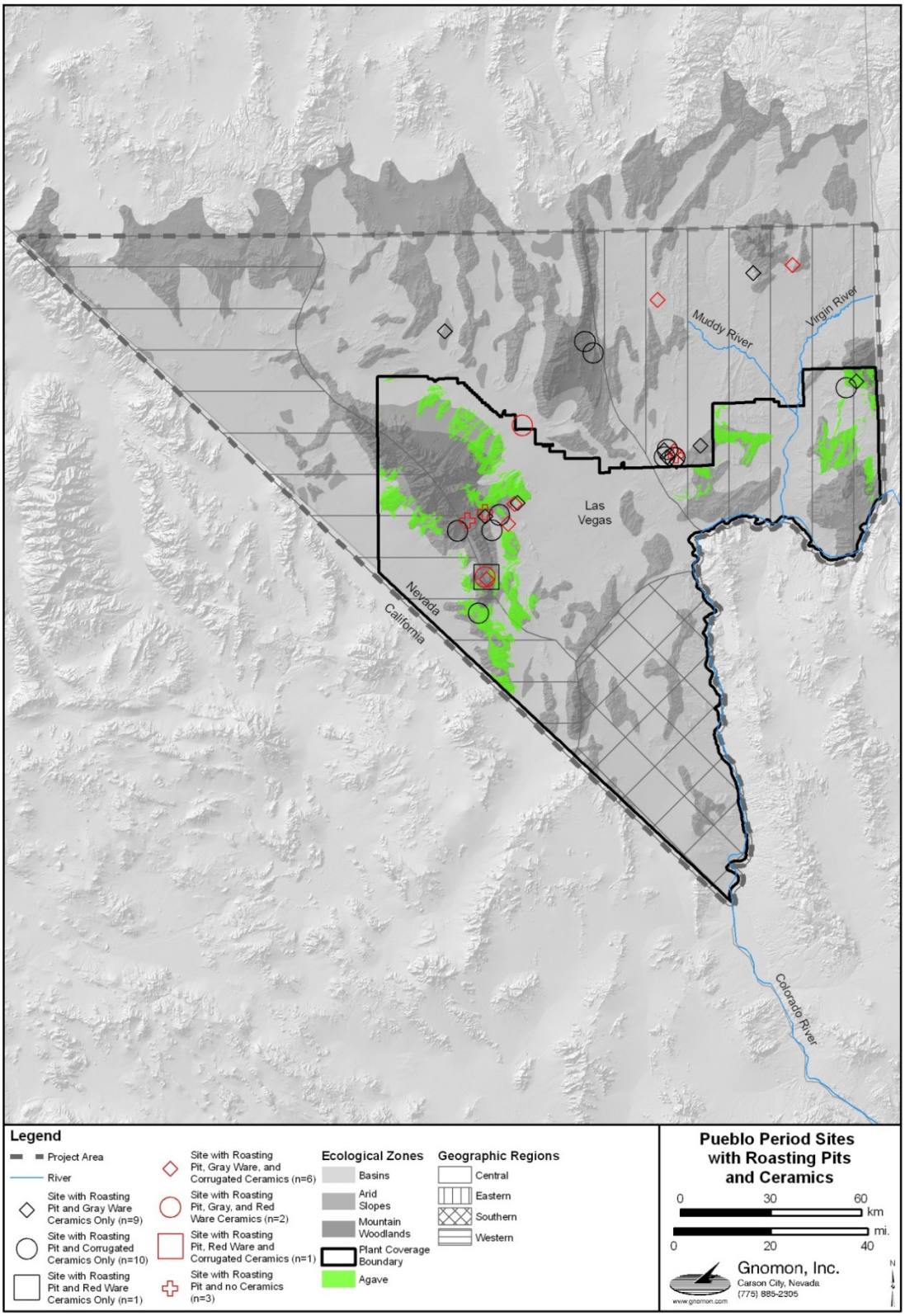


Figure 6.13. Map showing the distribution of Puebloan period sites with roasting pits, along with areas where agave currently grows or that would be suitable for its growth.

evidence suggests were the primary plant resource processed in these features. Available evidence on the distribution of these plants, or at least of areas where they are likely to occur, is also presented in Figure 6.13. As can be seen in the figure, this kind of plant distributional data is available for slightly less than the southern half of the southern Nevada study area. Within those limits, however, there is a strong correlation between the distribution of roasting pits and agave-friendly habitats, particularly in the Spring Mountains, but to some extent in the Gold Butte–Virgin Mountains area.

The second factor influencing the location of roasting pits is the presence of outcrops of limestone. This rock was far and away the favorite for use in these features (Brooks et al. 1975:121; Ellis et al. 1982:55). The rocks functioning to hold heat from the fire built within the pit and, thus, to extend the feature's cooking time. The role of this factor can also be demonstrated, though somewhat indirectly, with data from Figure 6.13. The figure shows a substantial cluster of Puebloan period roasting pits in the Upper California Wash Area, located northeast of the Las Vegas Valley and just outside the area covered by the plant-distributional evidence. Three points are significant about this site cluster and its location. First, those who have worked in the area, specifically on the sites depicted in the figure, have noted that agave plants are not present there today (Blair 1986; Brooks et al. 1975). Second, from the distribution of agave-friendly locations shown in the figure, it is reasonable to infer that agave plants grew nearer to site cluster in the past than the figure would indicate. Third, what the map does not show is the fact that limestone is abundant and forms the primary hard-rock substrate in this area. The implication of these observations is that prehistoric people carried agave hearts to this location for roasting from procurement areas that, though perhaps not absolutely "local," were probably only a few miles away (cf. Brooks et al. 1975:121, 370). Several sites in the Upper California Wash and Gold Butte-Virgin Mountains areas have produced valuable evidence on roasting pits and roasting-pit sites that date to the Puebloan period; that evidence is discussed below.

A number of the sites with roasting pits, particularly on Upper California Wash but to some extent in the Gold Butte–Virgin Mountains as well, include small rockshelters (Ellis et al. 1982:56-57). The presence of these shelters, combined with the general lack of habitation structures and generally small artifact assemblages, is consistent with an inference of short-term camping. The roasting pits evidence one activity that was carried out on a seasonal basis and during relatively brief stays at the sites. As mentioned previously, faunal remains and assemblages of flaked stone tools, including arrow points, found at some of the sites suggests that hunting was carried on in association with these visits. The data do not, however, seem to indicate numerous or extended episodes of hunting activity. We are, of course, dealing with small samples of larger site populations, so what appears as the occasional, opportunistic use of specific locations for hunting might represent only a small part of a much more important activity. It is also possible, however, that the hunting indicated by evidence from the sites with roasting pits was tethered—that is, of secondary importance—to the use of those features, which as previously discussed often occurred over intervals that could be centuries in length.

Settlement Patterns and Architecture

SITE-LAYOUT AND ARCHITECTURAL TRAJECTORIES

The Moapa and Virgin river valleys and now, thanks to recent investigations, the Las Vegas Valley have produced evidence relating to the layout and construction of architectural features at "habitation sites" dating to the Puebloan period. The vast majority of this comes from the Moapa–Virgin River area.

Las Vegas Valley

Variability is the keyword for describing the small sample of excavated habitation structures in the Las Vegas Valley. The assemblage includes one deep pit structure that presumably had vertical pit walls (at Corn Creek), one or possibly two shallow pit structures with vertical pit walls (at the Three Kids site and Las Vegas Springs Preserve), two shallow pit structures with sloping pit walls (at Scorpion Knoll), and one feature perhaps best characterized as a shallow surface structure (Corn Creek). Data on

hearths are incomplete, since several of the structures were only sampled; however, the three completely excavated cases (the shallow pit structures at the Three Kids site and Las Vegas Springs Preserve and the "surface" structure at Corn Creek) have these features, whereas it is suspected that two of the sampled structures (the shallow pit structures at Scorpion Knoll) do not. Only one of the three completely excavated structures produced evidence of a lateral entryway (the shallow pit structure at the Three Kids site).

Only two of the sites where the habitation structures are located have produced even a little evidence relating to their overall layout. The deep pithouse at Corn Creek was initially observed as one of a group of perhaps 10 depressions that are located near the edge of a gently sloping ridge top, scattered within an area that measures about 30 m north-south by 25 m east-west (Roberts et al. 2003b, 2007). Limited testing of one of the depressions indicated that it overlay a deep pit structure. The surface evidence suggests that the pit structure may be one of a cluster of similar structures. The other site, Scorpion Knoll, was also tested, though more extensively than the Corn Creek site area. In this case, the data hint at a vaguely pueblo-like site layout, with three storage pits scattered to the southwest and west of two (or perhaps more) ephemeral habitation structures, and with discarded surface artifacts (neither the label "midden" nor even "trash deposit" seems to apply in this case) concentrated to the east of those structures.

All of the excavated habitation structures have been radiocarbon dated to the 600-year interval from A.D. 400 to 1000. As a group, these structures point to a period that included a greater degree of residential stability than was characteristic of the preceding Terminal Archaic period or the succeeding final centuries of the Puebloan period and subsequent Post-Puebloan period. The latter portion of the Puebloan period, in particular, appears to have been marked by a shift to sheltered site locations. The implication of this and later changes in site settings are discussed in Chapter 7.

Moapa and Virgin River Valleys

The core population center for Virgin Puebloan populations was along the Muddy and Virgin river drainages. During the Basketmaker II through Puebloan III periods the largest excavated sites consist of three to five habitation features associated with linked storage rooms that surround a plaza area. Lyneis (1992a, 1995) has summarized the Virgin Puebloan settlement pattern as a small-scale society with undifferentiated habitation sites. Using the Lightfoot and Upham (1989) categories for scale of polities in prehistoric Southwestern societies Lyneis (1992a:86) places the Virgin Puebloans in the least complex category. This category is "characterized by what they call a bimodal settlement pattern and consisting of a large village with surrounding smaller habitation sites" (Lyneis 1992a:87). Lyneis has suggested that the lack of specialized architectural forms argues against the presence of "elites." None of the new data summarized here substantially changes her interpretation.

In her 1995 paper on the "Far Western Puebloans," Lyneis (1995) summarized the record of architectural development in the Moapa and Virgin River Valleys, and her framework is followed closely here—though with some revisions made possible by more recent excavations.

Late Basketmaker II (A.D. 200–500)

Lyneis (1995:211) notes that, in the Moapa and Virgin River Valleys, Basketmaker II pithouses typically occur in groups of one to five, have hearths and clay floors, and are characterized by architectural variability. That variability was demonstrated by post-1995 excavations conducted on Black Dog Mesa. Among the variable features in these and other excavated Basketmaker II structures are those involving the presence or absence, number, and arrangement of postholes, the presence or absence of lateral entryways, and, as in two of the three structures excavated on Black Dog Mesa, the use of plastered-over slabs to line the walls of the house pit. All of the excavated Basketmaker II pithouses have been circular in shape. According to Lyneis (1995:211), the pithouses are "rarely accompanied by separate storage cists." Several storage pits were, in fact, uncovered in the vicinity of the Basketmaker II pithouses on Black Dog Mesa, but these individually undated features may well have been associated with a Late Basketmaker III–Pueblo I pithouse (Feature 10) that is located in the same area of the site.

Basketmaker III (A.D. 500–800)

Only a little evidence from excavated Basketmaker III sites was available to Lyneis in 1995, all from sites that had been excavated in the 1930s. She noted that two of the investigated sites "had at least four structures, all of which were interpreted as dwellings. Only about half of them had fireplaces, however, so some of the structures may have been storage facilities" (Lyneis 1995:211). Shutler's (1961:14) brief description of the structures, on which Lyneis's summary is based, provides the added details that the houses were "round" and the walls of the house pits were either unaltered or plastered with adobe. There is no mention of evidence for the presence of side entryways. According to Shutler, the houses were "randomly placed" in relation to one another, and one of them was accompanied by a round, 3 foot, 6 inch diameter, semi-subterranean storage bin (Shutler 1961:14).

Another of the pithouses (Feature 12) that was excavated on Black Dog Mesa *after* 1995 appears to date to the Basketmaker III period. Like the structures to which Lyneis and Shutler referred, it was round and, like at least some of them, it had a hearth. It differed from the other structures in that it included an eastern ramp entryway and had a wainscoting of plastered-over interwoven sticks built against a portion of the wall of the house pit. Several extramural features were uncovered just outside the entryway. They included an arc of postholes interpreted as the remains of a lightly constructed "arbor" or shelter, along with a hearth and two storage pits. The excavators of the 1930s may in some cases have been most interested in uncovering pithouses and other relatively substantial structures, with the result that populations of these kinds of ephemeral or small extramural features were probably underrepresented by their investigations. This was not always the case, as reflected in the data recovered from House 102.

Although excavated in the 1930s, House 102 was not specifically described in Shutler's (1961) report (though much information on the site's many burials is provided in tables); nor is it mentioned in Lyneis's paper. For information on the site, we must turn to the records, including a detailed site map, which were recently compiled by Harry et al. (2008) and summarized in Appendix E. House 102's layout was described earlier. It included a single large circular pithouse, as many as 13 smaller mostly circular habitations, another 26 structures of similar size and mostly circular as well that, in many if not most cases, were probably used as storage facilities, and 17 smaller storage bins or cists. A number of the habitation and storage features were arranged in a ring around the large pit structure; others lay to the east or, in a few cases, to the south of it. Finally, there is one pairing of attached, rectangular storage rooms that, on a small scale, fits the description of storage-room alignments that Lyneis considers typical of sites dating to the Pueblo I period (see below). These structures aside, the architecture and layout of House 102 appears to fit a Basketmaker III pattern. It is important to emphasize here that this is a typological *and not* a chronological observation. The fact that the two-room unit is stratigraphically superimposed over one of the small circular habitation structures may, however, be chronologically significant. That point aside, there is at present no basis for arguing that the site dates either before or after A.D. 800 and, therefore, whether it falls in either our Basketmaker III or Pueblo I period. Its occupation may well have straddled that temporal boundary.

The site produced only a few instances of superposed structures. The example of the two-room alignment overlying a circular habitation room has already been mentioned. A second case involves that same habitation room, which itself overlies an earlier structure of the same kind. There is also an instance of one probable storage feature overlying another. This is a small number of "overlaps" for a site with so many features, which suggests that House 102 was not occupied long enough for the locations of old, abandoned habitations and storage units to be forgotten or at least ignored. There is no way to quantify this inference, though it may be reasonable to argue on this basis that the site experienced a single occupation that lasted for a few decades. This inference is contradicted by the size of the site's burial population, consisting of 115 individuals, in relation to the total quantity of its available living space. Perhaps House 102 was actually occupied for more than a few decades; or perhaps the site's inhabitants continued to regard it as their "traditional burial ground" after they had abandoned the site and relocated to others in the area. Here it is useful to cite an additional, non-architectural instance of stratification that

occurs on the site. This is the presence of six burials located on the floor or in the fill of the single large pit structure that was discovered on the site. This structure, at least, was used as a burial location after it was abandoned.

Pueblo I (A.D. 800–1000)

Lyneis's summary of Pueblo I habitation sites applies to the Virgin Puebloan archaeological record as a whole. She observes that pit structures continued to serve as habitations during this time:

> They often have benches, sometimes ventilators; none seem to have antechambers. The arrangements for storage change as cists become more oval and are arranged end-to-end in arcs or curves. The pit structure may be off one end of the alignment at some distance, or more occasionally, the alignment of storage cists is attached to the pit structure. Either way, the relationship between pithouse and alignment of storage rooms begins to define an outdoor space for the coresidential group, anticipating the courtyards of PII times [Lyneis 1995:211].

Lyneis acknowledges that excavated Pueblo I Virgin Puebloan sites are rare, and in fact cites only a single example from the Moapa and Virgin river valleys. This is Cliff's Edge, a site located on the Virgin River in far northwestern Arizona. This site fits the portion of Lyneis's description that refers to an alignment—or, in the actual case, alignments—of storage rooms. The site also produced evidence of ramadas, i.e., roofed structures without permanent or substantial walls. (The presence at the site of a pithouse that may date to the Basketmaker II period was mentioned earlier.)

Early Pueblo II (A.D. 1000–1050)

As in the case of the Pueblo I period, Lyneis's (1995:213) description of Early Pueblo II period habitation sites applies to the Virgin Puebloan region as a whole. Pithouses continued to be used as living structures. "Storage rooms, still laid end-to-end, are set less deeply into the soil than earlier cists." The sites were still small and, with one exception located in southwestern Utah, included only a single pithouse each. Lyneis's Yamashita 2 site appears to date to the very end of the Early Pueblo II and perhaps into the Middle Pueblo II—though in any case slightly earlier than the Yamashita 3 site (Chapter 5, Appendix D). The remains of contiguous storage rooms found at this site are illustrated in Appendix D.

Middle Pueblo II (A.D. 1050–1150)

By the Middle Pueblo II period (referred to as Late Pueblo II in Lyneis's 1995 paper), "habitation rooms were usually incorporated into a curving alignment of storage rooms that defined and sheltered a courtyard…which we can term a courtyard group. [These units] remained small in size, usually housing one or a few families. Although pithouses never completely dropped out of use, habitation rooms increasingly were built essentially as surface structures" (Lyneis 1995:213-215). For the first time in her discussion, Lyneis can refer to a large dataset from the Moapa and Virgin river valleys, specifically from the Main Ridge community. She suggests that Main Ridge was inhabited around A.D. 1050, at the end of Early Pueblo II and beginning of Middle Pueblo II. In the course of excavations that were conducted during the 1920s, 203 rooms and 44 courtyard groups were identified at Main Ridge. The site occupies a series of long narrow ridge fingers, with the courtyard groups being "as closely packed as the badlands topography on which they are built permits. Open space remains at the scale of courtyards for coresidential groups; there are no plazas" (Lyneis 1995:215). The Yamashita 2 and 3 sites date to this time as well (Appendix D).

Late Pueblo II (A.D. 1150–1200) and Pueblo III (A.D. 1200–1300)

In her 1995 paper, Lyneis (1995:217) identified an Early Pueblo III period that could be dated to the interval from A.D. 1150 to 1225. She has since revised that portion of the chronology to include a Late Pueblo II and Pueblo III period, with the latter continuing, at least provisionally, to A.D. 1300. This period is represented in the Moapa and Virgin river valleys by Mesa House and Yamashita 5 South (Appendix D). At Mesa House, "the courtyard is almost completely enclosed by a curve of habitation and storage rooms. Such a layout is not present at all Early PIII sites, but others from the Moapa Valley are

similar" (Lyneis 1995:217). She argues that, although too large to house a simple household, the site is nevertheless small: "Of 33 rooms in Mesa House's formal layout, only 3 to 5 are habitation rooms" (Lyneis 1995:217). Around this formal layout are another 30 rooms, most appearing to be "scattered about," but some are in tight groupings. More than a half dozen of these structures have hearths and, although smaller on average than the living rooms incorporated in the formal layout, may have been living rooms as well—one of these is a small pithouse. Most of the other structures were probably used for storage. The presence of these outlying structures does not contradict Lyneis's characterization of Mesa House as a small site. It would, however, complicate any attempt to interpret the site in social terms.

Kivas?

Lyneis (1995:217–218) argues that, although some kiva-like pit structures in the St. George Basin and Colorado Plateau portions of the Virgin Puebloan world have been identified, no good candidates for this designation are known from the Moapa and Virgin river valleys. The picture has not changed over the 15 or so years that have passed since she came to this conclusion.

Technology

Shutler's (1961) synthesis of the Lost City artifact assemblages provides the most comprehensive summary of Virgin Puebloan technology. The following section briefly summarizes new information on this topic. Lyneis has reviewed the pottery types associated with this period in Appendix I.

Connections between the Fremont culture area and the Virgin Puebloans have been seen as minimal largely because Fremont pottery is rarely recovered from Virgin Puebloan sites (Aikens 1965; Lyneis 1995; Shutler 1961). In her report on the excavation of Black Dog Cave, Winslow (2009) noted stylistic similarities between clay figurines from the site and Fremont figurines. On the other hand, Shutler (1961) examined the figurines recovered during the Lost City investigations and concluded that they resembled examples recovered from Schroeder's (1955 Zion Park excavations and found elsewhere in Southwest in sites dating to the Basketmaker III period. Do the Black Dog and Lost City figurines resemble Fremont rock art styles and clay figurines more than those reported from Kayenta Puebloan and other Puebloan sites? These artifacts should be reevaluated and compared to those from adjacent regions—including figurines in our Southern Geographic Region at Catclaw Cave (Gilreath 2012:55–56, 61–62).

The question of whether or not cotton was grown in the Moapa Valley has not been resolved despite a recent effort by Harry and Watson (2010) to recover evidence from Main Ridge macrobotanical samples. One piece of new evidence comes from Black Dog Cave, and it consists of an unfired clay spindle whorl found with a fragment of the wooden spindle to which some cotton fibers were attached (Winslow and Blair 2003). This is an important topic for future research. The first Mormon settlers in the region demonstrated that the area was climatically suited to cotton production, but it remains to be determined when and if the Virgin Puebloans grew cotton in southern Nevada.

As mentioned previously in this chapter, little is known about the agricultural techniques used prehistorically. Lyneis (1995) has suggested that the Muddy River is suitable for small-scale irrigation using diversion dams. The early Mormon settlers reported that the Muddy River does periodically flood, and it may also have been suitable for floodwater farming. Ponding irrigation techniques practiced by the Southern Paiutes may also have been a successful irrigation method (Fowler 2010).

In 1995 Lyneis reported that turkeys and dogs were recovered from Virgin Puebloan sites near Kanab, Utah (Lyneis 1995:225). Remains of domesticated dogs have been found in burials at Main Ridge (Lyneis 1995), House 102 (Harry et al 2008), Adam 2 (Lyneis 1995), and Mesa House (Hayden 1930), but turkey bones have not been reported from southern Nevada's Puebloan sites. It is not known if dogs were used as a food source (Lyneis 1995, Harry et al. 2008).

We can infer from the quantities of raw and worked turquoise recovered from Puebloan sites in the Moapa Valley (Shutler 1961) that some beads were made at Virgin Puebloan sites. Selenite pendants were probably made at Gypsum Cave around A.D. 1000 (Gilreath 2012:67), and they have been reported

in several of the Moapa sites by Shutler (1961). The extent of the area's involvement in the manufacture of beads, both shell and turquoise is not well understood. A turquoise sourcing study currently underway by HRA and the University of Manitoba using raw and worked turquoise from the Yamashita sites will, we hope, provide new information on this topic.

The arrival of bow-and-arrow technology is well-dated in southern Nevada. It appears in the Central Region at the Three Kids Pithouse site by A.D. 500 and at the Windy site (26CK1086) in the California Wash area between A.D. 400 and 600 (Brooks et al. 1975). In the Moapa Valley at Black Dog Cave Winslow reported a radiocarbon date on a bow with a calibrated date range of A.D. 440 to 640. Geib and Spurr suggested that bow and arrow technology arrived somewhat earlier in the Kayenta Region by A.D. 300 to 400 and perhaps as early as A.D. 200 (Geib and Spurr 2000:195).

Ground stone technology and the changes in metate and mano forms throughout the period have not been evaluated in light of new data. Shutler reported that Utah (n=5), trough (n=11), slab (n=26), and basin (n=12) style metates were recovered during the Lost City investigations; however, he was unable to evaluate the changes in styles through time. Both basin and slab metates were collected from the Basketmaker structures at Black Dog Mesa, but no trough metates were recovered. Just when this technology was introduced to the region is a question for future research. Only four mortars were recovered during the Lost City investigations (Shutler 1961:35), which seems to be too few in light of the importance of mesquite pods as food in the region.

Trade and Exchange

The extent of Virgin Branch involvement in the regional trade of shell, turquoise, salt, selenite/gypsum, pottery, and other items has been a topic of considerable discussion over the years and will only be briefly reviewed here. The reader is referred to Lyneis' section on trade in her Main Ridge report (Lyneis 1992a) and to her 1995 synthesis on the Virgin Puebloans for more comprehensive discussions.

To briefly summarize her data, Lyneis (1982a, 1992a, 1995) et al. (Rafferty 1989, 1990c) have suggested that the Moapa Virgin settlements played a key role in the Southwest's shell and turquoise trade, possibly in terms of production and exchange (Lyneis 1992a). These goods have been recovered in quantity from sites throughout the Moapa Valley (Shutler 1961; Lyneis 1992a), and the pottery evidence suggests long-term economic links with the Virgin and Kayenta populations living to the east, particularly to the Plateau regions (Lyneis 1995). While there is general consensus that the Virgin region played an important role in intra- and inter-regional exchange, debate continues on the nature of these trade networks. For example, did Virgin Puebloan trading parties move goods directly from the California coast to the Southwest as ethnographic accounts suggests for the early historic period (Fowler 2010), or did goods move through down-the-line exchange networks, trade fairs, or other mechanisms? Using pottery evidence Lyneis (1995) and Aikens (1965) have suggested there is little evidence for exchange between the Virgin Puebloans and Fremont groups. In light of the obsidian data presented in Appendix B, which suggests that this material was coming into the region from the Wild Horse Canyon source near Milford, Utah, this inference should be reevaluated.

Puebloan Abandonment

The best evidence relating to the abandonment of the region by Virgin Puebloan populations comes from the Yamashita sites (Lyneis Appendix D). Lyneis's radiocarbon dates indicate that the occupation at this site continued quite late, into the A.D. 1200s and possibly into the 1300s. The pottery assemblage at Yamashita 5 South—the site's late component—was dominated by corrugated pottery, and both the radiocarbon and luminescence dates provide a consistent date range of A.D. 1200-1400. Three later dates suggest continued use of the site between A.D. 1600 and 1950. A similar suite of dates was obtained from Yamashita 5 North, where a trash deposit but no features were encountered in the single excavated unit.

Two contexts at the Yamashita 2 site produced evidence of re-use of this predominantly Puebloan site by Southern Paiute people. The first of these consisted of the remains of a fire that was built on top of adobe rubble from a collapsed Puebloan building (Structure 4) produced a radiocarbon date (from charcoal) and a luminescence date (from a Southern Paiute potsherds) that exhibit substantial overlap during the A.D. 1300s, suggesting that the fire was built during this century. The second context involved another thermal feature, again combining charcoal and fire-cracked rock and associated with a single Southern Paiute potsherd, placed next to the wall of a second Puebloan building (Structure 1). A radiocarbon date obtained from a sample of the charcoal suggests that this feature post-dated A.D. 1500 and, thus, applied to a more recent visit to the site than the other feature. What these data demonstrate is that there is only a brief gap in time between the area's Puebloan and Southern Paiute occupations—with the exact duration of this gap being difficult to pinpoint with current dating methods.

While the Yamashita sites provide new information on the timing of population replacement there is still no "smoking gun" for the mechanism. Larson and Michaelson (1990) have made a case using the tree-ring record for a mid-twelfth century drought that caused down-cutting and erosion of the Virgin River and its tributaries. They hypothesized that this resulted in region-wide famine and abandonment. Allison (1996) rejects this argument, arguing that there is no evidence for a decline in Virgin Puebloan population around A.D. 1150 and, furthermore, that there is good evidence for the continuation of Virgin Puebloan occupation well into the A.D. 1200s. Both he and Lyneis (1992a) have pointed out as well that the Muddy River—the center of Western Virgin population—is a spring-fed stream and, therefore, would have been less directly affected by the kind of climatic event identified by Larson and Michaelson than the Virgin River—the source of their environmental data. The possible influence of climatic variation on a later disappearance of decline of Virgin Puebloan population in southern Nevada has not been addressed. Nor do the data as they currently stand specifically favor explanations of either regional conflict by outside groups (Hayden 1930; Ambler and Sutton 1989) or some combination of climate change and resource imbalance (Lyneis 1995). In Chapter 7, Roberts makes a case for a push by Patayan groups into the Central Region around A.D. 950 and the Eastern Region after A.D. 1250. Perhaps a combination of factors—population pressure from the Patayan region, the dissolution of the Puebloan system across the Southwest, and environmental deterioration—are responsible for the abandonment of the Moapa and Virgin valleys by Virgin Puebloans. McGuire et al.'s (2010) observation that use of the Gold Butte area increased during the later Puebloan periods may support a migration model of Virgin groups moving east through that area and on to the upland plateaus.

CHAPTER 7
POST-PUEBLOAN PERIOD (A.D. 1300–1776)

Heidi Roberts

The Post-Puebloan period is viewed as a time of change that bridges the gap between the end of the Puebloan era and the beginning of the Historic period. When the first Euroamericans—Fray Francisco Dominguez and Fray Silvestre Velez de Escalante—traveled through the Southern Paiute territory in 1776, they observed that some Paiute groups lived as foragers/collectors, while others, for example those in the St. George Basin, were farmers (Warner 1995). The priests and the explorers who followed noted that the groups that farmed lived in brush shelters, rather than adobe or masonry pueblos, and that they preferred basketry over pottery. This cultural disconnect between the sedentary lifeways of the prehistoric Puebloans and those of the mobile ethnographic Numic groups has been the topic of considerable debate since the discontinuity was first recognized by archaeologists working in the Southwest and eastern Great Basin. As recently as 1994, entire volumes have been devoted to this topic (Madsen and Rhode 1994), and the debate shows no signs of lessening (Hill 2001, 2002; Kaestel and Smith 2001).

Today, most archaeologists support a model of Virgin Branch Puebloan abandonment of the region by A.D. 1300, followed by a Numic migration into the area from somewhere near Owens Valley. Vigorous discussions regarding the timing and mechanisms of arrival of these Numic groups dominate regional research (Madsen and Rhode 1994; Sutton and Rhode 1994). Although the detailed history of this debate will not be recapitulated here, a brief summary of the various models that have resulted from these discussions is presented here. In this way, each model can be evaluated using the data compiled from southern Nevada's Post-Puebloan sites. The competing models are:

1. Discontinuity Model: Lamb (1958) and Madsen (1975) proposed that the Numic languages spread across the Great Basin from a homeland in the southwestern Great Basin beginning around A.D. 1000.
    a. Bettinger and Baumhoff (1982) and Bettinger (1994): Pre-Numic, hunting-focused "travelers" were outcompeted by the less mobile Numic wild-seed "processors" who spread north and east from the Owens Valley homeland.
    b. Sutton and Rhode (1987, 1991): This model is consistent with Lamb; however, Sutton suggests that warfare and raiding were used to control the critical resource patches. Once these patches were overexploited the groups would relocate to the next one.
2. Continuity Model: Gunnerson (1962), Jennings and Norbeck (1955), et al. (Roberts and Ahlstrom 2006; Stoffle and Zendaño 2000).
    a. Gunnerson (1962): During the drought of the period around A.D. 1200 farming was abandoned and the Virgin Branch Puebloans became the Northern Paiute, the Fremont became the proto-Ute and Southern Paiute, and the Sevier (Parowan Fremont) people became the Shoshone-Comanche.
    b. Aikens and Witherspoon (1986, Aikens 1994): Numic people practiced a hunting and gathering lifeway for 5,000 years in the central Great Basin while wetlands-adapted foragers and agricultural groups occupied the eastern and western edges. When periods of aridity occurred these farming groups abandoned the wetland areas, and the Numic people expanded into these areas.
    c. Lyneis (1994) proposed a hypothesis that fits the Aikens and Witherspoon idea of multiple groups occupying the same region. She identified this relationship as

"mutualism." Great Basin Brown Ware pottery makers were foragers who traded for food and other goods with the Puebloans of southern Nevada.

The goal of this chapter is to conduct a detailed and thorough examination of all the data from excavated and recorded sites throughout the project area. With this objective in mind, labels that attribute artifacts or complexes of artifacts to historic ethnic populations (note that we have substituted the label Southern Paiute Brown Ware with Great Basin Brown Ware in discussions that follow) are avoided if possible, for the author agrees with Sutton and Rhode that attributing artifact assemblages to ethnic groups is fraught with problems and difficult at best:

> Archaeologists presuming to construct the history of a linguistic group assume that certain artifact classes are diagnostic of that group, but the ability to demonstrate that certain kinds of artifacts are diagnostic of linguistic entities is very difficult in practice…. Typically artifacts classes are assumed (rather than demonstrated) to be diagnostic by invoking the direct historic approach or by arguing that some change in artifact distribution through space and time corresponds with a hypothesized pattern of movement of a linguistic group [Sutton and Rhode 1994:10].

The reader is referred to Scott Ortman's (2010) recent dissertation on Tewa ethnogenesis or David Gregory and David Wilcox's book *Zuni Origins* (Gregory and Wilcox 2007) for a comprehensive discussion of these theoretical and methodological issues. Both of these volumes represent a variation on the direct historic approach that combines archaeological data with genetics, linguistics, and culture to link archaeological cultures to ethnographic ones. In the author's opinion, tracing ethnic origins has come back into vogue (Gregory and Wilcox 2007; Ortman 2010) because the Native American Graves Protection and Repatriation Act (NAGPRA) has caused archaeologists to look more closely at the link between ethnographic groups and archaeological cultures. Plus, scientific break throughs, such as DNA studies, have added a new dimension to this research.

This report will *try* to avoid attributing ethnic identities to artifact complexes, not just to steer clear of the theoretical conundrum of ethnic identity, but also because the project area is a modern political boundary that incorporates a region used historically by many Native American groups. At least four groups—Southern Paiute, Chemehuevi, Shoshone, and Mojave—inhabited portions of southern Nevada during the Historic period (Figure 7.1), and in many cases intermarriage and the blending of cultural traditions and languages made material culture distinctions impossible. When the first ethnographers began their studies of the Native Americans living in the region they observed that multiple languages were spoken, and some areas, such as Ash Meadows and the Colorado River, were shared by more than one group. Tribal boundaries were likely fluid and varied through time and space, until those boundaries were converted to static lines by Euroamericans. It is reasonable to expect that the boundaries were highly dynamic throughout prehistory and such fluidity could account for the perplexing mix of pottery types in the archaeological sites that post-date A.D. 1000.

A powerful example of this blending was reported by one of Isabel Kelly's consultants, Daisy Smith, when Kelly conducted her ethnographic research in the Las Vegas Valley in the 1930s (Fowler 2010). Daisy Smith was born in Las Vegas to a Southern Paiute family and she married a Chemehuevi man named Bishop Smith (Fowler 2010). After her marriage she lived at times in the Chemehuevi Valley and in Las Vegas. When Kelly asked her to describe pottery making in the Las Vegas Valley, she described manufacture techniques for buff ware rather than Great Basin Brown Ware; despite that fact that she considered her pottery to be the Las Vegas style (Fowler 2010:182) rather than the Mojave style. She said that clay was obtained from Cottonwood Island on the Colorado River, and the temper used was a white rock from the Las Vegas Valley that was heated. She described making pottery vessels using paddle and anvil techniques into buff ware shapes. An archaeological site containing sherds from these vessels would be labeled Patayan, when in reality the makers of the vessel were Chemehuevi and Paiute. If the clay was sourced it would be shown to have been made on Cottonwood Island and if the temper was sourced it would indicate a Las Vegas Valley origin.

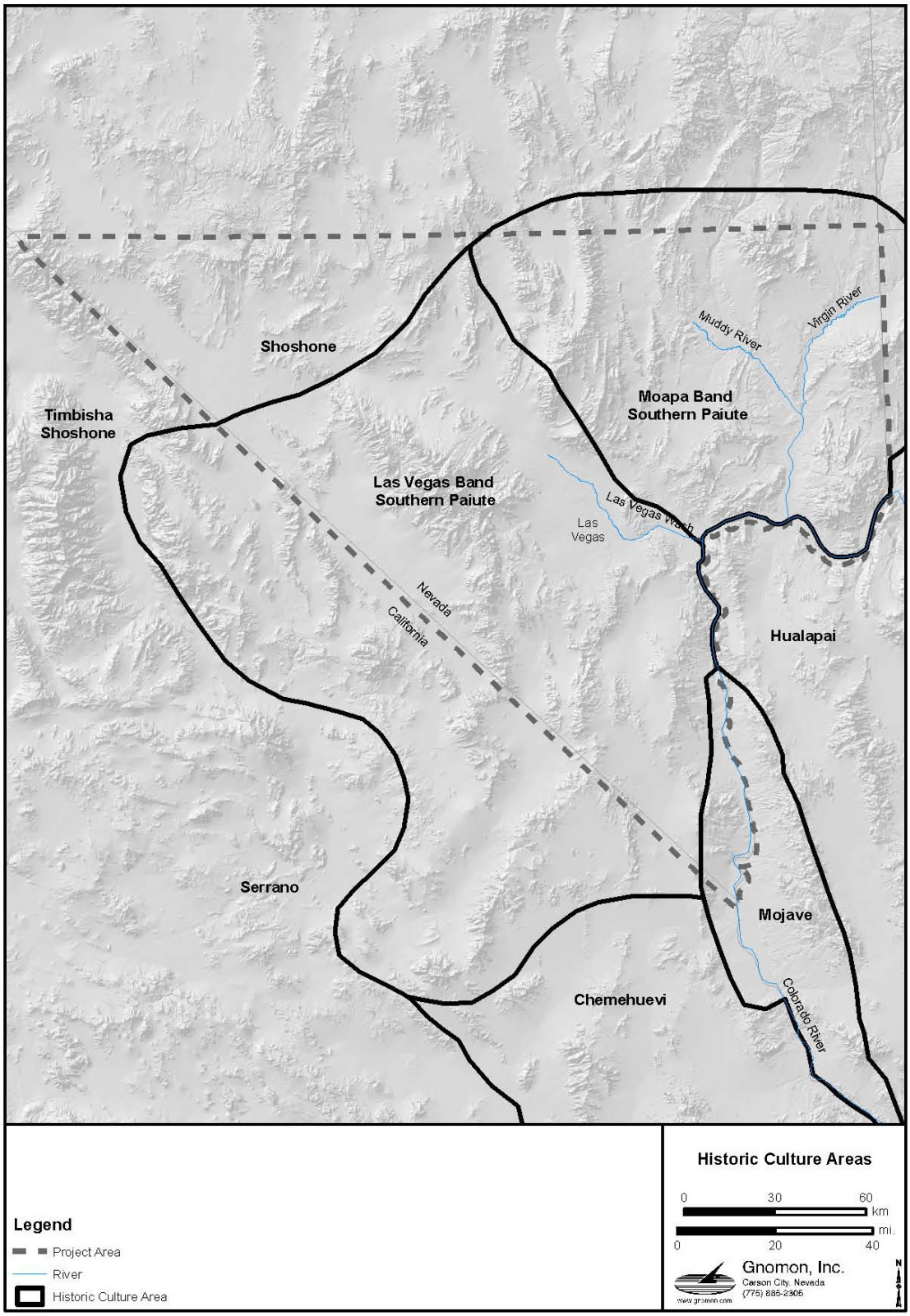


Figure 7.1. Subregions (Mojave, Chemehuevi, Southern Paiute-east of Moapa, west of Moapa) relevant to the Historic period in the project area (after Fowler 2010: Figure 1.1; Kelly 1934).

POST-PUEBLOAN PERIOD RESEARCH IN THE GREAT BASIN

Catherine Fowler has conducted the lion's share of research on the Post-Puebloan transition in the Southern Paiute region. In 1981, Catherine and Don Fowler (Fowler and Fowler 1981) wrote a paper that examined the archaeological, ethnographic, linguistic, and material culture data to evaluate "Southern Paiute origins, the spread of horticulture, the nature of Southern Paiute material culture, and the effects of both Spanish contact and influence in the region" (Fowler and Fowler 1981:129). Based on the available data, the Fowlers concluded that Southern Paiute people may have practiced horticulture in the Virgin River drainage by A.D. 1400. Also, their pottery and basketry forms were "wholly new in the area by A.D. 1000–1300, and may well evidence Southern Paiute arrival from the west." Fowler and Fowler (1981:153) found that important changes to the Paiute lifeways had undoubtedly resulted from European colonialism, in particular from the introduction of new diseases and new cultigens.

In 1994, Catherine Fowler compared more than 800 Southern Paiute-provenienced objects, representing a period of collecting from 1867 into the 1930s, to their Virgin Puebloan equivalents. Objects included baskets, bows, arrows, quivers, ladles, tortoise shell dishes, clubs, nets, cordage, rabbit hooks, figurines, games, arrow gear, pipes, brushes, chipped stone, clothing cradles, ground stone, horse gear, beads, and pottery. She concluded that there are continuities and discontinuities in the assemblages: "Some of the general type, perhaps reflecting an older cultural base common to the whole of the region: use of netting, cordage, basketry, ground stone, etc. Others would seem to reflect a great degree of relationship, such as the figurines, certain features of coiled basketry, one sandal type, etc. It seems doubtful that the similarities outweigh the differences; but then what is the source of the similarities?" (Fowler 1994a:110)

Fowler found that Southern Paiute basketry types contained more diverse types and techniques than Northern Paiute types (Fowler 1994a:108). She suggested that Southern Paiute coiling "bears some relationship to that of the Anasazi, although never exactly" (Fowler 1994a:108–109). The flat coiled tray, for example, goes back to at least Basketmaker III times (A.D. 600) in this region although these early foundation types and decorations are unlike Southern Paiute forms. By Pueblo III times (A.D. 1200), similarities are greater, including some use of a characteristic Southern Paiute splice type (Fowler 1994a:109).

Her analysis suggested that both Southern Paiute and Virgin Anasazi sandals are variable in form and technique (Fowler 1994a:109). More similarities could be documented in Paiute and Anasazi figurines. Two other points of similarities that Fowler (1994a:110) discovered were between shaft wrenches and bone and horn dishes. Mountain sheep horns were used by both groups for wrenches and spoons/ladles, although the exact size and number of holes varied for each group. Artifact categories that exhibited distinct manufacture differences included pipes and cordage (Fowler 1994a:110). Southern Paiute cordage is typically two-ply Z-spun S-twist, and Virgin Anasazi cordage is more often S-spun and Z-twist. In her analysis of ground stone, Fowler (1994) noted that Southern Paiute examples were poorly represented. Desert Side-Notched points are considered to be one of the diagnostic artifact types of sites occupied by Numic groups (Lyneis 1994:142). As noted by Lyneis (1994:142), however, these points are widely distributed throughout the Southwest, the Great Basin, California, and even the Plains region (Justice 2002a, 2002b). Powell's collection of Southern Paiute arrow points contains hafted Desert side-notched, Rose Spring, and earlier point styles (Fowler and Matley 1979).

POST-PUEBLOAN PERIOD RESEARCH IN SOUTHERN NEVADA

Except for Margaret Lyneis' research on Great Basin Brown Ware there have been no funded research projects that specifically focus on post-Puebloan period archaeological sites in southern Nevada. A majority of the excavated sites that contain Post-Puebloan components were investigated to mitigate impacts from development projects. Although some of these reports compare the results of contemporaneous sites (see Harper 2006), there have been no systematic efforts to synthesize data from the numerous Post-Puebloan sites excavated in southern Nevada. A few projects—in in particular Lyneis' ceramic studies on brown ware—are worthy of mention.

In HRA's survey report of the Ash Meadows National Wildlife Refuge, Lyneis analyzed the Great Basin Brown Ware and Puebloan pottery that HRA collected from surface sites (Lyon et al. 2008; Lyneis 2008c). Lyneis also examined the pottery collected from several different investigations at the Corn Creek Dunes site located in the Desert National Wildlife Refuge (Lyneis 2011a). She reported that Great Basin Brown Ware is the most common pottery type in Ash Meadows Refuge, and it was made with temper from mountain sources located over 36 km or more from Ash Meadows. These temper sources were also used to make two other wares collected during the Ash Meadows survey, a locally made gray ware, including some that was corrugated, and a locally made buff ware (Hoisch 2011; Lyneis 2011b). Lyneis suggested that

> the use of these distant temper sources by potters of all three traditions suggests a similarity in the land use of all three groups. Assuming their pottery production was embedded in mobile aspects of food procurement strategies, each group was using the same areas. None was so immersed in gardening at Ash Meadows that they were tethered to that locality or fully sedentary [Lyneis 2011b:130]

At the Corn Creek Dunes site Lyneis (2011a) recognized a local variety (Corn Creek Variety) of Logandale Gray Ware (some of which was corrugated) that was made with temper that included Eureka Quartzite from the nearby Sheep Range. As at Ash Meadows, the Great Basin Brown Ware sherds collected from the same components were made with similar temper as the Logandale Gray, but the amount of quartz/quartzite versus limestone in this type was greater than in the gray ware.

EXCAVATED SITES WITH POST-PUEBLOAN PERIOD RADIOCARBON DATES

This section of the report summarizes 51 excavated sites with radiocarbon dates or radiocarbon dated components who's date range intercepts A.D. 1300 and 1950 (the modern radiocarbon dates are not included) (Figure 7.2). Figure 7.3 shows the location of the excavated sites discussed in this section of the chapter, and Tables 7.1 and 2 provides a summary of the sites, features, and date ranges for each of the sites discussed below.

Appendix H contains a detailed summary of most of the excavated Post-Puebloan sites in southern Nevada. These descriptions were compiled for two reasons: (1) to demonstrate the extreme variability between sites, which presents difficulties in large scale archaeological interpretation, and (2) to allow for data mining, in hopes that future research can bridge the gaps in current knowledge. The site narratives are organized by occupation range (oldest to most recent) and by the geographic regions shown in Figure 7.3. Many of the sites have radiocarbon dates that span the entire period, or they also contain earlier components. If the Post-Puebloan components can be separated from the earlier components, then the narrative does not discuss the earlier components in detail. However, the earlier occupation of several rockshelters, which began around A.D. 1000, may be culturally important and reflect a settlement change; therefore, the entire occupation of these sites have been included in this summary for purposes of comparison.

Western Region

Radiocarbon dates associated with this period have been obtained from two sites in Ash Meadows, two sites associated with artifacts in the Yucca Mountain area, and one site at the southern edge of the Western Region (Figure 7.3 and Appendix H). A single hearth associated with Great Basin Brown Ware at the Barnett site in Ash Meadows was used between A.D. 1150 and 1955. At the Fairbanks site, also in Ash Meadows, a radiocarbon date with a calibrated date range of A.D. 1400–1460 was obtained on charred prickly pear and thornberry seed fragments from an occupation surface (Eskenazi and Roberts 2011, Muto et al. 1976). Artifacts associated with this feature included ground stone, bifaces, and debitage. Although Southern Paiute people who occupied Ash Meadows during the historic period were farming, the limited archaeological evidence for the Post-Puebloan period has produced evidence for wild plant processing and temporary camps rather than agriculture and pithouse habitations.

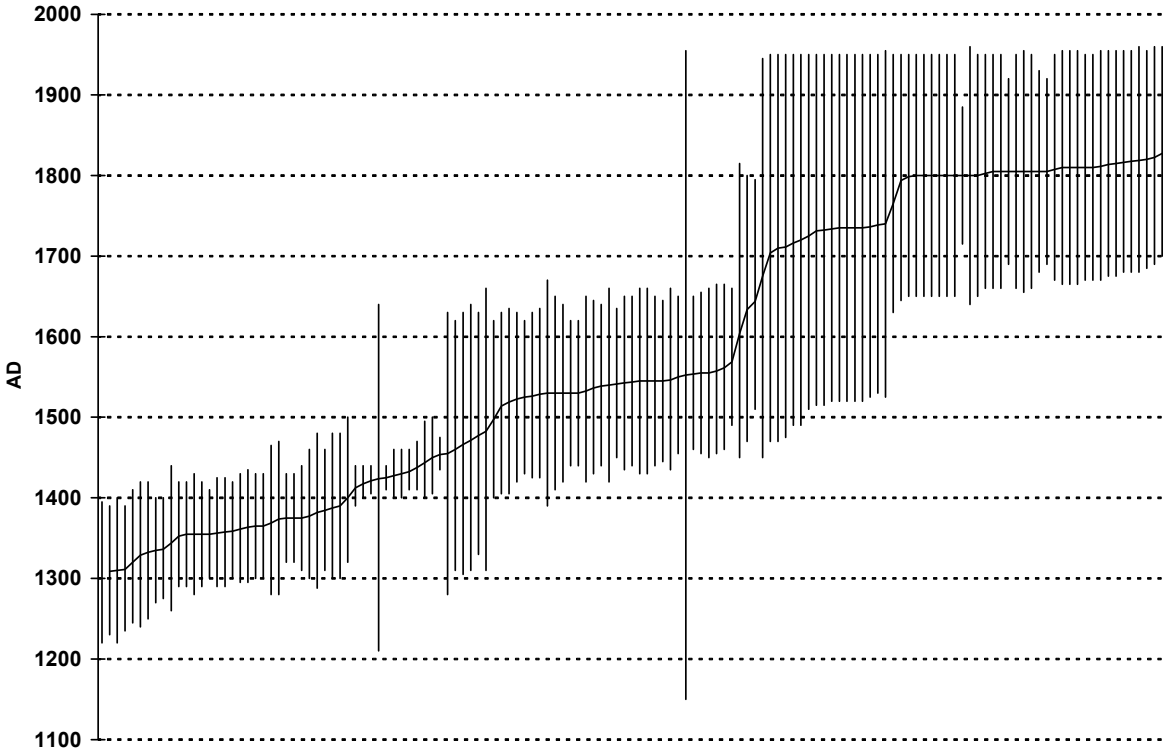


Figure 7.2. Post-Puebloan period radiocarbon dates: two-sigma calibrated date ranges with moving-average trend line (not including "modern" dates).

In the Yucca Mountain area (Figure 7.3 and Appendix H) the Sever Tanks site contained a charcoal lens that yielded a calibrated radiocarbon date of A.D. 1280–1630 and a luminescence date on Great Basin Brown Ware of A.D. 1812 (Rhode 1994). The charcoal lens was associated with grinding implements and a Rose Springs point; an adjacent excavation unit yielded Great Basin Brown Ware and an incised stone. The second site in the Yucca Mountain area consisted of a cache in a rockshelter with a Paiute winnowing tray (twined), milling implements, grasses that were likely materials for basket making, a stone manuport, and a curved wooden artifact.

Artifacts traditionally associated with Southern Paiute groups dominate the well-provenienced and dated artifact assemblages from the Western Region. Great Basin Brown Ware is dominant and a twined winnowing tray yielded a calibrated radiocarbon date range of A.D. 1525–1955. These dates may extend the Southern Paiute occupation of the Western Region back to the early part of this period, and they support the idea of Numic migration after Puebloan and Fremont pottery types were no longer in use. The sites are temporary camps and archaeological evidence for farming is currently lacking. An important question for future research is: When did farming begin in the Ash Meadows area? The association of incised stones at these sites also has important implications, which are discussed at great length in the chapter's conclusion.

Southern Region

Several sites were excavated along the Colorado River, south of the Hoover Dam, before the area was inundated by Lake Mohave (Baldwin 1948; Schroeder 1961; Wright 1954); however, only one of these, Catclaw Cave, has been thoroughly radiocarbon dated. Perhaps the most famous of the excavated sites is Willow Beach (Schroeder 1961), which was a stratified open site with evidence of use from the Archaic to the Post-Puebloan period. The upper strata (Appendix H) contained an oval-shaped, burned hut (3 x 4 m in diameter) with a hearth located 15 cm below the surface. This feature was associated with tortoise shells with drilled holes, *Olivella* shell beads, bone, hematite, cotton cloth, a broken metate, yucca

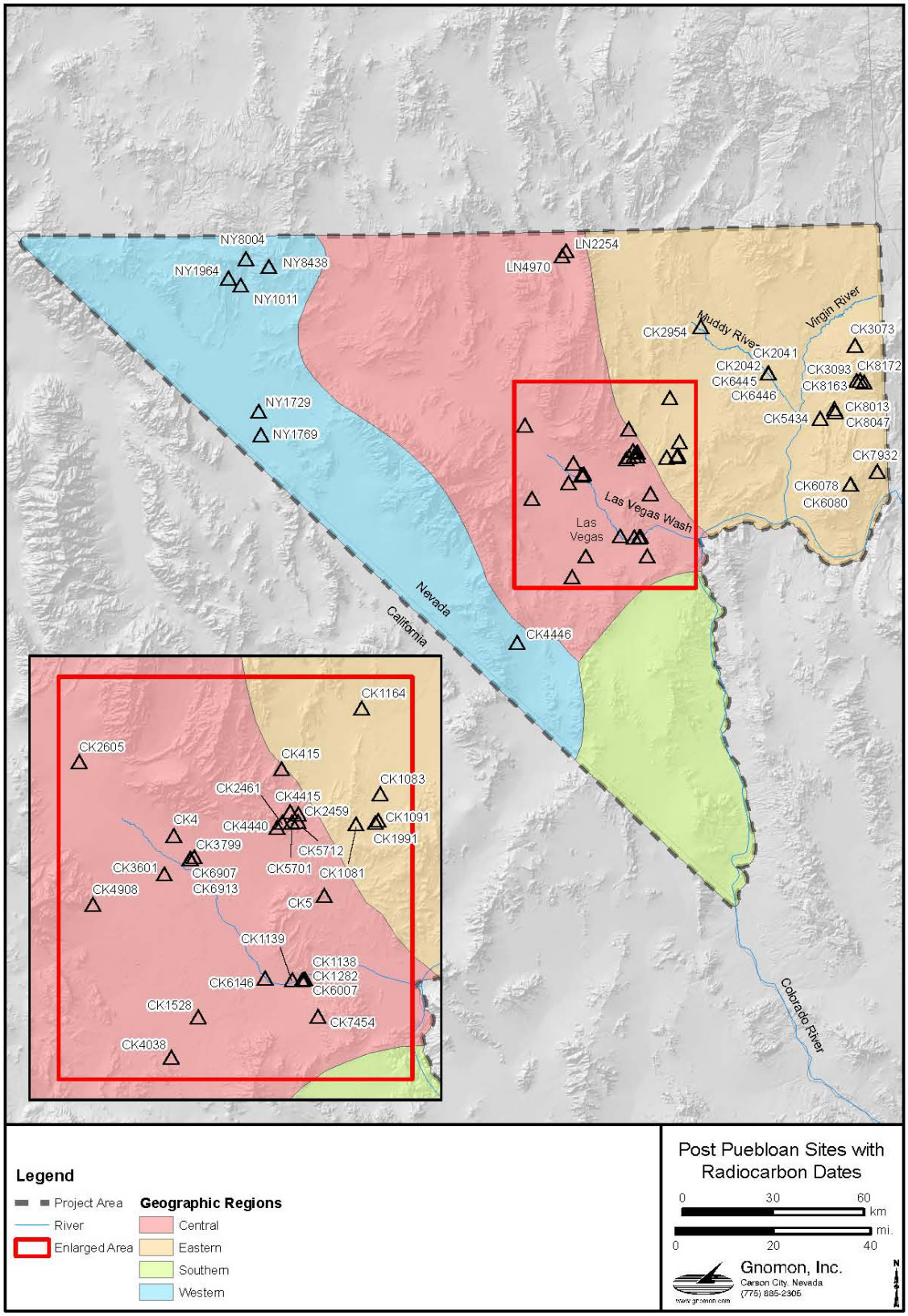


Figure 7.3. Radiocarbon dated Post-Puebloan period sites.

Table 7.1. Summary of Excavated Post-Puebloan Sites, Features, and Date Ranges.

Site No.	Site Name	2 Sigma Cal. Date Range	Multiple or Single Component	Region	Type	Feature Types
CK1139		A.D. 1020–1950	Multiple (all dates included)	Central	Rockshelter	Unknown
CK5	Gypsum Cave (Room 1)	A.D. 1050–1390	Multiple (earlier components not included)	Central	Rockshelter	Unknown
CK501/1528	Berger site	A.D. 1190–1630	Multiple (data incomplete)	Central	Open Midden	Midden
CK3799	Pardee site	A.D. 1235–1425	Multiple (Archaic not included)	Central	Open Campsite	Small roasting pits with fire-cracked rock
CK3601	Burnt Rock Mound	A.D. 1250–1420	Multiple (Late Archaic to Post-Puebloan included)	Central	Open Midden	Midden
CK2461		A.D. 1260–1620	Single?	Central	Rockshelters	3 Hearths
CK6007		A.D. 1270–1400	Single	Central	Open Campsite	Hearth
CK4	Tule Springs Locus 41	A.D. 1280–1465	Single	Central	Open Campsite	Hearth
CK4440		A.D. 1280–1650	Multiple (one earlier Puebloan date A.D. 540-690)	Central	Rockshelter	Four + hearths
CK4446	Bighorn Cave	A.D. 1290–1950	Multiple	Central	Rockshelter	Rock alignment
CK1138		A.D. 1290–1955	Multiple (all dates included)	Central	Open Campsite	Rock circles, hearths, cleared circles
CK6913		A.D. 1300–1410	Single?	Central	Open Campsite	Hearth with fire-cracked rock
CK4908		A.D. 1310–1955	Multiple (earlier use of the roasting pit dated to A.D. 560–760)	Central	Rockshelter, Agave Pit	3 Large agave mounds, rock walls in shelter
CK2605	Corn Creek Dunes	A.D. 1320–1440 and A.D. 1690–1920	Multiple (Late Archaic and Puebloan not included)	Central	Open Midden	2 Rock-lined roasting pits, 2 midden deposits
CK2459		A.D. 1320–1500	Single	Central	Rockshelter	Informal hearth
CK6907		A.D. 1390–1440	Single	Central	Small roasting pit	Rock-lined roasting pit
CK6146	Larder site	A.D. 1400–1620	Multiple (Terminal Archaic and Puebloan not included)	Central	Open Storage	2 Storage Pits
LN2254		A.D. 1405–1630	Multiple (earlier dates not included)	Central	Open Campsite	Hearth with fire-cracked rock
CK415	Flaherty Rockshelter	A.D. 1405–1650	Multiple (Archaic and Puebloan dates not included)	Central	Rockshelter	Unknown
CK7454		A.D. 1405–1950	Multiple (all dates included)	Central	Rockshelter	5 Informal hearths
CK1282		A.D. 1420–1900	Multiple (earlier components not included here)	Central	Open Campsite	Hearth, fire-cracked rockcluster, *Typha* mat
CK4415		A.D. 1435–1950	Multiple (all dates included)	Central	Rockshelter	None
CK5701		A.D. 1490–1660	Single	Central	Open Campsite	2 Rock alignments, hearth
LN4970		A.D. 1520–1950	Multiple (earlier components not included)	Central	Open campsite	Hearth
CK4038	Mended Basket	A.D. 943–1473	Multiple (all dates included)	Central	Rockshelter	5 Hearths, slab-lined cist, rock wall

Site No.	Site Name	2 Sigma Cal. Date Range	Multiple or Single Component	Region	Type	Feature Types
CK5712	Garrett's Shelter	A.D. 990–1850	Multiple (all dates included)	Central	Rockshelter	Rock alignment, 4 hearths, yucca caches
CK1081	Rattlesnake site	A.D. 1000–1950	Multiple (all dates included)	Eastern	Rockshelter, Agave Pit	Large Agave Mounds
CK1091	Roadside Roast	A.D. 1210–1640	Multiple (all dates included)	Eastern	Rockshelter, Agave Pit	Large Agave Mounds
CK1083	Burial site	A.D. 1220–1400	Multiple (all dates included)	Eastern	Rockshelter, Agave Pit	Large agave mounds
CK2042	Yamashita 5S	A.D. 1290–1420	Multiple (Puebloan not included)	Eastern	Open Midden	Midden
CK2041	Yamashita 5N	A.D. 1300–1660	Multiple (earlier Puebloan component not included)	Eastern	Open Campsite?	None
CK6445	Yamashita 2	A.D. 1310–1955	Multiple (earlier dates not included)	Eastern	Open Campsite	Hearth with fire-cracked rock, hearth, 1 rock-lined hearth,
CK8163		A.D. 1400–1495	Unknown	Eastern	Agave pit	Large Agave Mounds
CK3073		A.D. 1450–1635	Unknown	Eastern	Agave pit	Large Agave Mounds
CK1164	The Shelf site	A.D. 1450–1950	Multiple	Eastern	Open Campsite	2 Rock circles, midden
CK3093		A.D. 1455–1655	Unknown	Eastern	Agave pit	Large Agave Mounds
CK1991	The Agave Ovens site	A.D. 1455–1950	Multiple (earlier component A.D. 680-1185 not included)	Eastern	Habitation, Agave pit	Large Agave Mounds
CK6080/6081	Ian's Rockshelter	A.D. 1470–1950	Multiple (earlier components not included)	Eastern	Open Midden	Rock-lined roasting pit
CK8013	Dune Field site	A.D. 1515–1950	Single?	Eastern	Open campsite	Rock-lined roasting pit
CK2954	Coyote Springs Rockshelter	A.D. 1520–1950	Single?	Eastern	Rockshelter	Berm, hearth
CK8172		A.D. 1525–1950	Unknown	Eastern	Agave pit	Large Agave Mounds
CK6446	Yamashita 3	A.D. 1530–1950	Multiple (earlier Puebloan component not included)	Eastern	Open Campsite	Hearth
CK6078/ 6095	Cedar Basin Midden	A.D. 1655–1955	Multiple (earlier component not included)	Eastern	Open Midden	2 Rock rings, midden
CK5434	Firebrand Cave	A.D. 1660+	Multiple (earlier components not included)	Eastern	Rockshelter	None
CK7932		A.D. 1680–1955	Unknown	Eastern	Agave pit	Large Agave Mounds
CK8047	Dart Shaft Shelter	A.D. 1680–1955	Multiple (earlier component not included)	Eastern	Rockshelter	Midden, hearth, rock circle, hearth with fire-cracked rock, sand-filled pit
NY1769	Barnett site	A.D. 1150–1955	Multiple (earlier dates not included)	Western	Open campsite	Hearth, midden
NY1964	Sever Tanks	A.D. 1280–1630	Single ?	Western	Open Campsite	Charcoal lens
NY1729	Fairbanks Spring	A.D. 1410–1460	Multiple (earlier dates not included)	Western	Open Campsite	Occupation Surface?
NY8004		A.D. 1525–1955	Single	Western	Rockshelter	Cache

Table 7.2. Summary of Materials Recovered from Excavated Post-Puebloan Sites.

Site No.	Points	Ceramics	Ground Stone	Basketry	Exotics	Obsidian Sources	Economic Plants	Faunal
CK1139	1 Rose Spring, 1 Parowan, 5 Cottonwood, 9 DSN	237 Lower Co. Buff, 15 Paiute (P) brown, 12 Virgin Series, 11 Tizon, 18 Prescott, 1 Fremont	8 Manos, 13 metates, 8 grinding slabs	None	Glass Beads, Shell beads, incised stones	Kane Springs, Wildhorse Canyon	Mesquite, chenopods, seepweed, squash, pine nuts, cactus, screwbean, maize	Artiodactyls, tortoise, rabbits, birds, small mammals
CK5	1 DSN, 1 Cottonwood Triangular	16 North Creek Corrugated, Dogoszhi style bowl	Unknown	Cotton cordage, S-twist yucca cordage	Shell beads	None	Corn, beans, squash, mesquite, rice grass, pine nuts	Artiodactyls, rabbits, tortoise
CK501/ 1528	Unknown	1969 Buff 28%, P. Brown ware 39%	Present	None	Unknown	None	Unknown	Unknown
CK3799		3 P. Brown ware, 26 North Creek Gray	None	None	None	None	Yucca seeds	Unknown
CK3601	4 DSN, 3Rosegate, 1 Elko, 2 Gypsum	645 Puebloan (66%), Buff (20%) and P. Brown	Present	None	Unknown	None	Unknown	Unknown
CK2461	None	None	3 Metates	None	None	None	Unknown	Tortoise, rabbits
CK6007	None	None	1 Metate	None	None	None	None	Small mammals
CK4	Unknown	Unknown	Unknown	Unknown	Unknown	None	Unknown	Unknown
CK4440	1 Elko Corner, 1 Rosegate	67 Logandale, 44 North Creek, 25 North Creek Corrugated, 21 Boulder Gray,	6 Pieces ground stone	None	6 Incised Stones	11 Wildhorse Canyon, Pumice Hole Mine	Hedgehog cactus	Tortoise
CK4446	17 Rosegate Series, 11 Desert Side Notched, 4 Cottonwood Triangular, 2 Elko, and 1 stemmed point	Lower Colorado Buff Ware (N=81), S.P Brown Ware (N=79), Tizon Brown Ware (N=6), Topoc/Tizon (N=4), Moapa Gray Ware (N=5), and North Creek Gray (N=3)	2 manos, 5 mano fragments, 1 basin metate, 11 metate fragments, and 7 ground stone fragments	Basket sidewall (close diagonal twining, S-twist weft), cordage (two-ply, Z-spun S-twist; two-ply S-spun, Z-twist; three-ply, s-spun, Z-twist, one-ply S and Z spun)	2 shell beads, 3 bone beads, 1 polished turquoise nugget, 1 polished	32 Devils Peak 4 Wild Horse Canyon (Rosegate point and debitage), Kane Springs (point fragment) Castle Mountain (Desert Side-Notched point	Agave leaves, devil's claw pod, piñon nut shells (n=40), and burned cactus	Tortoise, rabbits, rodents, and birds
CK1138	Agave knife, 1 DSN, 2 Dart,	20 Tizon, 1 Parker, 1 Buff, 1 NC Gray	2 Manos	Compound arrow foreshaft, sinew, fibers	Glass Beads	None	Mesquite, cattail, piñon nuts,	Tortoise, artiodactyl
CK6913	3 DSN	None	None	None	None	5 flakes, 1 DSN all Modena/Panaca	Yucca, goosefoot, rye, rush, popcorn flower, mesquite	Tortoise, rabbits, l/m mammals
CK4908	1 Pinto, 3 Rosegate, 20 DSN, 18 Cottonwood	29 % P. Brown and Corrugated, 69% Buff, 2% Gray	30 Pieces of ground stone	None	Metal arrowpoint, metal buttons, 3 shell beads	None	Pine nuts, Yucca, goosefoot, hedgehog cactus, bromus seeds, other cactus	Tortoise, rabbits

Site No.	Points	Ceramics	Ground Stone	Basketry	Exotics	Obsidian Sources	Economic Plants	Faunal
CK2605	3 DSN, 3 Rosegate, 2 Elko Corner, 1 Rose Spring	1 Logandale Gray, 1 Tusayan	1 fragment	None	None	None	Cactus, fruit, tuber, amaranthus seed, possibly maize	Large and small mammals
CK2459	None	None	2 Metate, 2 manos	None	None	None	None	Tortoise
CK6907	None	None	None	None	None	None	None	None
CK6146	1 Desert Side-Notched	None	None	None	None	None	Maize, cactus, mesquite, Cheno-ams,	None
LN2254	None	None	None	None	None	None	None	None
CK415	Unknown	Unknown	Unknown	Yucca plain weave Figure 8 sandal,	Unknown	No late points sourced	Unknown	Unknown
CK7454	1 Rosegate, 1 Cottonwood	237 Buff, 15 Paiute brown, 12 Virgin Series, 11 Tizon, 18 Prescott	1 Metate, 8 Mano fragments, 6 Palettes, 20 Slab Metate fragments	None	None	None	None	Tortoise
CK1282	Unknown	Buff, Parker red-on-buff, Tizon and S. Paiute brown	Unknown	*Typha* mat	None	None	Maize, mesquite, cactus, acacia, pine nuts	Tortoise, rabbits, ducks, artiodactyls
CK4415	3 DSN, 1 atlatl dart shaft	1 North Creek	2 Pieces ground stone	1 Twined sandal round toe, 1 Figure-8 sandal (A.D. 1510-1795), 1 firedrill	2 incised stones	None	Cactus, plantain, yucca	Tortoise, rabbits, chuckwalla, bighorn sheep
CK5701	None	None	1 Metate, 1 Mano	None	None	Modena/Panaca	None	Tortoise, Artiodactyl
LN4970	None	None	None	None	None	None	None	None
CK4038	3 Rosegate, 1DSN	12 P. Brown ware	4 Manos, 2 metates	Closed-twined winnowing tray A.D. 1240–1420	Disc shell bead, juniper bark	None	Coyote gourds, mesquite, squash, *Opuntia*	Tortoise, rabbits, birds
CK5712	Elko Corner Notched, Humboldt, Datil, Rosegate, 2 DSN	None	4 Manos, 17 metate fragments,	Cordage-2 ply, Z-spun, S-twist, yucca sandal	2 Shell beads	None	Hedgehog cactus, wild potato, buckwheat, yucca	Tortoise, rabbits, antelope, artiodactyls
CK1081	2 Cottonwood, 16 DSN, 5 Rose Spring, 2 Eastgate	32% Gray, 29% Gray Corrugated, 6% Buff, 2% Brown	1 Metate, 6 Manos, 21 pieces of ground stone	None	1 Incised stone, 5 shell beads	None	Unknown	Tortoise,
CK1091	28 Elko, Humboldt, Rose Spring	9 Verde Gray, 5 Gray Corrugated	Unknown	None	None	None	Unknown	Tortoise
CK1083	2 DSN, 1 Rose Spring	North Creek plain and corrugated	1 Metate	N/A	None	None	Unknown	Unknown
CK2042	Unknown	Corrugated Pueblo Brown	Unknown	None	Unknown	None	Unknown	Unknown
CK2041	Unknown	50% Corrugated	Unknown	None	DSN Point	Unknown Source	Unknown	Unknown
CK6445	None	Paiute Brown ware	Unknown	None	Unknown	2 DSN points Modena/Panaca	Unknown	Unknown

Site No.	Points	Ceramics	Ground Stone	Basketry	Exotics	Obsidian Sources	Economic Plants	Faunal
CK8163	Unknown	Unknown	Unknown	Unknown	Unknown	Kane Springs	Unknown	Unknown
CK3073	Unknown	Unknown	Unknown	Unknown	Unknown	None	Unknown	Unknown
CK1164	10 Elko, Rose Spring, DSN	133 Sherds, buff 29%, gray 20%, red 17%, brown 2%	16 Metates, 10 manos	None	1 Shell bead	None	Unknown	Tortoise
CK3093	Unknown	Unknown	Unknown	Unknown	Unknown	Modena/Panaca	Unknown	Unknown
CK1991	4 Elko, 1 dart, 1 Cottonwood	72 Patayan, 46 Puebloan	6 Millingstones	None	None	Timpahute, Kane Springs, Modena, Delmar	Agave, pine nut, goosefoot seeds	None
CK6080/ 6081	DSN points	Buff ware dominant, brown, ware, gray ware	Ground stone	None	Quartz crystal, shell and glass beads	2 DSN points from Partridge Creek and Black Tank, flakes from Modena, Wild Horse, Kane Springs	Goosefoot, pine nuts, grasses, tansy mustard	Bighorn sheep, artiodactyls, rabbits, tortoise
CK8013	3 DSN points	8 Brown ware, 86 corrugated	2 Millingstones	None	Lead musket ball	Modena/Panaca, Kane Springs	None	Tortoise, Artiodactyl, rabbits
CK2954	6 DSN points	4 Paiute brown, 3 Virgin Series	4 Metate pieces	None	3 incised stones, 14 glass beads	Modena/Panaca, Kane Springs	Saltbush, seepweed, cheno-am, sedge, bulrush	Tortoise, chuckwalla, waterfowl, rabbits, artiodactyls
CK8172	Unknown	Unknown	Unknown	None	Unknown	None	Unknown	Unknown
CK6446	Unknown	Unknown	Unknown	None	Unknown	2 DSN points Modena/Panaca	Unknown	Unknown
CK6078/ 6095	4 Elko,	9 Buff, 7 Logandale, 14 Moapa, 28 Tusayan	1 Handstone	None	None	None	Pine nut	Artiodactyl
CK5434	None	None	None	Arrow shaft with V-shaped notch	None	None	None	None
CK7932	Unknown	Unknown	Unknown	Unknown	Unknown	None	Unknown	Unknown
CK8047	Dart point	1 Brown ware, 1Shivwits, 2 Tusayan	1 Piece of ground stone	None	None	None	None	Tortoise, Artiodactyl, rabbits
NY1769	Unknown	Brown ware	Unknown	None	Unknown	None	Unknown	Unknown
NY1964	1 Rose Spring, 2 Arrow points	5 Brown ware, 3 corrugated brown ware, 1 Snake Valley	1 Mano, 1 Millingstone	None	1 Incised stone	None	None	None
NY1729	None	None	3 Pieces	None	None	None	Prickly pear, Thornberry	None
NY8004	None	None	Millingstone	Twined winnowing tray	None	None	Unknown	Unknown

cordage, possible basketry fragments coated with pine resin, and a small assemblage of pottery consisting of 2 Pyramid Gray, 1 Moapa Black-on-gray, and 1 Tusayan White Ware sherds. The hut had burned and it is possible that some of this material could be located in museum collections and radiocarbon or luminescence-dated. The dominant pottery type in the upper levels of the entire site were buff wares and Great Basin Brown Ware represented less than 2 percent of the assemblage from the strata.

Recently, Far Western (Gilreath 2012) obtained eight radiocarbon dates from basketry, cordage, and other perishables collected from the Catclaw Cave excavations (Wright 1954). The items yielded a calibrated date range of A.D. 1283–1665, which suggests the shelter's small habitation structure, roasting pits, and cache pits likely date to this period. The pottery assemblage was dominated by Pyramid Gray and other Patayan buff wares, and the ephemeral habitation was a shallow, concave, semi-rectangular depression (.85 x 1 m) with a partially plastered floor. Postholes were found in each corner and some of them were rock-lined. The house floor contained pits with fish bones, willow string, and a yucca pod; a Pyramid Gray sherd was found on the plastered surface.

This feature is the only Patayan habitation feature that has been excavated in the region, and its late date points to an ancestral relationship to the modern Mojave and Colorado River Tribes. The structure does not resemble the Puebloan or Southern Paiute ephemeral brush structures that have been excavated in the Las Vegas Valley and at Willow Beach. Instead, its subrectangular shape suggests ties to the Hohokam region or to other lower Colorado River groups. This connection to the Colorado River region of Arizona is supported by the coiled baskets, which according to Wright (1954:52) resembled Pima or Papago baskets. The figurines found at the site have stylistic similarities to Hohokam artifacts, particularly their narrow pinched noses (Neitzel 1991). They also resemble figurines collected during the Lost City excavations (Shutler 1961: Plate 78) and from Black Dog Cave (Winslow and Blair 2003). Long-distance travel or trade is indicated by the presence of a bison horn core and cotton string. The presence of gourds, maize, and fish bones indicate a farming economy supplemented by fishing, which is entirely consistent with historic Mojave strategies (Roberts 2010).

Central Region

Twenty-six archaeological sites contain components with radiocarbon dates that fall within the Post-Puebloan period (Table 7.1, Figure 7.3). Most of the sites are located in the Las Vegas Valley or in the southern foothills of the Las Vegas Range, in the vicinity of Apex. Two sites are situated on the northern edge of the Central Region at Desert Lake in the Desert National Wildlife Refuge. All of these sites are located in the valleys or in the low foothills surrounding the Valley. Many large sites with Great Basin Brown Ware and buff ware pottery have been reported in the Sheep Range and Springs Mountains (Harper 2012; Kathleen Sprowl, 2011 personal communication); however, none of them have been excavated and reports are not available for the large surveys that have been conducted there. In summary, most of the excavated sites are located in Las Vegas Valley or the surrounding foothills, and most of these sites were excavated because of urban expansion.

Sites excavated in the Central Region fall into several different types including rockshelters (n=12), open camps with or without, small thermal features (n=10), middens (n=2), fragile pattern sites (n=1), and cache sites (n=1). Many of these sites were occupied during the prior period and use continued throughout the Post-Puebloan period. In a few cases these sites continued to be used into the Historic period. The largest rockshelters, such as Flaherty and Gypsum Cave, were continuously occupied since the Archaic period, but the majority of the rockshelters that date to the period were first used after A.D. 900. The behavior associated with this shift from open sites to sheltered ones is discussed later in this chapter.

No formal habitation features have been excavated in the Central Region's excavated Post-Puebloan sites. Most sites are small rockshelters and open sites that contain associated hearths, small roasting pits, or large agave roasting mounds. Wild plants and animals dominate the subsistence record for this period (Table 7.2), although maize pollen was recovered from two storage pits with a date range of A.D. 1430 to 1620 at the Larder site. Maize was also recently dated to the early nineteenth century

from a house (House 46) at site 26CK8411 in the Moapa Valley (Gilreath 2012: Table 17). Archaeological evidence is accumulating across the Southern Paiute culture area for maize cultivation by Post-Puebloan groups in the Southern Paiute culture area (Allison et al. 2008). Wild plants recovered from the sites in the Central Region indicate that mesquite, chenopods, pine nuts, screwbeans, yucca, grass seeds, and various cactus species were important foods. Taken together these data support a model of settlement mobility with a mixed economy and periodic movement to wild resource patches. This model is consistent with historic Southern Paiute subsistence strategies as outlined by Kelly's consultants for southern Nevada (Fowler 2010).

Sites in the northern portion of the Central Region are more likely to be associated with Great Basin Brown Ware; in the eastern Central Region gray wares are present; and buff wares dominate the Post-Puebloan site assemblages recovered from sites in Clark County Wetlands Park and at sites on lower Duck Creek. At the Corn Creek Dunes site Great Basin Brown Wares are associated with Post-Puebloan features, and the brown ware pottery was made with the same temper as the earlier gray wares.

Desert Side-Notched points dominate the projectile point assemblages recovered from components excavated in the Central Region (Table 7.2). If these projectile points (n=99) are tallied according to type, Desert Side-Notched represents 49 percent; Rose Springs make up 24 percent; Cottonwood Triangular represent 21 percent; and the remaining types including Parowan, Elko Side Notched, and Gypsum, each make up less than 3 percent.

Eastern Region

Twenty archaeological sites contain components with radiocarbon dates that fall within the Post-Puebloan period (Table 7.1, Figure 7.3) in the Eastern Region. Most of the sites are clustered in the California Wash area on the eastern edge of the Eastern Region or in the Gold Butte area where Far Western recently conducted test excavations. Two of the sites are located in the upper Moapa Valley along the Muddy River and radiocarbon dates associated with this period were also recovered from the Yamishita sites on the lower Muddy River; these are described in Appendix D. These sites were excavated for thesis research, for resource management, and for development projects, and their location and distribution probably does not reflect prehistoric settlement preferences.

Sites excavated in the Eastern Region fall into several different types including rockshelters (n=6), open camps with or without thermal features including agave mounds (n=6), and middens (n=3). No fragile pattern sites or open cache sites have been investigated in this region. Formal habitation features are also missing, although earlier Puebloan habitation structures were frequently reused. The majority of the sites are small rockshelters and open camps with associated hearths, small roasting pits, or large agave roasting mounds. Agave mounds are particularly well represented in the Gold Butte and California Wash areas; many of these sites also contain earlier components.

Economic plant data have been recovered from only four of these sites, and the wild plants represented in the samples processed include goosefoot, pine nuts, grasses, tansy mustard, saltbush, seepweed, cheno-ams, sedge, and bulrush (Table 7.2). As mentioned previously, maize was recently radiocarbon dated to the early nineteenth century from a house (House 47) at site 26CK8411 in the lower Moapa Valley (Gilreath 2012: Table 17). Harrington (1930b) reported that Paiute Cave, which has not been radiocarbon dated, contained stratigraphic evidence that maize was stored in pits during the Post-Puebloan occupation of that site.

Most sites in the Eastern Region contain mixed assemblages of gray wares, Great Basin Brown Ware, and buff wares. Buff wares were common pottery at the Post-Puebloan sites in the Gold Butte region (McGuire et al. 2010), and Great Basin Brown Ware is most often associated with sites in the Moapa Valley. The temporal and cultural implication of these assemblages is discussed in great detail later in this chapter.

As in the Central Region, Desert Side-Notched points dominate the assemblages from excavated sites in this area (Table 7.2). If the total number of points are tallied from excavated sites (n=46) in this region the percentages of each types are as follows: Desert Side-Notched represent 57 percent; Rose

Springs make up 13 percent; Elko Corner Notched represent 17 percent; Cottonwood Triangular represent 6 percent; and Eastgate points make up 4 percent of the total.

NVCRIS SURVEY DATA

As argued in the preceding discussion, Desert Side-Notched points are the most temporally diagnostic artifact for this time period. Cottonwood Triangular points are also common. One hundred eleven sites in the NVCRIS database have Desert Side-Notched or Cottonwood Triangular points and most of these sites are not associated with pottery (Figure 7.4). Of those sites associated with pottery, 24 contain brown ware (Figure 7.5), 22 contain gray ware, 4 contain buff ware (Figure 7.6), and 6 have corrugated gray ware. Because many of the NVCRIS sites are palimplisets of numerous reoccupations, the author argues that brown, gray, and buff plain wares are temporally and culturally problematic and recommends that these data should be used cautiously. With that caveat, Figure 7.7 shows the types of Post-Puebloan sites and their distribution across the project area. The sites occur throughout southern Nevada, but are particularly concentrated in the arid slopes in rockshelters and in well-watered locales away from the valley bottoms (Figure 7.4).

Figure 7.4 shows that sites with Desert Side-Notched points are common in all the geographic regions except for the Southern Region. They have been reported at sites in the valley bottoms, the foothills, around well–watered locales, such as Ash Meadows, and they are also found throughout the Spring Mountains. When Cottonwood Triangular points are added (Figure 7.5), the Southern Region is also represented. Many of the sites with Cottonwood Triangular or Desert Side-Notched points also contain brown ware ceramics (this category includes Great Basin Brown Ware et al. such as Tizon Brown). Figure 7.6 shows that sites with either of these two point types and buff ware pottery are rarer, and surprisingly they are not as common in the Southern Region as one might expect.

The distribution of Post-Puebloan sites in our NVCRIS database is shown in Figure 7.7. Here we define Post-Puebloan Period sites as containing brown ware pottery, buff ware pottery, Desert Side-Notched points, or Cottonwood Triangular points. Post-Puebloan Period rockshelter sites, open camps with thermal features, and midden sites have been recorded in all four of the geographic regions. Many of the sites with Desert Side-Notched points recorded in the Las Vegas Valley do not show up on this figure because these sites do not contain thermal features, rockshelters, or midden deposits and they are not associated with brown ware pottery.

DISCUSSION AND INTERPRETATION

Chronology

One hundred thirty-eight radiocarbon dates (not including 14 modern dates) that fall into the Post-Puebloan period have been obtained from 51 excavated sites in the project area (Figure 7.2). This represents 35 percent of all of the dates accumulated for southern Nevada. What these dates demonstrate is that the region continued to be used extensively during and after the abandonment of southern Nevada by the Virgin Puebloans. A cursory look at the distribution of the mean dates for the Post-Puebloan period shows that with two exceptions the dates are fairly evenly distributed throughout the period. Only during the 1200s (see Figure 6.4) and 1500 and 1600s do the numbers fall from approximately 20 radiocarbon dates per century to four or five dates per century.

Although these data provide insight into the changes in the number of dated components through time, it should not be viewed as representative of the actual human population. The record is probably biased by a host of factors including site formation processes, visibility, the locations of modern development projects, and other events that can effect preservation, destruction, discovery, and excavation. Forty (78 percent) of the 51 excavated Post-Puebloan period sites contain multiple components or frequent episodes of reoccupation and reuse. This can be seen visually in Figure 7.8.

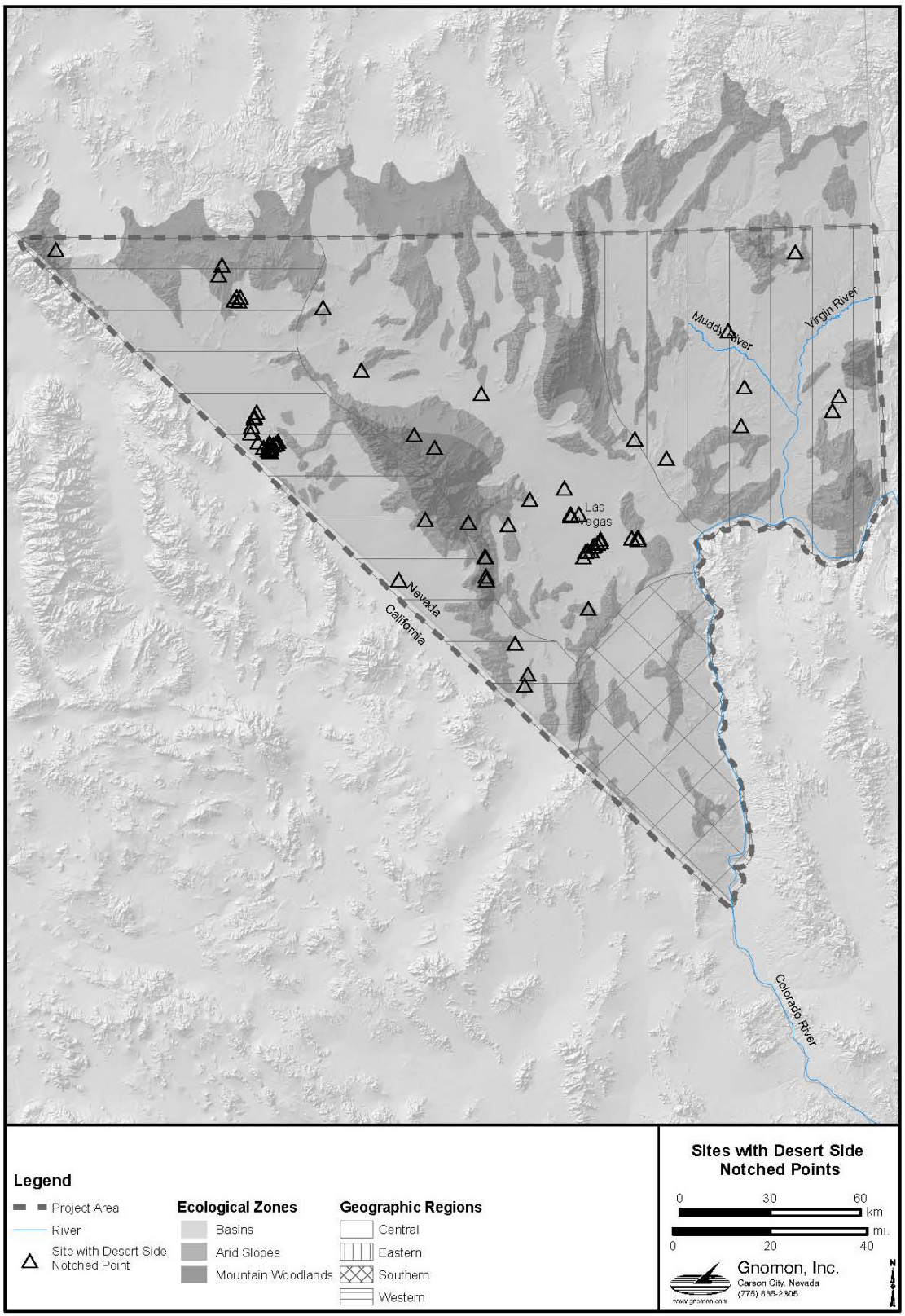


Figure 7.4. NVCRIS sites with Desert Side-Notched points.

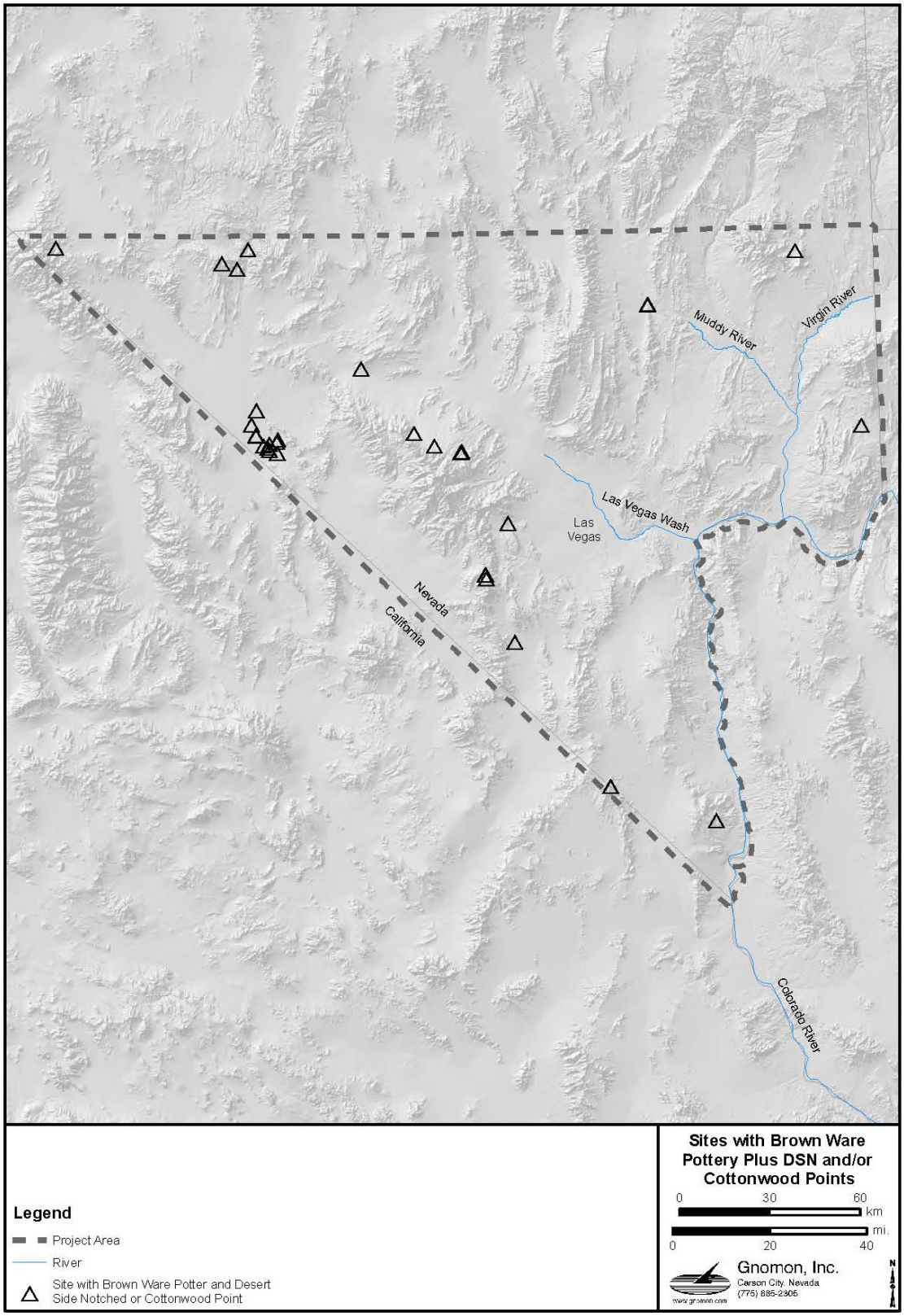


Figure 7.5. NVCRIS sites with Desert Side-Notched or Cottonwood Points and brown ware pottery

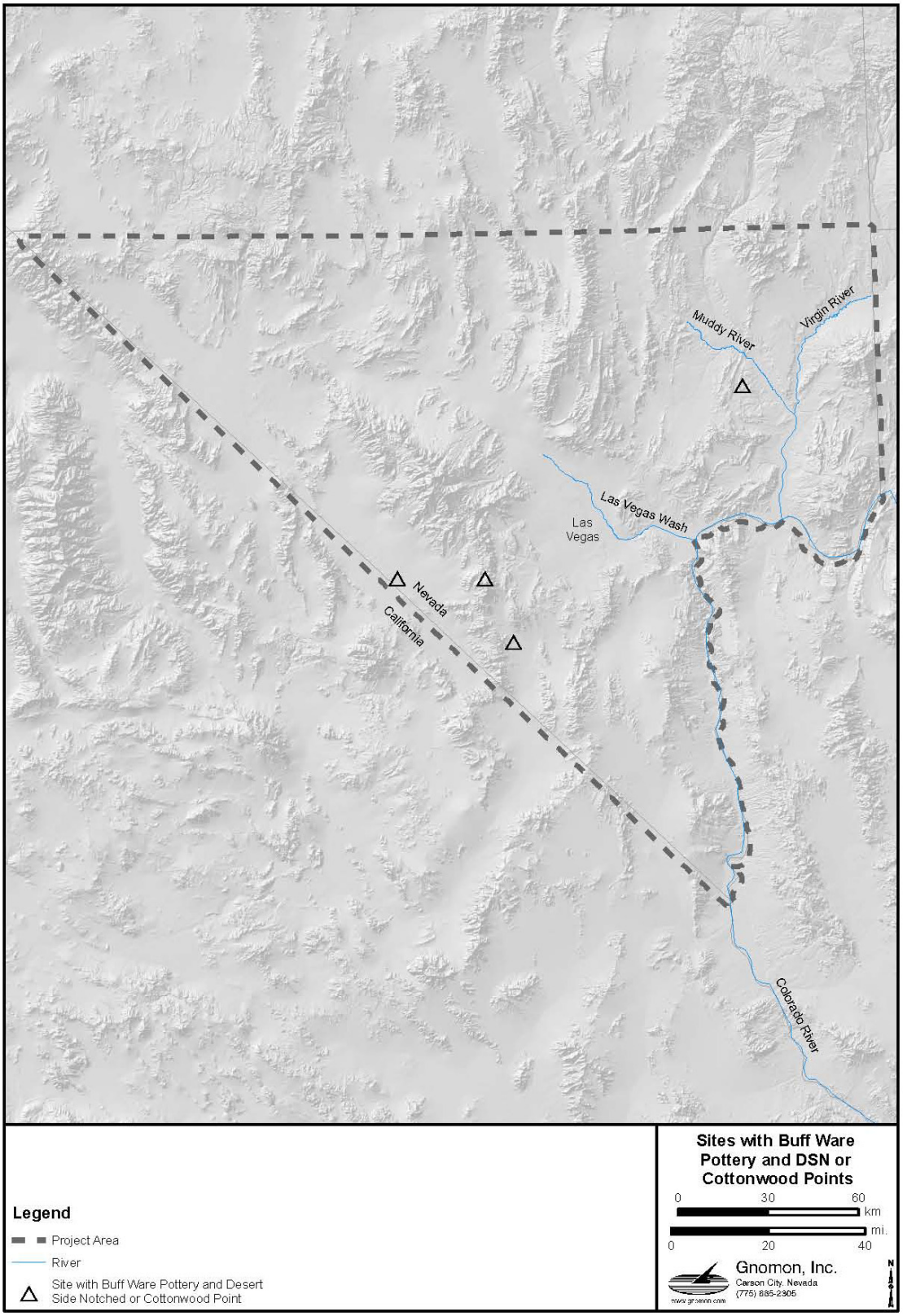


Figure 7.6. NVCRIS sites with buff ware pottery and Desert Side-Notched or Cottonwood Triangular points.

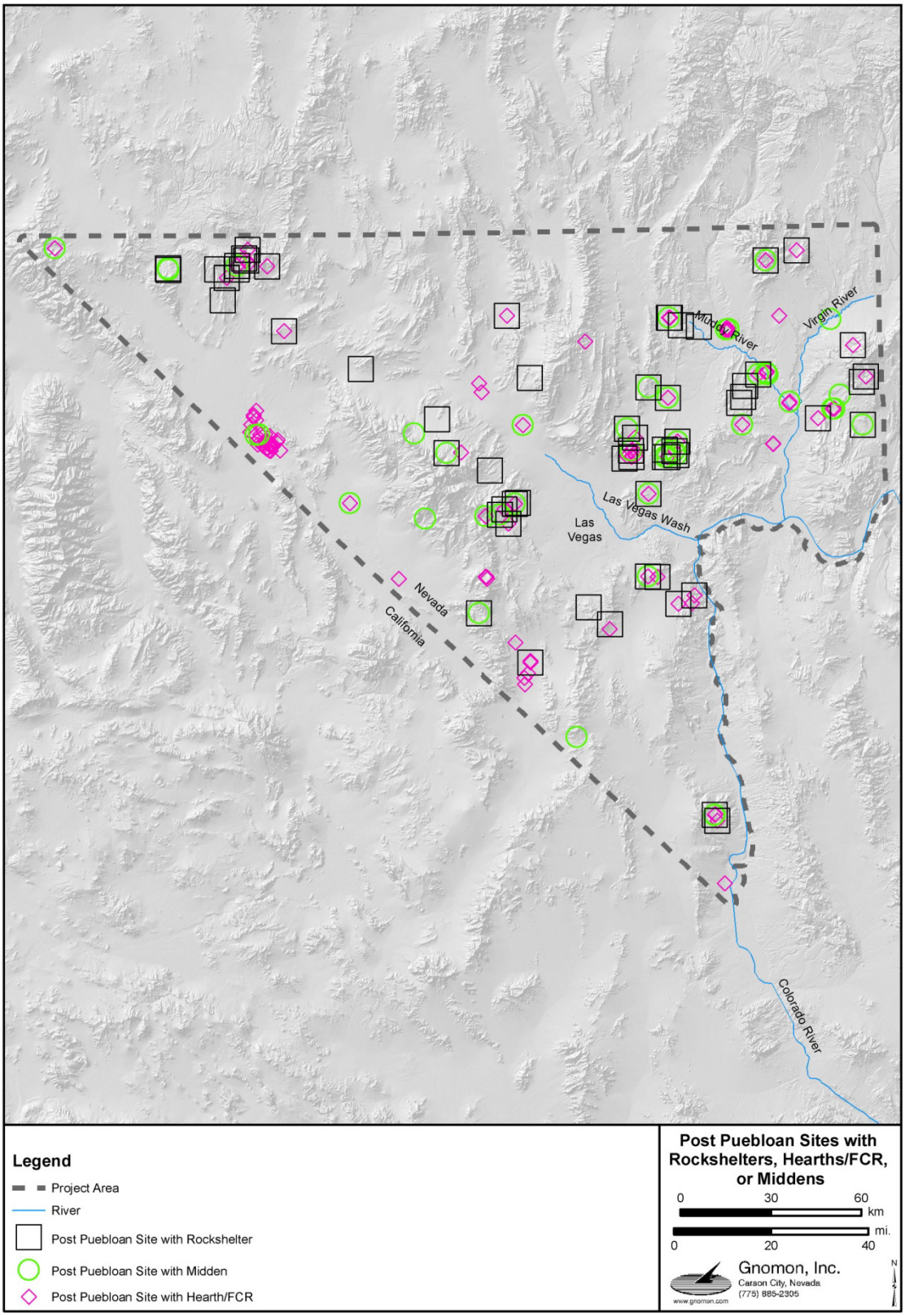


Figure 7.7. NVCRIS Post-Puebloan sites and their distribution across southern Nevada.

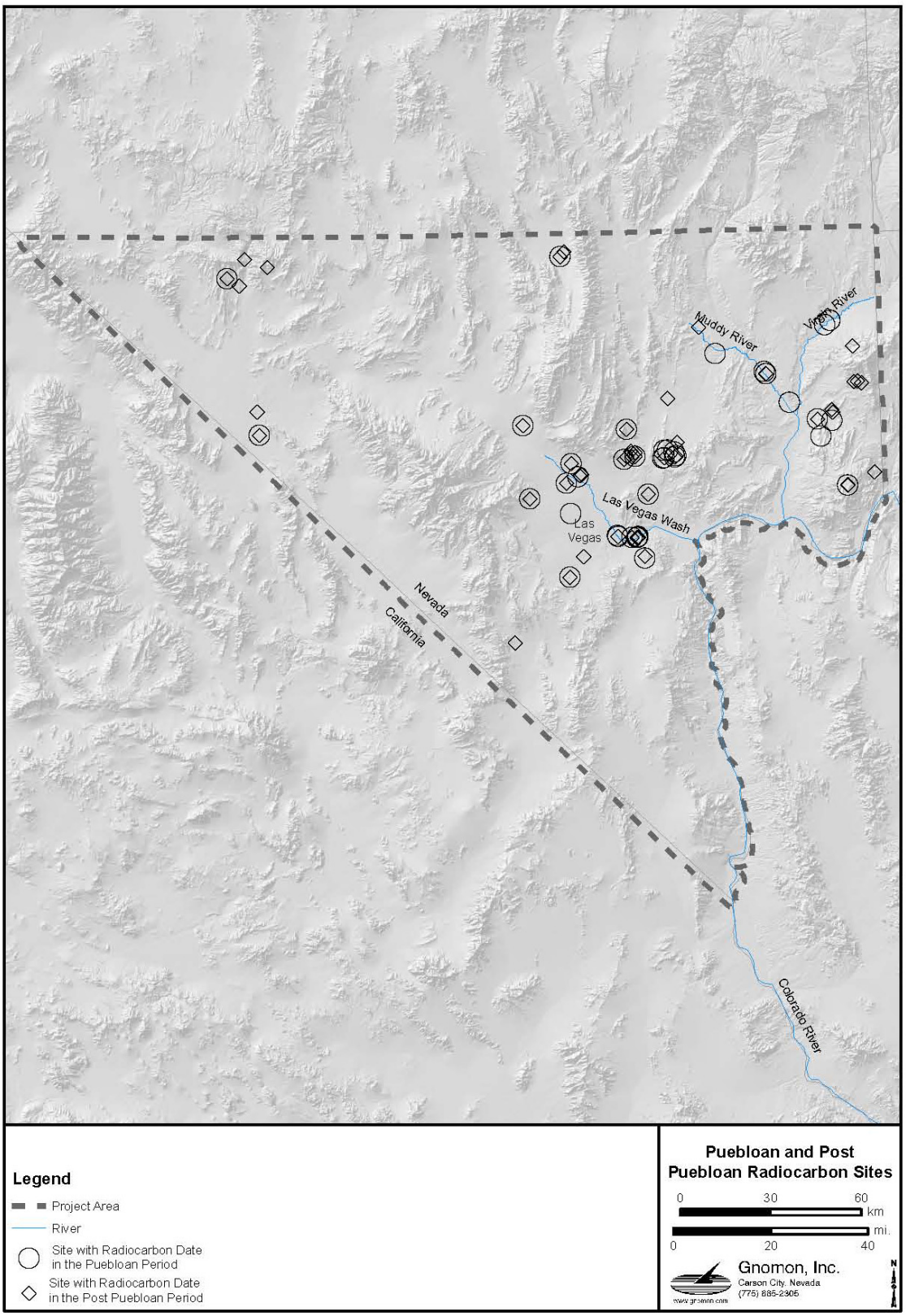


Figure 7.8. Puebloan and Post-Puebloan radiocarbon–dated sites in the project area.

PROJECTILE POINTS

Single component sites that contain only one episode of use, or were used for a short period of time, can shed light on what artifacts are temporally sensitive during this period. Regional archaeologists generally consider the Desert Side-notched points (includes Sierra Side-notched and Delta Side-notched) and the Cottonwood Triangular points to be diagnostic types for this period (Jennings 1986: Figure 3; Justice 2002a, 2002b; Warren and Crabtree 1986:192), and both point styles are widely distributed throughout the Great Basin and Southwest (Justice 2002a: Map 46; Justice 2002b). Justice (2002b) shows the distribution of Cottonwood Triangular points as extending north to Oregon and southern Idaho, west to the California coast, and east to western New Mexico and Colorado. Desert Side-Notched points are typically viewed as a Great Basin style; however, following Justice (2002a, 2002b) they closely resemble Pueblo Side-notched points. If Pueblo Side-notched points are grouped with Desert Side-Notched then their distribution covers California, the Great Basin, and most of the greater Southwest (Justice 2002b: Map 43). Both the Pueblo Side-notched and Desert Side-Notched points are found in the archaeological record after A.D. 1150, and their use continues into the Historic period. Justice (2002a: 368) concluded that Cottonwood Triangular points appear in the archaeological record slightly earlier, around A.D. 900. Their use also extends into the Historic period.

Of the 11 single-component radiocarbon-dated Post-Puebloan sites or short occupation sites in our project area, four contain projectile points, and all but one of these four sites contains Desert Side-Notched points to the exclusion of other types (Tables 7.1 and 7.2). Three Desert Side-Notched points were recovered from a small campsite (26CK6913) occupied between A.D. 1300 and 1400 in the Central Region (King et al. 2006); one of the obsidian points was sourced to the Modena/Panaca source. In the Eastern Region two single component sites, the Coyote Springs Rockshelter (26CK2954) (Harper 2006) and the Dune Field site in the Gold Butte region (26CK8013) contained only Desert Side-Notched points; Coyote Springs Rockshelter had six points and the Dune Field site had three. Both of these sites were occupied sometime between A.D. 1520 and 1950. Euroamerican artifacts found at the sites demonstrate use as late as the early Historic period. Only one of the single component sites, Sever Tanks, which was located in the Western Region of the project area, did not have Desert Side-Notched points. The three projectile points collected during the test excavations at that site included one Rose Springs point and two unknown types (Pippin 1984).

Cottonwood Triangular points were not recovered from any of the single component Post-Puebloan sites, but they were well–represented in multiple component sites. Cottonwood Triangular points were associated with six (15 percent) of the multiple component sites and Desert Side-Notched points were recovered from 14 (35 percent). Only four sites contained both Cottonwood Triangular and Desert Side-Notched points and three (26CK5, 26CK1139, and 26CK4908) of these four sites were located in the Central Region. The fourth site—26CK1081—is a small rockshelter located in the Eastern Region.

Five rockshelters (26CK5 [Room 1], 26CK1081, 26CK1139, 26CK4038, and 26CK5712) were used extensively throughout the Post-Puebloan period with occupation beginning around A.D. 950; they contained Elko Corner notched, Rosegate, Humboldt, Cottonwood Triangular, and Desert Side-Notched points. Garrett's Shelter (26CK5712) contained a dart-like point. This point type has been reported throughout the Southwest between 1600 B.C. and A.D. 300 (Justice 2002b:174). Elko Corner- Notched points are common throughout the Great Basin and Southwest between 1500 B.C. and A.D. 700 (Justice 2002a:312), while Rosegate (Rose Spring Corner-notched, East Gate Expanding Stem, and Parowan Basal-notched) are common in the Great Basin and are associated with the introduction of the bow around A.D. 500 to A.D. 1300 (Justice 2002a).

In summary, the data from these sites suggest that Desert Side-Notched points are the most temporally sensitive projectile point style of the Post-Puebloan period in southern Nevada. While other point types maybe associated with this period, Desert Side Notched points appear to have been introduced to the area after A.D. 1200.

POTTERY

The focus of this discussion is on pottery as a temporal marker, with special attention on the changes in the types and distribution of wares collected from excavated and radiocarbon–dated Post-Puebloan components in the study area. Probably the most dramatic change in the pottery during this period is its overall prevalence; the quantities drop from thousands of potsherds at individual habitation sites in the Moapa Valley, to dozens of sherds at individual sites. In this section the discussion will initially focus on the quantities and types of pottery recovered from single and multiple component sites, and then review the distribution of pottery types. This will include an examination of changes in pottery styles temporally and spatially across the project area—west to east.

Most of the single component sites that date to this period lack associated pottery, in fact, only three (Sever Tanks, Dune Field site, and Coyote Springs Rockshelter) out of 11 single component Post-Puebloan sites contain pottery. The Dune Field site (26CK8013), located in the Gold Butte area, post–dates A.D. 1515. Eight Great Basin Brown Ware sherds and 86 corrugated Great Basin Brown Ware sherds from a single vessel were recovered from the site. A lead musket ball found on the surface of the site supports an Early Historic period date. The Sever Tanks site (26NY1964) is located in the Western Region and was investigated as part of the Yucca Mountain Project (Pippin 1984; Rhode 1994). The pottery assemblage from this site included five plain Great Basin Brown Ware sherds, three corrugated and/or incised Brown Ware sherds, and one Snake Valley Gray Fremont sherd. A thermoluminescence date of A.D. 1081±100 was obtained from one of the obliterated corrugated brown ware sherds and a luminescence data of A.D. 1812±14 was obtained from a plain brown ware sherd (Table 7.3). The third site, the Coyote Springs Rockshelter (26CK2954), also had associated historic Euroamerican artifacts. Four Great Basin Brown Ware sherds and three Virgin Series sherds were found in the rockshelter. Luminescence dates were obtained on four of these sherds. Three dates, on a North Creek Black-on-gray sherd (Table 7.3) and two brown ware sherds, fell within the expected eighteenth-century range. A fourth sherd, a North Creek Gray sherd with an everted rim, dated to A.D. 1250±38.

In her article on the Numic Expansion, Lyneis (1994) closely examined the region's archaeological record with the goal of tracing the arrival of Great Basin Brown Ware in southern Nevada. Based on her reevaluation of the Great Basin Brown Ware collected during the Lost City excavations she was able to dismiss Shutler's (1961) claims that the Southern Paiute occupation overlapped because he mistakenly identified Shivwits Plain Ware as Great Basin Brown Ware. She also noted that the large ceramic assemblages, recovered from four late sites in the Moapa Valley—the Steve Perkins Site, Bovine Bluff, and Mesa House—entirely lacked Great Basin Brown Ware ceramics.

Other claims for contemporaniety are more difficult to dismiss. Conaway and O'Malley caves, located just north of the present project area in the Meadow Valley, contained stratified cultural deposits with undisturbed strata that included Virgin Puebloan, Fremont, and Shoshonean pottery. Fowler et al. (1973) concluded that the wares were contemporaneous. In 1994 David Rhode directly dated some of the pottery recovered from these levels using thermoluminescence dating. The dates, shown in Table 7.3, lend support to the excavator's conclusion that the brown ware and gray ware types may indeed be contemporaneous. Lyneis recently recovered brown ware pottery from the Virgin Puebloan Yamashita sites and her radiocarbon dates and luminescence dates on brown ware and North Creek Gray lend additional support to the possibility that both pottery types were made in the Muddy River area in the early part of this period (Table 7.3).

If we assume that the luminescence dates shown in Table 7.3 are a correct reflection of the pottery's manufacture date, then we must conclude that Great Basin Brown Ware was made in the region as early as A.D. 800. Furthermore, the Virgin Series Gray Wares and Fremont Gray Wares continued to be produced much later than previously assumed. A pottery vessel that John Wesley Powell obtained from the Moapa Band of Paiutes sometime between 1867 and 1880 is a North Creek Gray olla with blurred red pigment lines running down the sides of the vessel from the neck (Fowler and Matley 1979:84). Previous investigators thought that the vessel was a curated item, yet the luminescence dates on gray ware recovered from the Coyote Springs Rockshelter near Moapa were also late.

Table 7.3. Thermoluminescence Dates on Pottery Collected from Post-Puebloan Period Components

Lab Sample	Site Number	Sample Type	Cat #	Provenience	Age Years A.D.	Reference
UW1056	26CK2954	Great Basin Brown Ware	FN 57	24N26E, Stratum A	1820±52	Harper 2006
UW1057	26CK2954	North Creek Black-on-gray	79	23N23E, Stratum A	1749±42	Harper 2006
UW1058	26CK2954	Great Basin Brown Ware	179	21N26E, Stratum A	1793±22	Harper 2006
UW1059	26CK2954	North Creek Gray (Everted rim)	155	20N24E, Stratum A	1250±38	Harper 2006
UW1074	26CK2042 Yamashita-5S	North Creek Corrugated	A232-0781	298N105W, -55 to -62 cm.	1274±58	Lyneis Chapter 6
UW1075	26CK6445 Yamashita -2	Great Basin Brown Ware	A229-3348	210N80W, -30 to -35 cm	1521±59	Lyneis Chapter 6
UW1076	26CK6445 Yamashita-2	Great Basin Brown Ware	A229-3722	212N64W, -30to -40 cm	1312±77	Lyneis Chapter 6
UWTL-64	26NY1964, Sever Tanks	Brown ware, obliterated finger-impressed corrugations	N/A	Unknown	1081±100	Rhode 1994
UWTL-81	26NY3042, Dune Wash	Brown ware	N/A	Unknown	1496±35	Rhode 1994
UWTL-83	26NY3022, Azrael Ridge	Brown ware	N/A	Unknown	1532±28	Rhode 1994
UWTL-67	26NY1964, Sever Tanks	Brown ware	N/A	Unknown	1812±14	Rhode 1994
UWTL-84	26NY3055, Prow Pass	Brown ware	N/A	Unknown	1814±14	Rhode 1994
UWTL-63	26NY5842	Brown ware	N/A	Unknown	1836±19	Rhode 1994
UWTL-89	Conaway Shelter	Snake Valley Gray	FS78/8	Feature 20, Stratum IV	1066±74	Rhode 1994
UWTL-88	Conaway Shelter	Brown ware	FS 78/9	Feature 20, Stratum IV	822±105	Rhode 1994
UWTL-91	O'Malley Shelter	Snake Valley Black-on-gray	FS 195/20	Stratum 17, Unit V	1512±41	Rhode 1994

What can the rest of the sites that were used over a period of hundreds of years tell us about the earliest and latest manufacture dates for these pottery types? Does a pattern emerge if we group the sites together into two hundred-year intervals: A.D. 1200–1400, A.D. 1400–1600, and post A.D. 1600? Eight sites (Gypsum Cave-Room 1, Burial site, Pardee site, 26CK6007, Yamashita 5S, Tule Springs Locus 41, 26CK6913, and 26CK6907) have radiocarbon date ranges that fall exclusively within the A.D. 1200 to 1400 period, and half of these are associated with pottery. Significantly, three of these sites contain only North Creek Gray, North Creek Corrugated, or North Creek Black-on-gray pottery, and one component (Yamashita 5S) is dominated by North Creek Corrugated. The fourth site, the Pardee site contained three Great Basin Brown Ware sherds and 26 North Creek Gray sherds.

There are four sites (Larder site, Fairbanks Spring, 26CK8163, and 26LN2254) with components that date to the next 200-year period, between A.D. 1400 and 1630, and *none* of these components are associated with pottery. Four sites contain components (Cedar Basin Midden, 26CK7932, Dart Shaft Shelter, and Firebrand Cave) that post-date A.D. 1600; all are located in the Gold Butte area. Pottery was associated with two of the sites including the late component at the Cedar Basin Midden, which contained 9 buff ware sherds, 7 Logandale Gray, 14 Moapa Gray, and 28 Tusayan Gray Ware sherds; and the late component at Dart Shaft Shelter, which included 1 Paiute Brown ware, 1 Shivwits Plain, and 1 Tusayan Gray Ware sherd.

These patterns do not appear to be random, and although the numbers of sites are too few to suggest statistical significance, sites excavated in the future should be evaluated for these trends. If the patterns do reflect cultural practices and behaviors then what could they mean? The dominance of North Creek Gray, found in the earliest sites to the exclusion of other pottery types, was followed by a dearth of pottery in the next two centuries. This distribution may represent continued manufacture of North Creek Gray by Puebloans into the 1300 or 1400s, and then abandonment by of the region by these groups between 1400 and 1600. The argument for continued manufacture is supported by the luminescence dates from the Coyote Springs site. The pattern of variable pottery types in the Gold Butte area, if it is in fact a valid trend and not simply the result of component mixing, could reflect an eastern migration by Virgin Puebloans. In fact, radiocarbon dates and the prevalence of corrugated pottery in that area hints that use of the Gold Butte area spiked after the Pueblo II period (McGuire et al. 2010: Figure 99). Could this area

have served as a refugia for Puebloan populations or a seasonal resource procurement area for Virgin Puebloans who migrated to the Upland regions of the Virgin Mountains and Shivwits Plateau?

What is the chronological relationship between Puebloan and Patayan pottery in the region? The radiocarbon-dated Post-Puebloan components in the present project area frequently contain mixed assemblages of pottery represented by Great Basin Brown Ware, Lower Colorado Buff Ware, Tizon Brown Ware, and Puebloan wares. Figure 7.9 shows that Patayan pottery is dominant in dated sites that have small assemblages. If pottery assemblages are examined on a region-by-region basis there is a *tendency* for sites in the Western Region (Ash Meadows) to be dominated by Great Basin Brown Ware. The northern and eastern halves of the Central Region (Corn Creek, 26CK4440, 26CK4908, Burnt Rock Mound, Rattlesnake Site, 26CK1164, Yamashita late components) *tend* to be dominated by Puebloan and Great Basin Brown Wares. Sites in the southern edge of the Central Region, for example in Clark County Wetlands Park (26CK1139, the Berger site, 26CK1138, 26CK7454, and 26CK1282) are dominated by Patayan Wares (Ahlstrom 2003b; Brooks et al. 1975; Rafferty 2008; Seymour 1997). Puebloan and Great Basin Brown Ware dominate the pottery assemblages of sites in the Moapa Valley and California Wash areas; however, the Gold Butte Area is dominated by Patayan types. During the Puebloan Period Patayan pottery types are documented at Lost City sites (Lyneis 1988), although not in the quantities claimed by Shutler (1961).

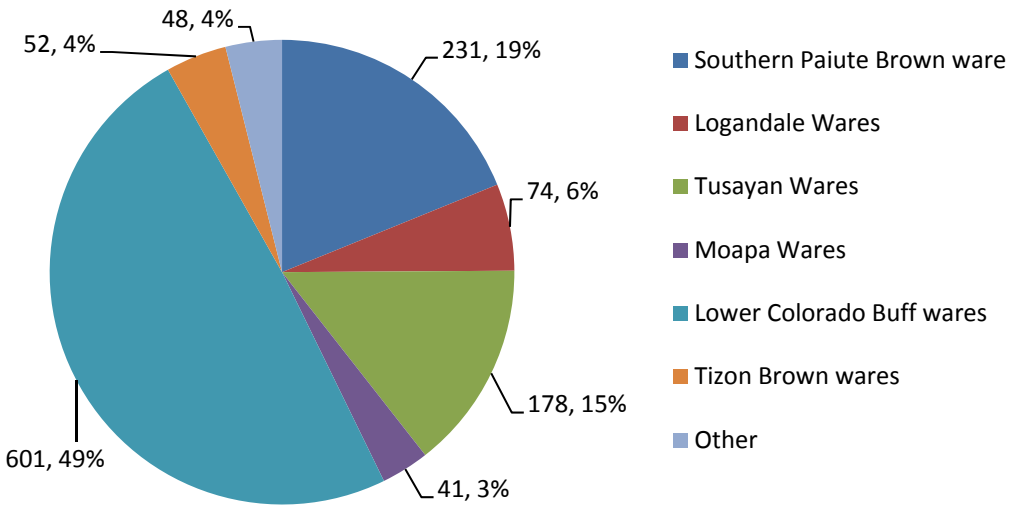


Figure 7.9. Number and types of sherds recovered from the Post-Puebloan components at sites 26CK1091, 26CK1138, 26CK1139, 26CK1164, 26CK4415, 26CK4440, 26CK1964, 26CK2954, 26CK3799, 26CK4446, 26CK8013, 26CK8047, and Room 1 at 26CK5.

It seems then, that the closer a site lies to the Colorado River, the more likely it will be that the site's pottery assemblage is dominated by Patayan wares. Harold S. Colton of the Museum of Northern Arizona identified the demographic potential of the prehistoric Patayans and their Yuman-language-speaking descendents. He noted that these groups were characterized by "a dense…population producing a surplus of food [and] a surplus population that radiated out on all the important trails where subsistence was possible (Colton 1945:118). The distribution of buff ware ceramics suggests that this movement included portions of the Southern Nevada region—though much of this distribution may instead have resulted from the movement of pots as trade items.

Gregory Seymour (1997) and Kevin Rafferty (2008) have suggested that this shift in the dominant pottery types from Puebloan to Patayan wares after A.D. 1100 in the Central Region represents a population movement of people living along the Colorado River, into southern Nevada. Roberts and Ahlstrom (2012) suggested that this pattern reflects shifting alliances and trade routes. They hypothesized that before A.D. 1200 trade goods such as shell and turquoise flowed into the Southwest through the Virgin Puebloan region. After this date proto-Mojave groups dominated the shell trade and exotic goods moved to the east via the Mojave and Pai regions south of the Colorado River.

Sorting out the chronological relationships between the pottery types is problematic because most of the rockshelters and other excavated sites lacked stratigraphy or were excavated in arbitrary levels. A second problem stems from the inherent difficulties of distinguishing plainwares. Lyneis (1988), and more recently Hildebrand et al. (2002), have pointed out issues associated with sorting Patayan ceramics into temporally and spatially meaningful types. Recent studies on Tizon Brown Ware (Hildebrand et al. 2002) and Great Basin Brown Ware (Eerkens et al. 2002a, Eerkens et al. 2002b) demonstrate that Instrumental Neutron Activation Analysis (INAA) and mineralogical investigations on temper and clays (Lyneis 2008a, 2011a, 2011b; Hoisch 2011) are viable alternatives to traditional classification systems, and future use of these methods in the project area may show more clearly where plain ware pottery was manufactured and where it was traded or transported.

PERISHABLES

The distribution of baskets, sandals, and other types of perishables varies through time and space, and is often considered an indicator of ethnic groups within the Great Basin (Adovasio 1986; Fowler and Dawson 1986). Eight radiocarbon-dated sites that date to the Post-Puebloan period in southern Nevada contain perishables such as basketry, sandals, and cordage. The earliest cordage recovered from a Post-Puebloan period site are two pieces of cordage from Room 1 of Gypsum Cave. Cotton and yucca cordage (S-twist) from this room have a combined calibrated radiocarbon date of A.D. 1050 to 1390. Yucca cordage (2-ply, Z-twist, and S-twist) was also recovered from Garrett's Shelter.

Twined basketry was collected from three sites including two closed-twined winnowing trays (two rods with an up-to-the-right slant) recovered from the Mended Basket site (26CK4038) in the Central Region, and radiocarbon dated to A.D. 1240 to 1420, and another twined winnowing tray from site 26NY8004 in the Western Region that produced a date range of A.D. 1525 to 1955. One fragment of a close diagonal twined basket was excavated from a cave site—26CK4446—in the Western Region. According to Fowler (1994a:108), twined Southern Paiute basketry is predominantly diagonally twined with an up-to-the-right direction of twists. The baskets found in the project area are consistent with this pattern.

Site 26CK4415 in the Central Region contained two sandals that were both radiocarbon dated and described as follows. Specimen 1 is made of yucca fiber and is roughly rectangular with a rounded toe area and square heel. The construction technique was twined and the calibrated radiocarbon date was A.D. 1445 to 1645. The other sandal (Specimen 2), with a calibrated radiocarbon date range of A.D. 1510 to 1795, is a plain weave figure-8 type sandal. Another plain weave sandal was recovered from the Flaherty Rockshelter and radiocarbon dated to A.D. 1440 to 1640. Barker (2008) recently reviewed this sandal type, and its spatial and temporal distribution within the Great Basin. He concluded that they are abundant in the Great Basin. They were collected from most of the cultural levels in Etna Cave. A figure-8 plain weave sandal from Black Dog Cave, near Moapa, was radiocarbon dated to A.D. 230 to 410. Wright (1954:52) also collected a plain weave sandal from Catclaw Cave that he described as resembling those from Etna, and Geib (2002b:128) reported finding a two-warp, plain-weave sandal from the upper levels of Bighorn Cave in the Black Mountains of Arizona with heel wrapping like the sandals recovered from Etna Cave.

Settlement Patterns and Settlement Systems

In the present context, the term "settlement pattern" applies to the distribution of activity sets or functional site types across a landscape, whereas "settlement system" refers to interpretation at a higher level of abstraction. Settlement system involves inferences about the nature of social groups that produced the sites, the place of the sites and the activities they represent in the settlement round of those social groups, and the relationship between the social groups. Presented here is a discussion on the patterns and distribution of sites across space, the types of sites present, the changes from the previous period, and what can be can inferred from these data about Post-Puebloan settlement systems.

SETTLEMENT PATTERNS

Figure 7.8 shows the distribution of sites with radiocarbon-dated Puebloan and Post-Puebloan components in the project area and Figure 7.7 shows the distribution of NVCRIS Post-Puebloan site types. Figure 7.8 demonstrates that many of the Puebloan sites continue to be occupied during the Post-Puebloan period in all regions except for the Southern Region. The distribution of Desert Side- Notched points from the NVCRIS data (Figure 7.4) shows a similar pattern, in that the points have been recorded throughout southern Nevada, except in the Southern Region. The radiocarbon dates from the Yamashita sites and a single radiocarbon date on maize from Main Ridge (Harry 2008a) suggest that Puebloan use of the Moapa Valley continued into the thirteenth or possibly fourteenth centuries; however, after A.D. 1300 formal architecture is abandoned in favor of rockshelters and open campsites with hearths. Agave roasting pits continue to be used in the upland settings, and they are also associated with informal campsites.

Was the abandonment of formal architecture in the Moapa Valley area a gradual phenomenon or did it occur rapidly? The Steve Perkins site, which was occupied into the Pueblo II period, contained habitations in two room block areas that were circular arrangements of postholes with or without central hearths. Four to seven linked adobe storage rooms were present at each of the room blocks. Although the construction methods of these habitation features were not described in detail, Myhrer (1989:35) suggested that the walls and roof were likely composed of poles and brush covered with mud. The South Room block at the Steve Perkins site also contained a circular surface habitation structure located at the end of linked adobe storage rooms. An adjacent plaza area contained numerous postholes and hearths. The two habitation features in the North Room block also consisted of circular arrangements of postholes. In addition, each of these structures had a shallow trench built along a small segment of the exterior of walls. At the Yamashita sites, Lyneis found that hearths, which post date A.D. 1200, were built inside or adjacent to abandoned adobe structures. Some of these features were associated with gray ware pottery et al. with Great Basin Brown Ware pottery.

There are little data on the settlement patterns in the Western and Southern Regions, except that rockshelters were used in the Yucca Mountain area after A.D. 1280. In Ash Meadows the radiocarbon-dated features are hearths or activity surfaces in open settings after A.D. 1150. We can infer from these data that settlement mobility increased in the Central Region after A.D. 1000 and in the Moapa Valley after A.D. 1200. In the Las Vegas Valley no habitation features, such as pithouses or wickiups, post date A.D. 1000. The only features recorded that even remotely resemble formal architecture are rock alignments placed perpendicular to rock outcrops or rock alignments built inside rockshelters to separate spaces. Rock alignments in rockshelters were reported at the Mended Basket rockshelter, Garrett's Shelter, 26CK4446, and 26CK4908. Parallel rock alignments enclosing a space and associated with an interior hearth were recorded at excavated site 26CK5701 in the Apex Area (Ahlstrom and Roberts 1999). The Coyote Springs rockshelter's (Harper 2006) opening was surrounded by an earthen berm that might also have represented some type of an enclosure.

Rockshelters were favored camping locations between A.D. 950 and 1200 in the Central Region, and then camps shifted, between A.D. 1250 and 1300, to open sites (26CK1138, 26CK6913, Corn Creek, the Pardee site). The five rockshelters that date to early part of the Post-Puebloan Period were used sporadically since about A.D. 950 (26CK1139, Room 1 of Gypsum Cave, Mended Basket, Garrett's

Shelter, and the Rattlesnake site), and all are situated away from the central population centers of the Las Vegas and Moapa Valley.

Could this movement from open sites to sheltered ones be a region-wide pattern for the end of the Puebloan period and the beginning of the Post-Puebloan sequence? If so what does this shift mean in terms of prehistoric behavior? Several years ago Ahlstrom and Roberts (1999) observed that radiocarbon-dated sites in the Apex Area and California Wash, which are on the boundary between the Central and Eastern regions, were the product of brief visits by small groups of people. These camps were used overnight, or for a few days. One site, Flaherty Rockshelter may have accommodated larger groups, and many of these sites contained caches for storage that reflect planning for later visits. Ahlstrom and Roberts dismissed the idea that the sites represented use along a transportation corridor when they discovered that the radiocarbon evidence demonstrated that the usage of the area was focused between A.D. 1300 and 1650.

Two aspects of the data suggested that during this time people were exploiting the resources of the arid slopes. First, there was consistent evidence for the use of low-elevation rockshelters as campsites where food resources were processed, and second, these sites were widely distributed throughout the region on the arid slopes. Taken together this suggested to Ahlstrom and Roberts that the area was an occasional destination on someone's annual round, the problem was determining who was exploiting the area, and why. The artifacts associated with these sites consisted of a mix of Virgin Puebloan, Patayan, and Southern Paiute pottery types and many of the sites entirely lacked pottery so it is not clear what group (i.e. Puebloan, Patayan, or other) was using the area.

Ahlstrom and Roberts posited three scenarios to explain the Apex area's site distribution pattern during the Post-Puebloan period. First, they suggested that population packing in the more heavily populated valleys resulted in expansion of foraging ranges into less desirable areas, such as the arid slopes. Second, they thought that the use of the area reflected a "release and recovery" from the earlier dry conditions. Dry conditions of the Medieval Climatic Anomaly (A.D. 800–1300) improved and became wetter and cooler during the Little Ice Age (A.D. 1300–1800), allowing for increased use of the arid slopes. Third, they suggested that these sites may represent occupations by groups engaging in "mutualistic" relationships with the larger more sedentary populations in the Moapa and Las Vegas valleys. Lyneis (1994:145) proposed that mixed ceramic assemblages may reflect mobile foragers, like the Southern Paiute, who occupied the upland and mountainous areas and developed trade relationships with the farmers settled along the valley bottoms.

A fourth possibility was suggested by two Southern Paiute elders who were asked their opinions on these ideas. They felt that relocation into rockshelters reflected raiding or invasion by other non-resident populations. They suggested that the population's relocation to the more peripheral and rugged uplands region between the core settlement areas of Las Vegas and Moapa valleys signaled the arrival of enemy groups. Can this pattern be observed throughout southern Nevada?

Is there a relationship between the abandonment of surface architecture, the relocation to rockshelters, and the use of cache pits in caves such as Paiute Cave and Black Dog Cave in the Moapa Valley? Materials in the Paiute Cave storage pits were not radiocarbon dated, but it is clear from the artifact associations and stratigraphy that the cave's features date to the late Pueblo II and Post-Puebloan periods. It is also clear the cache pit in Black Dog Cave dates to the Historic period. The caching of material culture and food in caves or subsurface pits was a common practice throughout prehistory, but particularly during the Archaic (Flaherty site), Early Basketmaker (Larder site, Black Dog Cave), Late Pueblo II (Larder site, Paiute Cave), Post-Puebloan (Larder site, Mended Basket), and Historic periods (Black Dog Cave and Paiute Cave). When settlement patterns became less mobile during the Basketmaker III, Pueblo I, and early Pueblo II periods, linked adobe rooms situated next to habitation features were probably used for storage.

What behavior would cause the replacement of surface storage features with hidden ones? Duncan Metcalfe (2008) has studied storage structures in the Range Creek Fremont sites in Utah where 62 granaries were built on the edges of cliffs or in other precarious settings. To learn more about storage behavior Metcalf examined the literature of animal behavior, and learned that there are two types of

behavior: larder storing and scatter storing or hoarding. "Larder storing is usually centralized, in areas where the stores can be defended. Scatter storing is what animals do when they cannot defend their stores in a central location or they leave the area for substantial lengths of time." (Metcalf 2008:121) Applying this behavior to Range Creek's cliff granaries and subsurface storage pits Melcalfe concluded that two behaviors could account for the granaries—seasonal mobility or protection from raiders.

What can this storage behavior tell us about the caches in the study area that replace the centralized Puebloan storage rooms in the Moapa Valley? During the Post-Puebloan period items, such as food, basket-making materials, baskets, ground stone, and other items were cached for later use at the Mended Basket site, in the Central Region, and at 26NY8004 in the Western Region. The Larder site in Clark County Wetlands Park was an open site where unlined subsurface pits were used to store food such as screwbean mesquite, honey mesquite, maize, and other wild plants (Ahlstrom 2008b). The site was used periodically between 300 B.C. and A.D. 1500. Diagnostic artifacts recovered from these pits were rare; however, one storage pit with a single Patayan sherd dated to A.D. 900 to 1040. This range is the approximate time when the adjacent habitation site, Scorpion Knoll was abandoned. None of the storage features at the Larder site dated to the period between A.D. 1050 and 1400, which admittedly could be the result of sampling rather than a cultural pattern.

SETTLEMENT SYSTEMS

Throughout this period sites become highly mobile camps occupied by small numbers of individuals. Some of the larger open sites also contain midden deposits, sometimes as deep as a meter, which represent the accumulated debris from short term camps for hundreds of years. The fact that nonlocal plant foods, such as pine nuts, are found at some of the valley's Post-Puebloan sites suggests that a seasonal round was practiced that may have resembled the historic Southern Paiute pattern. Farming may have continued, but probably on a smaller scale, and the evidence is only convincing in the Central Region at the Larder site where maize was stored in pits. In the poorly watered arid slopes between the Central and Eastern regions people foraged for plants and tortoises between A.D. 1300 and 1600.

In the Moapa Valley room blocks consisting of habitation features, several adobe storage rooms, and central work plazas drop out of the archaeological record after A.D. 1200. Some of these abandoned features were reused as windbreaks for hearths at the Yamashita sites. In the Gold Butte Area, McGuire et al. (2010: Figures 98, 99) see an increase in use during the PIII period; which is supported by the pottery types, obsidian dates, and radiocarbon dates. This pattern is also found in the Western Region where sites are rockshelters with caches, while in the Ash Meadows area, open campsites with hearths are associated with locally made brown ware pottery.

Overall, these data imply a disruption in the settlement system beginning in the Central Region around A.D. 950 and in the Eastern Region after A.D. 1150 to 1200. In the Central Region there are hints of this disruption. For example, the presence of intaglios and Patayan pottery indicate that Patayan or proto-Mojave groups may have expanded north along the Colorado River into the Central Region. Patayan pottery has also been found in the Moapa Valley region, and it is dominant in the Gold Butte pottery assemblages; however, the relationship between the Puebloan and Patayan groups in the Eastern Region is far from clear. What is evident is that habitations and sites in general, become less permanent and site size decreases, which suggests that settlement size, and possibly social complexity, decreases and shifts to smaller groups.

Technology

As previously discussed, several major technological shifts occur during this period in architecture, projectile point types, food processing and storage, basketry, pottery, and ground stone forms. Formal architecture is replaced by informal camps in rockshelters and later at open sites. The types and quantities of pottery also change dramatically. The quantities of pottery recovered from Post-Puebloan sites drops from thousands of potsherds at the large habitation sites in the Moapa and Virgin valleys, to dozens or hundreds of potsherds in the small rockshelters and open sites (Figure 7.9). The

dominant types of pottery also shift from Virgin Puebloan types to a mix of Patayan and Great Basin Brown Wares. Twenty-five percent of the 51 Post-Puebloan sites that were excavated did not contain pottery (Figure 7.10), despite the fact that some of sites, for example Garrett's shelter, contained substantial evidence of intervals of use over hundreds of years (Ahlstrom and Roberts 1999).

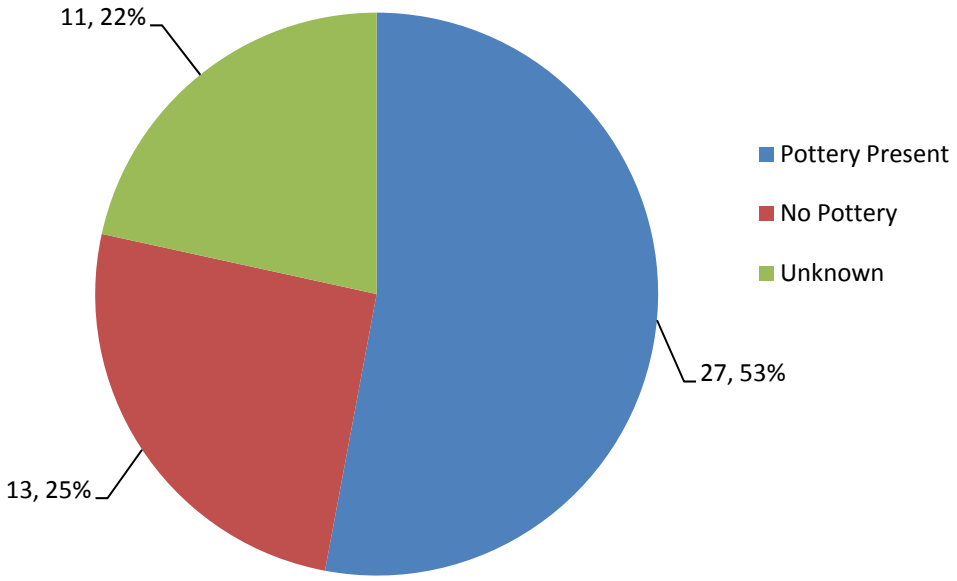


Figure 7.10. Percentage of Post-Puebloan sites with pottery.

Lyneis described the Great Basin Brown Ware pottery found in the region as manufactured with coiling and scraping and, although there is some continuity at the Corn Creek Dunes site and Ash Meadows sites terms of temper and clays, the finishing is rougher, with thicker walls than in the Puebloan wares (Lyneis Appendix I). At Ash Meadows one type of temper was used to make the local varieties of gray ware, corrugated gray ware, brown ware, and buff ware. At Corn Creek the locally made pottery there, both gray and brown, was tempered with limestone, quartz, and quartzite from the Sheep Range. Great Basin Brown Ware collected by Lyneis (Appendix D) from the Yamashita sites included 450 sherds scattered across the property. The pottery temper consisted of angular chunks of quartz or feldspar with mica, hornblende, and garnet inclusions that probably came from the South Virgin Mountains. Lyneis believes it is likely that Great Basin Brown Ware, the Moapa Ware and Shivwits Ware were made in the Shivwits Plateau or Mt. Trumball areas, located 70 to 110 km away. Lyneis (2005) and Harry et al. (2008) have suggested that depletion of fuel resources for firing during the later Puebloan periods may have been part of the reason for this shift in pottery production areas. Lyneis felt that the manufacture of brown ware pottery in the upland areas indicates a bi-local residence pattern. Could this have also been the case for later Puebloan groups?

Pit cooking in large mounded pits, which are associated with agave processing, continues uninterrupted from the Terminal Archaic to the Puebloan periods (see Chapter 6). Many of the excavated features were used over hundreds or even thousands of years to cook agave, cactus, and other plants.

During the Post-Puebloan period, small cobble-lined cooking pits like those excavated at the Corn Creek Dunes Site have been found at several excavated sites. Figure 7.11 shows the locations of NVCRIS sites with Post-Puebloan diagnostic artifacts and evidence of pit cooking. Macrobotanical samples processed from these features often do not contain evidence of economic plant species (King et al. 2006; Roberts and Lyon 2011); however, on occasion they produce seeds or burned plant tissue. At the Corn Creek Dunes site a small cobble-lined roasting pit, Feature 21, contained evidence that cactus and tubers

were cooked. These pit features usually measure 1to 2 m in diameter and they were probably used once or twice. Once the rocks were heated, the pit was lined with grass or other plants, and then the food was covered with earth and left to cook for several hours or overnight. Does pit cooking replace cooking in pottery vessels during this period, since the number of pottery vessels decreases dramatically? Or was the primary function of pottery vessels during the Puebloan period for storage rather than cooking?

Grinding technology changes little during this period, except that two types of metates found in the Moapa Valley—trough and Fremont style—(Shutler 1961: 33) are not present at most radiocarbon dated Post-Puebloan sites. Basin and slab metates that were lightly used are the common grinding implements during the Post-Puebloan period. Some of the small, single component sites lacked ground stone assemblages, even when macrobotanical samples contained small seeds (King et al. 2006; Blair et al. 2000). During the Post-Puebloan period ground stone is often reused in roasting pits. Pestles were not recovered from any of the excavated and radiocarbon-dated Post-Puebloan sites. Figure 7.12 shows the locations of the Post-Puebloan sites in NVCRIS that contain ground stone or mortars, and demonstrates that these sites are widely distributed throughout southern Nevada.

The only baskets recovered from Post-Puebloans sites are twined types that are typically associated with Southern Paiute groups. Sandal technology does not change from the earlier plainweave, Figure Eight type that are common in the region since Basketmaker times.

Desert Side-Notched and Cottonwood Triangular types dominate the assemblages of the 51 excavated and radiocarbon-dated sites (Figure 7.13). Fifty-five percent of all projectile points collected from excavated and radiocarbon dated sites are Desert Side-Notched points. Cottonwood Triangular (20 percent) and Elko Corner Notched points represent the next largest categories of points recovered. The shift to the Desert Side-Notched point style is a region-wide one that begins after A.D. 1100. A total of 111 sites in the NVCRIS database have Desert Side-Notched or Cottonwood Triangular points and most of these sites are not associated with pottery. Of those sites with pottery, 24 contain brown ware, 22 contain gray ware, two buff ware, and six have corrugated gray ware.

Subsistence

Macrobotanical and pollen samples have been processed from 18 of the sites with components that date to this period and faunal remains have been collected and analyzed from 23 sites. Table 7.2 summarizes the plant and animal species recovered from each excavated site. These data suggest that the region's Post-Puebloan occupants relied primarily on wild plants and animals, and possibly some farming was practiced. The evidence for use of cultigens during the Post-Puebloan period continues to accumulate; however, it is clear that farming, if practiced, was done on a much reduced scale from the earlier Puebloan period.

Six of the excavated sites that date to this period contain evidence of cultigens—squash, maize, and beans. Only one site, the Larder site in Clark County Wetlands Park, contained convincing evidence for small-scale gardening of maize by the Central Region's occupants before the arrival of Euroamericans. Using the pollen and macrofloral evidence from the Larder site, Ahlstrom (2008b) has argued that small-scale gardening, practiced historically by Southern Paiute and Chemehuevi bands (C. Fowler 2010), began in the Central Region as early as 200 B.C. and continued throughout the Puebloan and Post-Puebloan periods. The other five sites lack pollen evidence that would suggest the plants were grown or processed nearby. Squash seeds were recovered along with wild plants from one of the earliest occupied rockshelters, the Mended Basket site (A.D. 943–1473). Maize and squash were recovered from a rockshelter in Clark County Wetlands Park, 26CK1139, and Ahlstrom reported calibrated date ranges of A.D. 1600 to 1950 on a kernel and cob of maize from that site. A similar date was obtained from maize collected from an open site in Clark County Wetlands Park (26CK1282). Maize, beans, and squash were reported from Harrington's excavations in Room 1 at Gypsum Cave, although they were not radiocarbon dated during the recent reanalysis of the collections (Gilreath 2009). Harrington (1930b) also reported finding maize and squash in the Paiute levels at Paiute Cave in the Eastern Region.

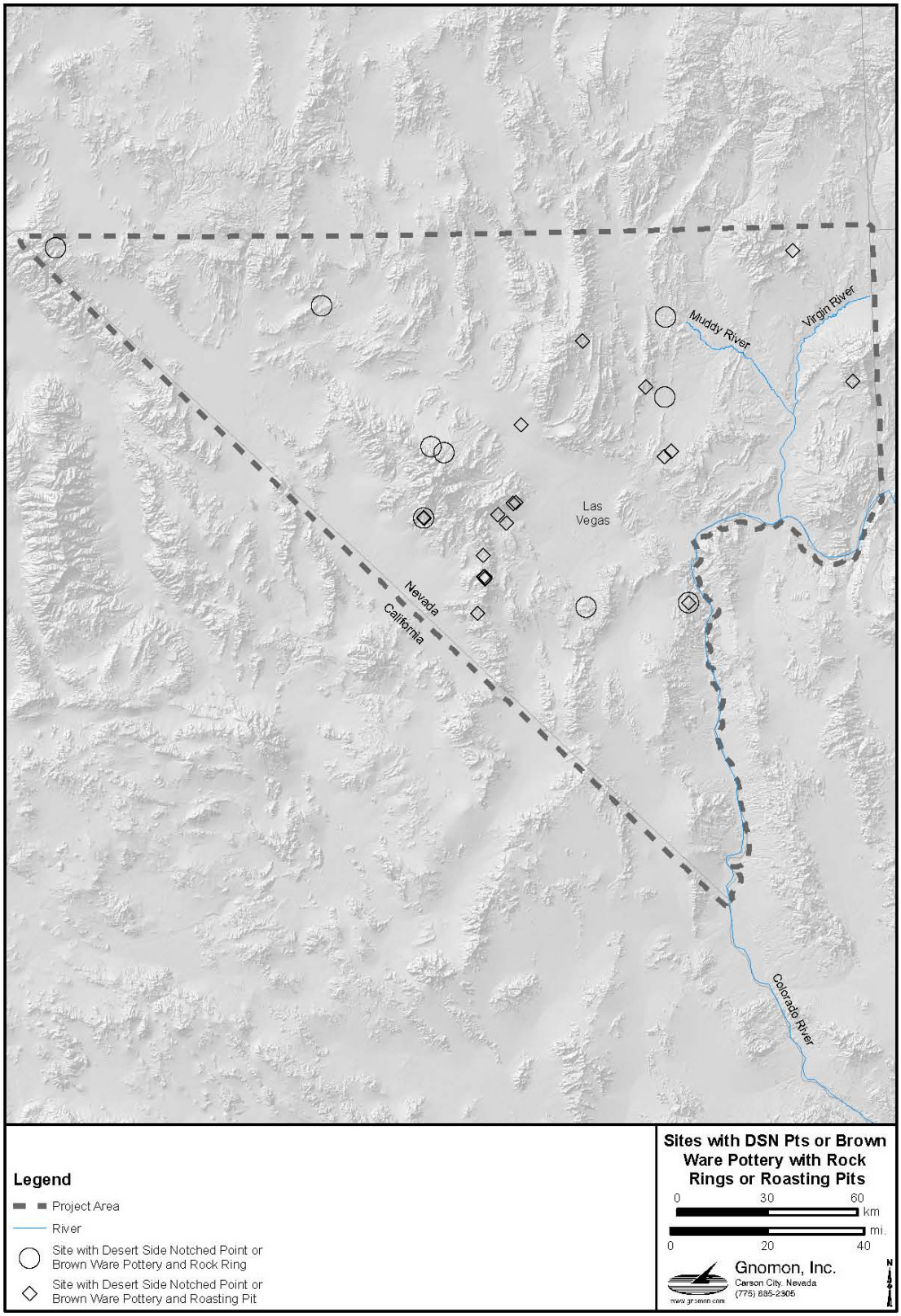


Figure 7.11. Archaeological sites recorded in the project area with Desert Side-Notched points or brown ware pottery and rock rings or roasting pits.

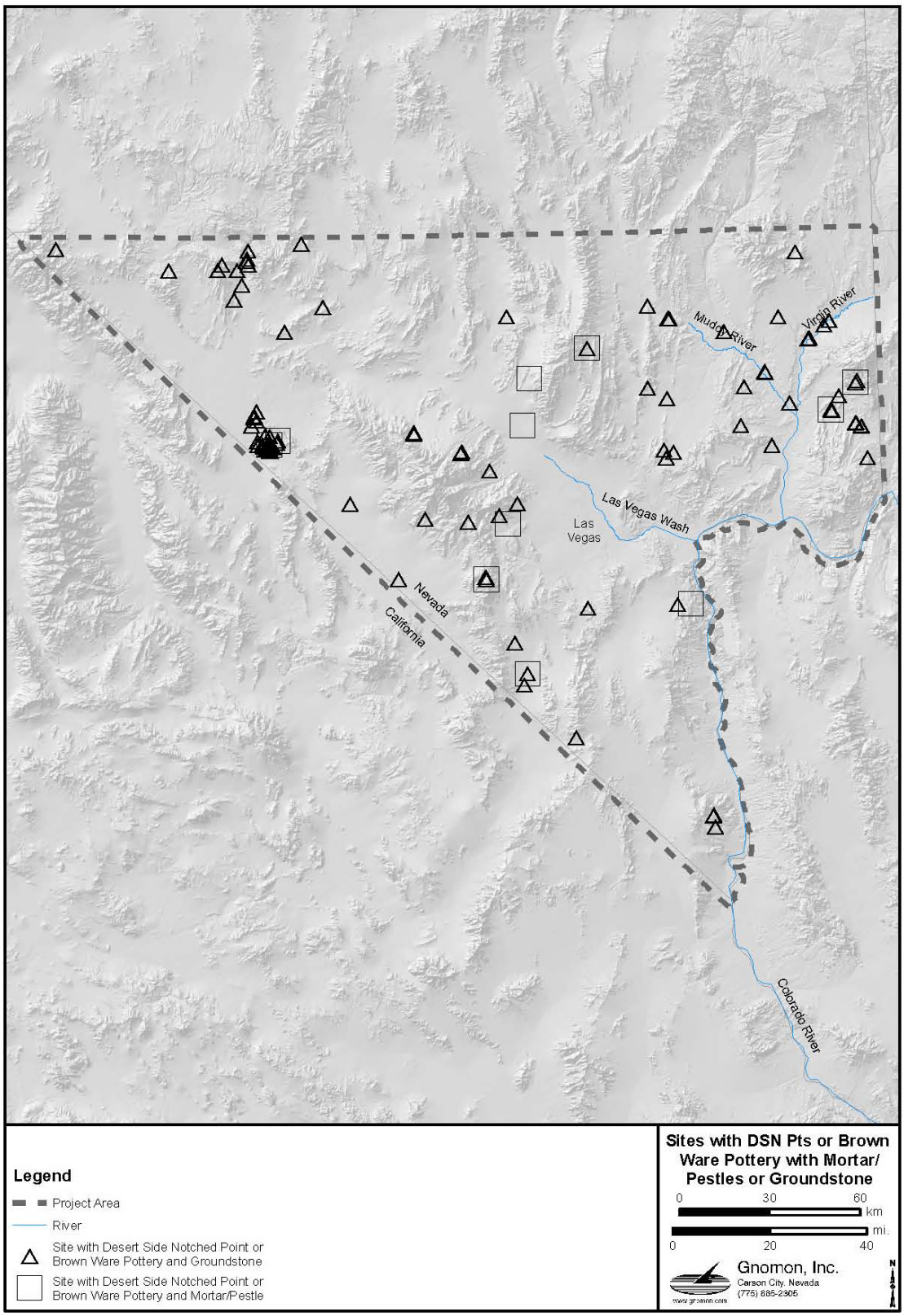


Figure 7.12. Archaeological sites in NVCRIS with Desert Side-Notched points or brown ware pottery with mortars and/or pestles and ground stone.

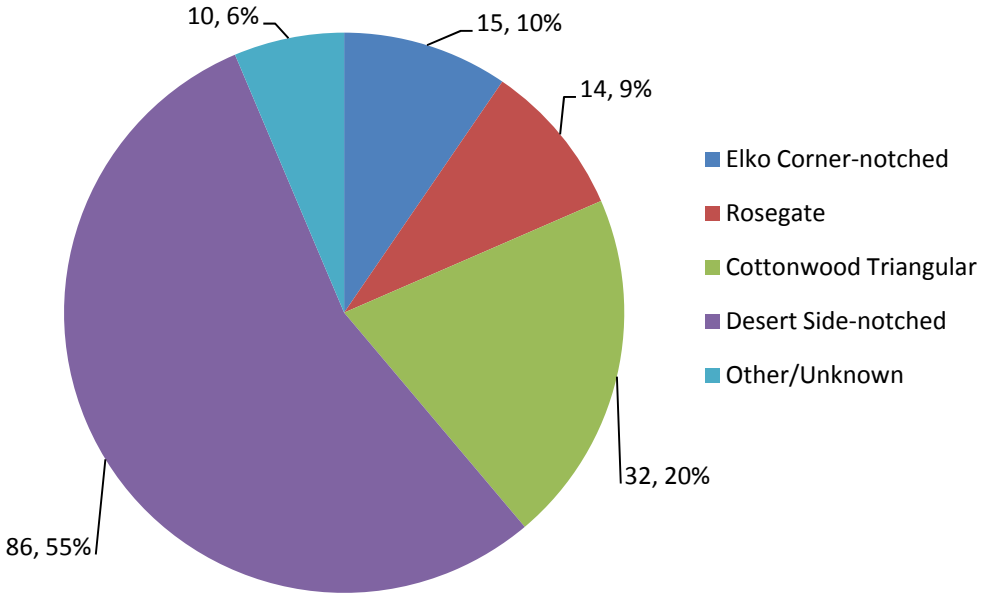


Figure 7.13. Projectile point styles from excavated radiocarbon-dated Post-Puebloan sites.

Wild seeds and plants that were identified at the 18 sites where macrobotanical samples were processed, in order of ubiquity include cactus seeds and fleshy parts of the plant (11 sites), cheno-ams (8 sites), pine nuts (9 sites), honey and screwbean mesquite (7 sites), yucca (6 sites), wild potato or tuber (3 sites), agave (2 sites), thornberry (1 site), rice grass (1 site), cattail pollen (1 site), rye seeds (1 site), buckwheat (1 site), seepweed (1 site), popcorn flower (2 site), saltbush (1 site), and tansy mustard (1 site). Pine nuts appear to have been transported from mountain settings, where they were collected and processed, to valley sites in the Central Region. Pine nuts were recovered from Gypsum Cave, from three sites in Clark County Wetlands Park (26CK1138, 26CK1139 and 26CK1282), and from a rockshelter site (26CK4908) in the northwest area of the Las Vegas Valley. Pine nuts were also recovered from a few of the sites excavated in the Gold Butte area.

Small seeds such as grasses, cheno-ams, tansy mustard, saltbush, buckwheat, et al. appear important, but less so than mesquite, yucca, and cactus. Large roasting mounds are assumed to have been used to cook agave, but only one macrobotanical sample from these features yielded agave (Agave Ovens site), and more sampling of these features is recommended. Phytoliths from soil samples collected from 26CK4908 yielded evidence that a cactus species other than *Opuntia* had been processed in those large roasting mounds.

Twenty-three sites contained evidence of tortoise processing, 12 sites contained burned rabbit bones, and burned artiodactyls bone was collected from 13 sites. In most cases the artiodactyls species could not be determined, although two sites had evidence of bighorn sheep. Other animals processed and eaten include ducks and waterfowl, chuckwalla, and small unidentified rodent. Garrett's Shelter, in the Central Region, contained pronghorn antelope remains. Pronghorns are not native to southern Nevada but are common in areas of central Nevada and portions of western and southern Utah.

Roberts and Ahlstrom (2010) recently compiled and contrasted subsistence data for the Central Region during the last 2,000 years. Their analysis of archaeological subsistence data included identifications of charred macrobotanical remains recovered from flotation samples, individual charred macrobotanical specimens, pollen grains extracted from soil samples, and individual faunal specimens. The various samples and specimens were assigned to one or another of our three periods on the basis of

radiocarbon dates. Samples of specimens not directly associated with these dates were excluded from the analysis. The goal of the analysis was to identify indicators of stability or change in diet breadth over time. Before summarizing the results, they reviewed the limitations of the dataset involving variability in the numbers of analyzed samples and specimens available from the three periods. The middle period, produced the most evidence, with data available from eight flotation and 18 pollen samples—or 26 samples in all (Figure 7.14). This is more than twice the number of samples available from the other two periods. It would appear that the number of plant taxa identified are related to the number of samples taken, rather than being a reflection of actual differences in the types of taxa used. This relationship between numbers of samples and are identified taxa is illustrated in Figure 7.14.

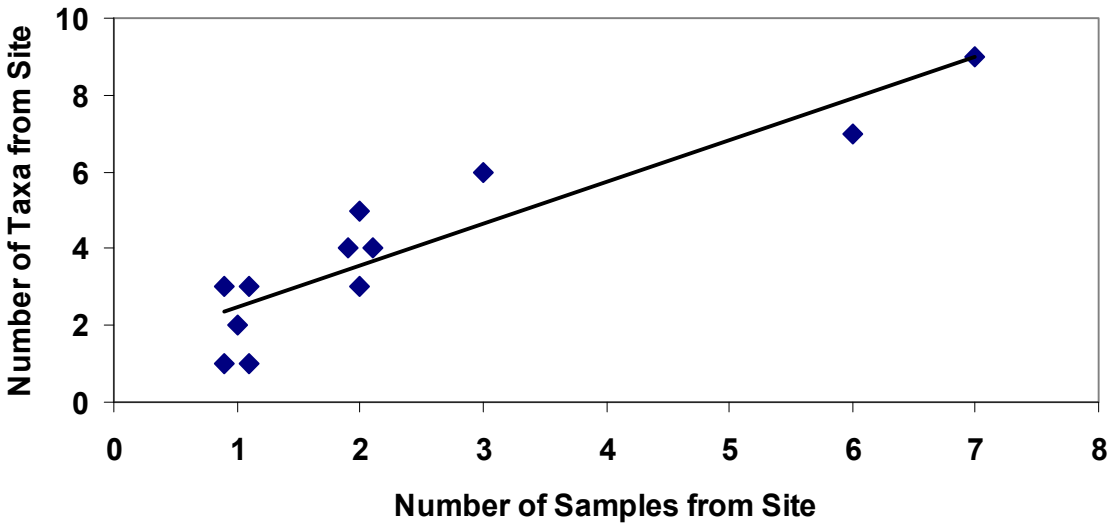


Figure 7.14. Numbers of pollen taxa by numbers of analyzed samples per site.

Even with these limitations, the available data appeared to be most consistent with an interpretation of continuity in diet breadth over time. Tables 7.4 and 7.5 summarize the botanical evidence obtained from both macrobotanical and pollen samples and specimens. Some of the most important taxa, at least from the perspective of archaeological evidence, are represented in all three periods. Other important taxa are missing only from the first of third of the three periods, which possess the smallest number of samples and are, therefore, the least representative of the datasets. Among the important *and* common taxa are mesquite, screwbean, piñon, various kinds of cactus, members of the chenopod-amaranth group of plants, and one cultivated plant, maize. What the table does not show is the fact that, among these plants, mesquite is the one that is most widely distributed among the individual samples. To repeat, although data for the middle or early–middle period shows evidence of the greatest breadth in diet, it is also the period with by far the largest number of analyzed samples.

Roberts and Ahlstrom (2010) also compiled a less robust dataset for faunal remains. Table 7.6 shows that the number of taxa, including desert tortoises, rodents, rabbits, and large mammals such as bighorn sheep and deer, were hunted and trapped throughout the second and third periods (there are no comparable data from the earliest period).

The subsistence strategy indicated by these data is a mixed economy of wild plants and animals supplemented by cultigens. The extent of farming activities probably varied from region to region and also varied through time. These data suggest that Post-Puebloan subsistence practices in the Central Region closely resembled the practices of the Southern Paiutes interviewed by Isabel Kelly and reported recently by Catherine Fowler (2010) for the Las Vegas Band (Table 7.7). Roberts and Ahlstrom (2010) suggested that the Southern Paiute farming system accommodated the scheduling requirements of important wild plants. The diet-breadth model assumes that the best-choice diet begins with the highest

Table 7.4. Central Region Breadth Analysis: Summary Data.

Data Type	Observation	Terminal Archaic (1250 B.C.–A.D. 250)	Early Pithouse Period (A.D. 450–1200)	Late Ceramic Period (A.D. 1300–1850)
Pollen	Sites with Samples	2	7	3
	Total Samples	7	18	4
	Mean Taxa per Sample	2.3	2.7	3
	Median Taxa per Sample	2	2	3
	Total Taxa in All Samples	8	18	9
Macrobotanical	Sites with Samples	2	5	3
	Total Samples	3	8	4
	Mean Taxa per Sample	1.3	2.9	1.5
	Median Taxa per Sample	1.5	3	1.5
	Total Taxa in All Samples	3	16	4
	Sites with Samples or Specimens	2	5	7

Table 7.5. Las Vegas Valley Diet Breadth Analysis: Botanical Remains.

Botanical Remains	Terminal Archaic	Early Pithouse Period	Late Ceramic Period
Numbers of Samples and Specimens	3 flotation samples	8 flotation samples	4 flotation samples
	–	–	6 macro specimens
	7 pollen samples	18 pollen samples	4 pollen samples
Maize	X	X	X
Mesquite	X	X	X
Screwbean		X	X
Piñon		X	X
Various cacti	X	X	
Saltbush	X	X	
Chenopod-amaranth	X	X	X
Rice grass		X	
Cattail		X	
Grass/wild rye/Alkali sacaton	X	X	X
Primrose		X	
Globemallow	X	X	
Buckwheat		X	
Nightshade		X	X
Ephedra		X	X
Wolfberry		X	
Mustard/tansy mustard		X	
Mojave yucca			X
Datura		X	X
Seepweed		X	
Squash		X	

Table 7.6. Central Region Diet Breadth Analysis: Faunal Data.

Faunal Remains	Early Pithouse Period (N=2)	Late Ceramic Period (N=4)
Tortoise	X	X
Jackrabbit	X	X
Woodrat		X
Antelope		X
Artiodactyls	X	X
Chuckwalla	X	X
Cottontail Rabbit	X	
Rabbits		X
Kangaroo rat	X	
Bighorn sheep	X	
Total taxa	7	7

Table 7.7. Las Vegas and Pahrump Southern Paiute Wild Food Procurement Schedule (from Fowler 2010)

Month	Mountains	Foothills	Valley	Gardens
January	Deer, bighorn sheep		Jackrabbits	
February	Deer, bighorn sheep		Jackrabbits	
March		Agave, cattail shoots, Indian spinach	Indian spinach	
April		*Rumex,* cactus buds, rodents, chuckawallas, tortoises, caterpillars	Broom rape, reptiles, rodents	Irrigate fields, plant gardens
May		Tansy mustard, *Rumex*	Indian rice grass, blazing star, chia,	
June		Wolfberry fruit	*Aphis* sugar,	
July	Pine nuts	hedgehog cactus fruit, Mojave yucca fruit	honey mesquite, screwbeans	Squash blossoms
August	Goosefoot, deer, bighorn sheep, pine nuts		mesquite, devil's claw	Maize, tepary beans, sunflower, amaranth
September	Pine nuts, deer, bighorn sheep	Prickly pear fruit, banana yucca fruit		Pumpkins, squash
October	Pine nuts, deer, bighorn sheep			
November	Deer, bighorn sheep		Jackrabbits	Prepare gardens
December	Deer, bighorn sheep		Jackrabbits	Prepare gardens

ranked resources. Rene Barlow's (2006) model for the Fremont predicts when foragers should increase or decrease investments in farming activities. At the most basic level, the model states that "the forager is simply expected to farm when the average return rates for foraging and farming, plus the additional returns expected for spending the next unit of time farming, are greater than the average return rates for foraging and farming, plus the additional returns for spending the next unit of time foraging." Therefore, "farming investments should only have intensified when higher-ranked foraging opportunities diminished" and vice versa.

Roberts and Ahlstrom (2010) hypothesized that because dependable and high-ranked wild plant species occur at various locations in the Central Region, there was no need to intensify horticulture. Several wild plant species were important, but three in particular made the system possible: honey mesquite, screwbean mesquite, and pine nuts. These species are present in the Central Region's farming period archaeological record. Since these species didn't diminish and human populations did not increase, then there was no need to intensify farming efforts.

Although these wild plants all represent high-yield resources, they are also located in widely spaced settings that require travel and relocation of residence camps. Families moved 10 to 30 miles to productive piñon groves to gather and store nuts. In the spring they relocated to the foothills to harvest agave, then moved to their summer camps to plant their fields and harvest mesquite. Other forays were made to distant resource patches to harvest cactus fruits, buds, berries, grass seeds, and other important plant resources. Women did most of the plant collecting, and they would have been accompanied by their young children (Fowler 2010). The foraging schedule of the Central Region required a good deal of mobility, but there were few scheduling conflicts between the planting and harvesting of garden crops and the procurement of important wild plant foods.

The shift from forager to farmer that is believed to have caused population expansion and increased sedentism elsewhere in the Southwest did not occur in the Central Region. Roberts and Ahlstrom (2010) suggested that the Central Region's populations did not exceed the carrying capacity of their environment because the system was supported by high levels of mobility. The seasonal mobility kept birth spacing at a level typically ascribed to collector/forager societies. Perhaps the decrease in birth spacing that is often associated with population growth among sedentary farming cultures did not occur in the Central Region, so that the balance between wild-resource availability and population density was maintained. Furthermore, this flexible system could accommodate slight changes in population by increasing garden size.

Trade and Exchange

Because the excavated Post-Puebloan sites often include earlier components, and the pottery assemblages contain several different wares, it is often difficult to determine what pottery types are the locally made varieties and which types are the trade wares. With that caveat, it appears that Patayan wares dominate the southern portion of the project area and Great Basin Brown Ware dominates the assemblages of the Western Region as well as the northern portions of the Central and Eastern Regions. These data suggest that contacts increased with Patayan or proto-Mojave groups living along the Colorado River. Although we do not currently understand what form these relationships took, the presence of intaglio features, which are usually linked to Pai groups, are found throughout the south Central and Southern Regions (Rafferty Chapter 9). While contacts increased with the Colorado River groups, the dissolution of the Virgin Puebloan and larger Puebloan system may indicate that ties with the Southwest may have lessened. Although Hopi Yellow Ware is found throughout the Southwest and as far west as Kanab, Utah, it has not been reported in the Moapa Valley. Hopi Yellow Ware was not recovered from any of the radiocarbon-dated sites in the project area, nor is it reported in the NVCRIS sites. In fact, the only Hopi Yellow Ware pottery that has been reported in the immediate region consist of two Jeddito Black-on-yellow sherds from Bighorn Cave located in northwestern Arizona (Geib and Keller 2002b:84).Small assemblages of shell beads collected from nine of the radiocarbon-dated Post-Puebloan sites indicate that trade continued with California. All of the sites that contain shell beads are rockshelters, and most of these assemblages consisted of one to three (Mended Basket, Garrett's shelter, Gypsum Cave Room 1, Bighorn Cave, 26CK4908) pieces. Most of these beads were made from *Olivella* shells. Two of the largest assemblages of shell beads came from 26CK1139 (n=7) and the Rattlesnake site (n=5). The bead types from 26CK1139 were quite varied and included barrel, disk, and cap *Olivella* beads and a *Glycymeris* pendant fragment (Vokes 2005). The beads from the Rattlesnake site were unspecified *Olivella* beads (Brooks et al. 1975). Turquoise nodules or beads were found at only one site, a small rockshelter near Goodsprings, 26CK4446.

Glass trade beads are probably the first Euroamerican goods to appear consistently in the archaeological record, and they are reported at six sites (26CK1138, 26CK1139, 26CK2954, 26CK4908, 26CK6080/6081, 26CK8013) with radiocarbon-dated components, and at three sites excavated during the Lost City investigations (Shutler 1961). All of these sites, except possibly 26CK4908, are situated on or within a short distance of the route followed by the Spanish Trail.

Two late Post-Puebloan/Early Historic period sites contain Euroamerican weaponry. A lead musket ball was collected from the surface of an open campsite, the Dune Field site (26CK8013), in the Gold Butte area. Two rockshelters, 26CK4908 and the Coyote Springs Rockshelter, contained an unusually large number of projectile points or point-making debris associated with a varied assemblage of Euroamerican goods such as metal projectile points, trade beads, metal buttons, and a copper percussion cap. The possibility exists that both of these sites served as defensive habitations during the early historic period.

Obsidian sources for the excavated Post-Puebloan period sites (Desert Side-notched and Cottonwood points only were included from some multiple component sites such as the Yamashita sites) are shown in Figure 7.15 and Table 7.8. No obsidian has been sourced from Post-Puebloan sites in the Southern Region. Figure 7.15 shows that obsidian procurement patterns vary widely for the three regions. Obsidian sources most commonly used in the Western Region were located in southwestern Nevada or California. This pattern is dramatically different from the Central Region where the most common obsidian sources are located in western Utah, namely the Modena/Panaca, Wild Horse Canyon, and Pumice Hole Mine sources. The Wild Horse Canyon source is located near Milford, Utah, at a distance of over 220 miles from the Central Region. The Modena/Panaca source is located on the Nevada-Utah border more than 170 miles from the region. Keeping in mind that most of the obsidian sourced from the Eastern Region came from the Gold Butte area located on the Utah-Arizona border, it is surprising that the Wild Horse Canyon source was not more prevalent in the Gold Butte assemblages. The most common sources for the Eastern Region were Modena/Panaca, Kane Springs, and Partridge (in Arizona).

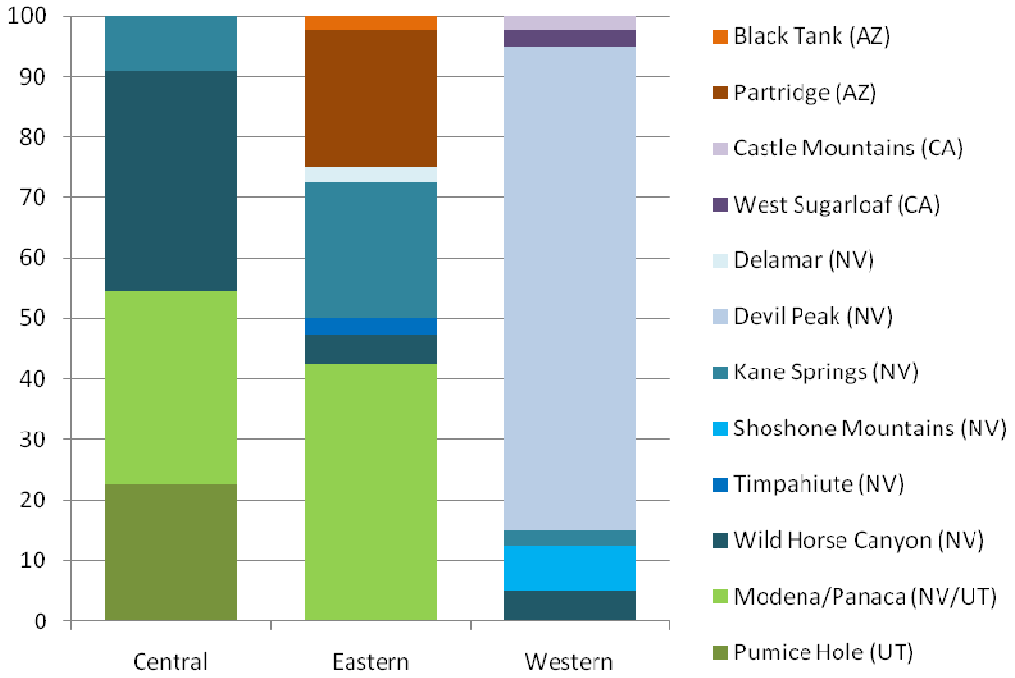


Figure 7.15 Obsidian sources for the excavated Post-Puebloan period sites in southern Nevada.

Table 7.8. Obsidian Sources for Post-Puebloan Period Sites that have been Radiocarbon Dated

Site Number	Region	Artifact Type	Obsidian Source	State
CK1139	Central	Unknown	Kane Springs	NV
CK1139	Central	Unknown	Kane Springs	NV
CK1139	Central	Unknown	Wild Horse Canyon	UT
CK1991	Eastern	Dart-sized point	Delamar Mountains	NV
CK1991	Eastern	Flake	Kane Spring	NV
CK1991	Eastern	Flake	Kane Spring	NV
CK1991	Eastern	Flake	Kane Spring	NV
CK1991	Eastern	Flake	Modena/Panaca Summit	UT
CK1991	Eastern	Elko Series	Timpahute Range	NV
CK3093	Eastern	Flake	Modena/Panaca Summit	UT
CK4440	Central	Flake	Pumice Hole Mine	UT
CK4440	Central	Flake	Pumice Hole Mine	UT
CK4440	Central	Flake	Pumice Hole Mine	UT
CK4440	Central	Flake	Pumice Hole Mine	UT
CK4440	Central	Flake	Pumice Hole Mine	UT
CK4440	Central	Flake	Wild Horse Canyon, Mineral Mountains	UT
CK4440	Central	Flake	Wild Horse Canyon, Mineral Mountains	UT
CK4440	Central	Flake	Wild Horse Canyon, Mineral Mountains	UT
CK4440	Central	Flake	Wild Horse Canyon, Mineral Mountains	UT
CK4440	Central	Flake	Wild Horse Canyon, Mineral Mountains	UT
CK4440	Central	Flake	Wild Horse Canyon, Mineral Mountains	UT
CK4440	Central	Biface	Wild Horse Canyon, Mineral Mountains	UT
CK4446	Western	Desert Side-Notched	Castle Mountains	CA
CK4446	Western	Unmodified Core	Devil Peak	NV
CK4446	Western	Unmodified Nodule	Devil Peak	NV
CK4446	Western	Flake	Devil Peak	NV
CK4446	Western	Flake	Devil Peak	NV
CK4446	Western	Unmodified Nodule	Devil Peak	NV
CK4446	Western	Unmodified Nodule	Devil Peak	NV
CK4446	Western	Core Fragment	Devil Peak East	NV
CK4446	Western	Core	Devil Peak East	NV
CK4446	Western	Projectile Point Fragment	Devil Peak East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Flake	Devil Peak, East	NV
CK4446	Western	Projectile Point Fragment	Devil Peak, East	NV
CK4446	Western	Projectile Point Fragment	Devil Peak, East	NV
CK4446	Western	Projectile Point Fragment	Devil Peak, East	NV
CK4446	Western	Desert Side-Notched	Devil Peak, East	NV
CK4446	Western	Rosegate Point	Devil Peak, East	NV
CK4446	Western	Cottonwood Triangular	Devil Peak, East	NV
CK4446	Western	Cottonwood Triangular	Devil Peak, East	NV
CK4446	Western	Biface	Devil Peak, East	NV
CK4446	Western	Biface	Devil Peak, East	NV
CK4446	Western	Utilized Flake	Devil Peak, East	NV
CK4446	Western	Utilized Flake	Devil Peak, East	NV
CK4446	Western	Biface	Devil Peak, East	NV
CK4446	Western	Projectile Point Fragment	Kane Springs	NV
CK4446	Western	Flake	Wild horse Canyon	UT
CK4446	Western	Rosegate Point	Wild horse Canyon	UT
CK5701	Central	Biface	Modena/Panaca Summit	UT
CK6080/6081	Eastern	Desert Series	Black Tank	AZ
CK6080/6081	Eastern	B Flake	Kane Springs Wash Caldera Variety 1	NV
CK6080/6081	Eastern	G Flake	Kane Springs Wash Caldera Variety 1	NV
CK6080/6081	Eastern	B Flake	Kane Springs Wash Caldera Variety 1	NV
CK6080/6081	Eastern	D Flake	Kane Springs Wash Caldera Variety 1	NV
CK6080/6081	Eastern	Elko Series	Modena/Panaca Summit	UT
CK6080/6081	Eastern	E Flake	Modena/Panaca Summit	UT
CK6080/6081	Eastern	F Flake	Modena/Panaca Summit	UT

Site Number	Region	Artifact Type	Obsidian Source	State
CK6080/6081	Eastern	A Flake	Modena/Panaca Summit	UT
CK6080/6081	Eastern	C Flake	Modena/Panaca Summit	UT
CK6080/6081	Eastern	A Flake	Modena/Panaca Summit	UT
CK6080/6081	Eastern	D Flake	Modena/Panaca Summit	UT
CK6080/6081	Eastern	Flake	Modena/Panaca Summit	UT
CK6080/6081	Eastern	Flake	Modena/Panaca Summit	UT
CK6080/6081	Eastern	Desert Series	Partridge Creek, AZ	AZ
CK6080/6081	Eastern	A Flake	Partridge Creek, AZ	AZ
CK6080/6081	Eastern	C Flake	Partridge Creek, AZ	AZ
CK6080/6081	Eastern	E Flake	Partridge Creek, AZ	AZ
CK6080/6081	Eastern	F Flake	Partridge Creek, AZ	AZ
CK6080/6081	Eastern	C Flake	Partridge Creek, AZ	AZ
CK6080/6081	Eastern	Flake	Partridge Creek, AZ	AZ
CK6080/6081	Eastern	Flake	Partridge Creek, AZ	AZ
CK6080/6081	Eastern	Obsidian Needle	Partridge Creek, AZ	AZ
CK6080/6081	Eastern	D Flake	Wild Horse Canyon	UT
CK6080/6081	Eastern	B Flake	Wild Horse Canyon	UT
CK6445	Eastern	Desert Side-Notched	Modena/Panaca Summit	UT
CK6445	Eastern	Desert Side-Notched	Modena/Panaca Summit	UT
CK6446	Eastern	Desert Side-Notched	Modena/Panaca Summit	UT
CK6446	Eastern	Desert Side-Notched	Modena/Panaca Summit	UT
CK6913	Central	Desert Side-Notched	Modena/Panaca Summit	UT
CK6913	Central	Point tip	Modena/Panaca Summit	UT
CK6913	Central	Flakes	Modena/Panaca Summit	UT
CK6913	Central	Flakes	Modena/Panaca Summit	UT
CK6913	Central	Flakes	Modena/Panaca Summit	UT
CK6913	Central	Flakes	Modena/Panaca Summit	UT
CK8013	Eastern	B Flake	Kane Spring	NV
CK8013	Eastern	A Flake	Modena/Panaca Summit	UT
CK8163	Eastern	Flake	Kane Spring	NV
CK8163	Eastern	Flake	Modena/Panaca Summit	UT
NY1717	Western	Cottonwood Triangular	Shoshone Mountain	NV
NY1717	Western	Desert Side Notch	Shoshone Mountain	NV
NY1724	Western	Desert Side Notch	Shoshone Mountain	NV
NY1735	Western	Cottonwood Triangular	West Sugarloaf, Coso Volcanic Field	CA

What these data suggest is that there may have been some type of trading or social relationship between the Post-Puebloan occupants of the Central Region and the people who occupied western Utah near Milford. Likewise, these data demonstrate a relationship in the Eastern Region with the groups living in southwestern Utah and northwestern Arizona. Obsidian sources are different in the Western Region where local sources dominate and only a small quantity of obsidian can be traced to the Utah sources. Two California sources, West Sugarloaf and Castle Mountains, were also used during the Post-Puebloan period in the Western Region, which suggests possible trade relationships with California groups.

As mentioned earlier, Roberts and Ahlstrom (2012) recently argued that after the collapse of the Puebloan system around A.D. 1200, domination of the shell and turquoise trade shifted from trade corridors north of the Colorado River, through the Virgin Puebloan territories, to south of the river. Dominating the shell trade were Patayan groups who occupied territories along the Colorado River's south side that were held historically by Pai groups. During the historic period Kelly's consultants remembered trading expeditions composed of a small group of Southern Paiute, Chemehuevi, and Walapai individuals who traveled from southern Nevada to Hopi for cotton blankets and other goods. According to Kelly's consultants shell beads were the standard medium of exchange used by all tribes, including the Southern Paiute, Mojave, and Cahuilla. The Serrano and Shoshone also had beads (Fowler 2010).

Cultural Boundaries and Definition of Ethnic Groups

Although plain ware pottery is problematic for identifying ethnic boundaries, broad changes do occur during this period in the dominant wares. Patayan wares dominate in the excavated sites located near the Colorado River or its tributaries (except the Moapa Valley) and a mix of brown ware and plain gray ware dominate in the Western Region, the Moapa Valley, and the northern half of the Central

Region. Although it is questionable whether plain ware pottery can actually signal population movements or be equated to ethnic groups or even "prehistoric cultures" during this period, there are indications that other types of archaeological phenomena, for example those tied to art and religion, may be useful in this regard.

Others have argued that basketry is a good indicator of "prehistoric territorial boundaries" (Adovasio and Pedler 1994), and twined basketry has been linked to the migration of Southern Paiute populations into the region (Bettinger and Baumhoff 1982). The few pieces of basketry that have been collected from dated Post-Puebloan sites are characteristic of the Southern Paiute weaving tradition. Fowler and Dawson (1986: Figure 10) show that basketry types vary for Numic groups across in the Great Basin. In the present project area both coiled and twined basketry technologies were practiced, and the distributions of twined and winnowing-parching trays and coiled parching-sifting trays overlap across southern Nevada, southwestern Utah, and northwestern Arizona. According to Fowler and Dawson (1986), the region where both coil and twining was practiced resembles the approximate boundaries of the Virgin Puebloan area.

Two categories of archaeological phenomena—incised stones and geoglyphs or intaglios—are possibly more useful than plain ware pottery or basketry in identifying prehistoric cultures and regional connections. Incised stones have been found throughout the Great Basin and Mojave Desert as early as the Archaic period (Thomas 1983; Tuohy 1986), yet they are not reported at Puebloan, Hohokam, or Mogollon sites in the Southwest. Incised stones have not been recovered from any of the Puebloan sites excavated in the Muddy River, and they are not typically associated with other Southwestern Puebloan traditions. Thomas (1983) identified three styles of incised-stone decoration; the project area falls within the Southern style, which includes southern Nevada and Death Valley. This style tends to "integrate curvilinear elements and to append disparate motifs" (Tuohy 1986:230). Quinlan discusses incised stones in greater detail in Chapter 8.

Incised stones were recovered from six of the excavated Post-Puebloan sites in southern Nevada in the Western, Central, and Eastern regions (Rattlesnake site [26CK1081], 26CK1139, 26CK4440, the Sever Tanks site, 26CK4415, and 26CK2954). The pottery assemblages from these sites are highly variable, and most contain a mix of Virgin Puebloan and Patayan wares. Only the Sever Tanks site's pottery assemblage is dominated by Great Basin Brown Ware. The site with the largest number of incised stones, 26CK4440, had hearth features that dated primarily to the Post-Puebloan period, yet the pottery was dominated by North Creek Gray and other Puebloan period wares.

Intaglios or earth figures are typically associated with Yuman groups, such as the Mojave and Quechan who occupied the Colorado River and adjacent regions when Europeans first explored the region. The figures are seen as a physical representation of their spiritual world view; they served as dance or ceremonial centers; and they tell of events that occurred in the past (Rafferty Chapter 9). They functioned as identifiers of social identity or a common cultural or ethnic identity; and they served to distinguish group membership and identity (Royse 1982:7). Their presence at sites in southern Nevada (Rafferty Chapter 9) strengthens the argument for Patayan influences in the region, probably after A.D. 1000. Rafferty (2008) has made the strongest case for these connections, in the sense that Patayan or proto-Mojave groups played an active role, as occupants or visitors, in southern Nevada particularly along the Colorado River and its tributaries, such as Las Vegas Wash. The Yuman/Mojave influence no doubt continued into the Historic period, as the first Mormon settlers mentioned the Mojave visiting the Las Vegas Valley, and the Chemehuevi combine both Southern Paiute and Mojave cultural practices.

In summary, the Colorado River tribes strongly influenced the Post-Puebloan groups occupying the Eastern and Central regions of southern Nevada. Obsidian sources and the presence of incised stones at Post-Puebloan sites in the Western Region and the northern edge of the Central Region suggest equally important ties to the Great Basin. The presence of fairly large quantities of obsidian from more than 200 miles away in the former Parowan Fremont heartland may argue for some type of affinial or trade connection with the Post-Puebloan residents of western Utah. Sites that contain the largest quantities of Utah obsidian are found it the arid slopes of the Apex area. Lesser amounts of Wild Horse Canyon and Modena/Panaca obsidian have been reported at sites in Wetlands Park and in the Moapa Valley. The Wild

Horse obsidian quarry is a massive obsidian flow in the Mineral Mountains, which has been used since the Paleoindian period. Since the obsidian from this quarry occurs in large pieces it was likely a desirable trade item, and many of the sites containing this obsidian are located not too distant from the approximate route of the Spanish Trail. The Gold Butte area is linked to the Virgin and Kayenta culture areas located to the east, and there are hints in the archaeological record that this area may have served as a refugia for Moapa Valley's Virgin Puebloan populations, or possibly a stopping off place on the migration east.

Fit of the Numic Models

How do these data support the various models proposed for the Numic migration into the region? Our analysis suggests a picture of greater complexity than each of the proposed Numic migration models imply. Some of the influences and practices, for example, the continued use of farming and Patayan cultural influences, are not taken into account by these previous models. Patayan/Yuman material culture and ideological systems appear in the region around A.D. 950. Buff ware pottery made with paddle and anvil techniques and intaglios associated with trails occur as far north as Clark County Wetlands Park in the Central Region and as far east as the Gold Butte area of the Eastern Region. The movement of Patayan/Yuman groups north along the Colorado River and into the Mojave Desert, visible in the archaeological record, have not been incorporated into any of the current models that argue for or against prehistoric-ethnographic discontinuity.

The importance of farming in the region's economy during the Puebloan Period, and possibly the Post-Puebloan Period, has also not been incorporated into these models. Bettinger and Baumhoff's model (1982) focus on the shift from a highly mobile hunting-driven economy to a seed-based one, and technological advances are invoked to explain the process of cultural replacement. Their models, and a third one by Sutton and Rhode (1987, 1991), ignore the evidence in the Central Region's prehistoric record for farming economies that began during the Terminal Archaic period, and continued into Historic period. Their models also do not incorporate wild plant species, such as mesquite pods, which are common in southern Nevada, but absent throughout most of the Great Basin.

Only Gunnerson (1962), Aikens (1994), and Lyneis (1994) consider the importance of farming in their models. They do not, however, consider the possibility that farming continued during the Post-Puebloan period. Aikens and Witherspoon's (1986; Aikens 1994) model fits the evidence for continuity in lifeways in the region during the Archaic, and they recognized that agricultural groups occupied the Great Basin's eastern and western edges until periods of aridity occurred. However, the growing evidence that farming continued into the A.D. 1500s and possibly later in the Moapa Valley is a game changer (Gilreath 2012: Table 17, see House 47, Site 26CK7592).

Lyneis' (1994) idea of "mutualism" best captures the complexity inherent in the archaeological record. She proposed that Great Basin Brown Ware pottery makers were co-residents with the Puebloans. As foragers, the makers of Great Basin Brown Ware traded goods, such as skins and meat, which they procured from the Upland areas, with the Puebloans for cultigens, salt, and pottery. Trade relationships between Great Basin groups and Puebloan groups could account for the mixed appearance of archaeological deposits at the O'Malley and Conaway caves, and at shallow caves throughout the region. It could also explain the early luminescence dates on brown ware.

The million dollar question remains: What happened to the Puebloans who occupied the Moapa Valley? Drought would probably not have stopped the flow of the Muddy River's many springs, so falling rainfall and a drying environment cannot fully explain the dramatic cultural changes. Perhaps the Puebloan abandonment of the area can be explained in terms of population pressures from groups like the Patayan/Yumans and possibly other groups from the north such as the Athabaskans, who would become the Navajos and Apaches. Could population pressures that resulted in territorial skirmishes, or even warfare, explain the mixing of ceramic assemblages and the other changes in the archaeological record? Did these pressures become too great for the Puebloan groups driving them east into the uplands of the Shivwits Plateau, or possibly to join other Puebloan groups? Did some Puebloans chose to stay, moving to more sparsely populated upland areas, or blending with Great Basin groups located in western Utah

who brought their obsidian with them when they moved south to share the sparsely populated Moapa Valley? This could explain the late luminescence dates on gray ware and the presence of Utah obsidian.

It is not clear when European exploration and settlement of the region began impacting populations with their host of new diseases and territorial disruptions. Insect-borne diseases introduced from Europe, such as malaria, were endemic in the region when the first Mormons attempted settlement (Larson 1950: 39; Roberts 2002b; Sterner and Ezzo 1996: 100; Tobiasson and Hall 2010:7). Malaria likely traveled through Native populations much as European cultigens did. Wheat and watermelons were being cultivated by the Southern Paiutes when the Mormons entered the region; presumably these plants or their seeds were obtained by the Paiutes from the tribes like the Mojave, who traded with tribes from southern Arizona who were in contact with the Spanish (Fowler and Fowler 1981). Diseases such as smallpox, malaria, et al. likely arrived along the same route that Euroamericans cultigens followed into the region. A demographic collapse, perhaps equating to the decrease in radiocarbon-dated components around 1600, and then again around 1750, would have caused further disruptions and resulted in mixing of ethnic groups as survivors banded together. By the time that Isabel Kelly et al. began recording Southern Paiute lifeways, some of the largest bands, such as those along the Santa Clara, Virgin, and Pahranagat rivers, had been completely eliminated by epidemics, the slave trade, and a plethora of other cultural disruptions.

Perhaps the "messiness" of the Post-Puebloan period's archaeological record, characterized by mixed artifact assemblages, disruptions in settlement patterns, and abandonment of architecture, are all a reflection of this chaotic period of change. The consequence of these pressures was increased settlement mobility, which in turn resulted in a decline in the visibility of the archaeological record (Upham 1988). Some of these cultural disruptions were no doubt caused by regional climate changes, the resulting population pressures, and by the push of Native American groups—Yuman, Athabascan, and Numic groups—into the region. Over time, these groups merged with the existing populations (Chemehuevi) and forged new ties along the periphery. In summary, the Post-Puebloan period's jumbled mix of artifact assemblages and the dramatic changes in settlement and subsistence strategies are all a reflection of a complex mosaic of regionwide culture change, which began with a regional drought in the twelfth century. The pace of these changes, and their impacts, accelerated with European colonization of the New World after 1492.

CHAPTER 8
ROCK ART

Angus R. Quinlan

Rock art is a widespread archaeological manifestation found throughout the western United States. A broad characterization of rock art is "the creation of visual images by painting or carving stone at particular places in the landscape. It is not a unitary phenomenon and it exhibits a wide range of variation across time and space" (Bradley 2000:65). Using this characterization, rock art would encompass inscriptions, and free-standing sculptures as well as petroglyphs and pictographs, all connected by their association with unaltered landscape features (Bradley 2000:65). This characterization draws attention to the landscape significance of rock art and the rather arbitrary classification of archaeological features as rock art. A more restrictive definition (used here) is that rock art comprises all forms of intentional, culturally meaningful, markings (Bednarik 2001:31-32), made on bedrock, boulders, cliff-faces, and cave ceilings and walls, as well as other modifications of the natural landscape, e.g., geoglyphs (or rock alignments). Rock art comprises two principal forms, petroglyphs (peckings, engravings, etchings, and scratchings) and pictographs (paintings). Petroglyphs are the most common form of rock art in southern Nevada (209 sites, 26 of which co-occur with pictographs) and most were made by removing the patinated surface of the rock, though examples made on unpatinated rock surfaces are known. Pictographs were made by adding pigment or charcoal to a rock surface and may have once been more frequent than their current distribution indicates (42 sites, 26 also co-occur with petroglyphs). This rock art type is, however, less likely to survive in exposed environments, which is why their distribution trends to rockshelters, caves, and other landforms or contexts that offer some protection from the elements. Less common in terms of number of sites (28) but relatively frequent in terms of number of specimens, are incised stones. This is a class of mobile rock art that was not necessarily deposited in its original landscape context.

Because it is difficult to scientifically date petroglyphs and there are limited opportunities for taking samples from pictographs for radiocarbon dating, rock art data lacks chronological resolution (for a review of current dating methods, see Livingston et al. 2005: Table 2). This makes rock art particularly difficult to integrate with mainstream archaeological research themes and is reflected in the sporadic interest Great Basin and Southwest archaeologists have paid to rock art until relatively recently. Styles are broadly defined and researchers use different criteria, methods, and understandings of "style" in classifying rock art data. Inevitably, explanatory theories of rock art's cultural functions have tended to be general. Also, identifying temporal sequences is complicated by rock art being an open-air monumental form. It is often highly visible and its use-life extends well beyond the act of its creation. Knowing when rock art was made does not address how long it was used. Intrasite superpositioning and visible differences in surface repatination are frequently noted at rock art sites (Woody 1996, 2000), indicating that rock art sites attracted interest and provoked cultural responses from those who encountered well after it was made (Bradley 2000; Quinlan and Woody 2003). Sites that exhibit multiple generations of production indicate that rock art was made, modified, or enhanced as a discontinuous but repeated process, perhaps over long periods (Woody 1996). Accordingly, explanations of rock art can only detect broad trends in its past uses, and styles defined solely on morphological and thematic criteria need to be cautious about inferring chronological sequences and cultural affiliations.

HISTORY OF RESEARCH

Rock art in the Desert West has long attracted the interest of Euroamericans. Descriptions first appear in scholarly literature by at least the mid-nineteenth century (e.g., Schoolcraft 1851-1857). The first general survey of Great Basin and Southwest rock art appears in Mallery's (1886, 1893) study of Native American systems of visual communication. The first systematic archaeological study of the

Desert West's rock art was made by Steward (1929), who synthesized data for the region, characterized rock art content and styles, and outlined the distribution of various styles. This was followed in the 1960s by Heizer and Baumhoff's (1962) synthesis, which refined Steward's style definitions, outlined a general chronology of styles, and theorized rock art functions and meanings. Subsequent researchers have criticized (e.g., Hedges 1982) and re-worked Heizer and Baumhoff's stylistic schema, particularly Schaafsma (1980, 1986, 1994a, 1994b), leading to the development of a regional stylistic sequence for Ancestral Puebloan and Fremont rock art that is of considerable importance for classing southern Nevada rock art.

Regional studies or systematic research into southern Nevada rock art are generally rare. Until relatively recently, the overall pattern has been of *ad hoc* data collection, often by amateurs interested in rock art to the exclusion of other archaeological features. Important exceptions are a master's thesis by Green (1987) that used a dataset of 106 sites from a sample of 129 rock art sites in the NSM record system at that time. Green provided summary descriptions of site structure and rock art styles represented, relating these to other archaeological features and environmental variables. Far Western's work in the Gold Butte area is the most current archaeological inventory project to record a large sample of rock art sites and place them in a broader archaeological context (Gilreath 2010). Other important studies that relate rock art to its broader archaeological setting include HRA Conservation Archaeology's survey of the Lower Canyon area (Eskenazi 2010), Far Western at Sloan Canyon NCA (Duke et al. 2004), and HRC at Logandale Trails (Winslow 2004). Many professional archaeological inventories of major sites and areas exist only as IMACS site forms, variably are uploaded into NVCRIS, and unsynthesized in research narratives.

DATING ROCK ART

Determining when a particular rock art panel was made has proved particularly challenging. Rock art is usually not deposited in dateable, stratified deposits and generally lacks organic or other materials that can be subjected to chronometric analysis. Direct or scientific dating methods are restricted to types of rock art (primarily pictographs) that contain some kind of organic or other material that can be sampled. Even in cases where carbonaceous samples can be taken from rock art and subjected to radiocarbon analysis, the results are often very difficult to interpret and are not necessarily a determination of the date that rock art was made (and does not address the age of use unless a wide range of samples are taken and dates obtained). The most reliable direct dating methods are restricted to pictographs; only in rare and specialized circumstances has it proved possible to apply direct dating methods to petroglyphs (Bednarik 2001). Researchers have relied heavily on relative dating methods to estimate the age of rock art, in particular analyses of superimposition, style, and iconography. Relative methods may be able to discern general sequences in rock art data, but provide only broad and often subjective estimations of minimum and maximum age.

The perception that it is not really possible to date rock art has often been seen as an important hindrance in its study. But, if dating an archaeological feature or artifact is understood as establishing the date it was made and determining the age of its use through rigorous scientific methods, then much of the Great Basin's archeological record is not directly datable. Most artifacts found are not directly dated by analyzing samples taken from them. Inferring the age of features and artifacts that occur in datable stratified deposits determines their date of deposition, not necessarily the date of their production or use. Great Basin chronology is heavily reliant on relative dating methods, in particular, using projectile point typologies identified through metric classification and ordered chronologically with reference to radiocarbon and obsidian hydration data, to estimate the age of similar surface artifacts. In this regard, rock art is not much different from other surface artifacts or features that are dated by association with other archaeological materials that co-occur with them.

The most common direct dating methods applied to rock art are based on radiocarbon dating of mineral accretions over or underlying rock art and radiocarbon analysis of inclusions in accretions. Some mineral accretions, such as reprecipitated carbonates, contain radiocarbon derived from atmospheric

carbon dioxide. But, carbonate accretions are subject to the problem of radiocarbon rejuvenation from the deposition of younger solutes in porous rocks. Densely crystalline carbonate deposits, particularly stalagmites and stalactites, have proved the most reliable source of dates from carbonate accretions. For southern Nevada, to date, no rock art has been reported to be concealed by stalagmites or stalactites. Radiocarbon dating of mineral accretions coating or underneath rock art at best could provide maximum and minimum age estimates for the date of its production. Because of the problems of radiocarbon rejuvenation, dates derived from carbonate mineral accretions (and also mineral inclusions that they might contain) are extremely complex to interpret. Oxolate accretions, although also subject to radiocarbon rejuvenation, are less porous than carbonates and in ideal circumstances have produced reliable age sequences (Bednarik 2001:125). But such accretions are rare in southern Nevada rock art and radiocarbon dating of oxalate or carbonate coatings is of limited application.

The most common mineral accretionary deposit on southern Nevada rock surfaces are rock varnishes, ferromanganous coatings that are best preserved in arid regions. Rock varnishes are one type of weathering rind that may contain small quantities of organic material derived from aeolian deposition, local microbial metabolic products, and vegetal-derived detritus. AMS dating has been used to date carbonaceous material and inclusions in rock varnishes that coat petroglyphs. Unfortunately, this produces unreliable and inaccurate dates as rock varnishes are open carbon systems with "substantial differences in the composition, pH and organic matter concentrations within the nano-stratigraphy of such deposits" (Bednarik 2001:127). Although rock varnishes are very thin, they are composed of complex stratigraphies that are in part due to cation recycling by microbes that may also effect the inclusion of introduced matter (Bednarik 2001:126).

In contrast to radiocarbon dating of rock varnish, analysis of organic material found in silica crusts has produced acceptable tentative minimum and maximum ages for rock art. Silica crusts are apparently a relatively closed carbon system compared with ferromanganous coatings. They also are not subject to recycling of cations by micro-organisms (Bednarik 2001). As noted previously, however, this method does not provide an actual date for the rock art and its application is limited to silica crusts that contain carbonaceous material covering rock art.

As a consequence, radiocarbon dating has proved to be of limited value in dating petroglyphs and it has primarily been used on pictographs. Painted rock art was commonly made by combining liquid materials (a "binder") with colored minerals to produce a pigment. If the binder used was organic, then it is potentially datable using standard radiocarbon methods. Unfortunately, it appears that the most common liquid used to make binders was water (Woody and Frock 2006), which is not datable. In addition, if pictographs are extremely weathered, there is unlikely to be enough of the original binder remaining to be successfully sampled. In many cases, all that remains of a pictograph is just the mineral component that has stained the surface of the rock, so radiocarbon analysis would only reveal the age of the mineral, not the date it was applied to a rock surface. And, rock surfaces are usually open carbon systems that can be affected by a range of processes, much like inclusions in accretions as previously described (Bednarik 2001:140).

Other direct dating methods of limited application to southern Nevada rock art include lichenometry and microerosion analysis. Lichenometry can provide an estimate of rock art's maximum and minimum ages by dating lichens that have colonized a pecked surface or, alternatively, lichens that have been cut through during petroglyph manufacture. This method is only accurate up to 500 years and is rarely used by rock art researchers (Bednarik 2001). Microerosion optically analyses chemical weathering processes that affect the newly formed rock surface created during petroglyph manufacture, especially in unsheltered environments, and is applicable only to comparatively erosion resistant rock types, mainly those comprising crystalline quartz. The method currently has inadequate calibration curves and its accuracy is limited in the absence of further research (Bednarik 2001).

One experimental direct-dating method (X-Ray refraction or XRF) developed in Nevada for petroglyphs has attracted much attention because, if validated, it offers the prospect of a non-destructive, reliable direct dating method. The basic method relies on measurement and chemical analysis of rock varnishes and can be summarized as:

> The chemical analysis of (1) the repatinated glyph and (2) the base rock material are made with a portable XRF instrument. Subtracting #2 from #1 produces the amount of material that has formed in the desert varnish on the glyph. Calibration from surfaces of known age (determined by cosmogenic nuclide analysis) are used to construct an age vs. element concentration calibration curve, from which the ages of the glyphs may be determined [F. W. Lytle, personal communication, July 2007].

More recently, Lytle has described the method:

> A comparison of the geochemical composition of the desert varnish on base rocks to that on analyzed petroglyph elements is the basis for developing a calibration curve of age vs. X-ray intensity. The major elements in the desert varnish of specific concern to this analysis are manganese (Mn), iron (Fe), and lead (Pb), with variably rubidium (Rb) and strontium (Sr). These last two usually occur in lower amounts in the base rock than in the revarnish, i.e., they are leaching out. A basic time-transgressive trend is that the amount of manganese and iron progressively builds up with increasing age" [Gilreath et al. 2011:55].

The XRF method remains experimental, given the absence of detailed descriptions of its theory and critical peer review.

Indirect dating methods have largely been relied upon to gain broad estimates of the age of rock art. Rock art occasionally is covered by sediments that can be assumed to be younger than the rock art. In some cases these may contain some datable materials that allow an age estimate. Time-related alterations of rock surfaces provide a general idea of age when comparing between different motifs. Weathering and patination processes are highly variable, however, and there is no simple method of quantifying surface changes (Bednarik 2001).

Superimpositioning provides a reliable way of determining relative sequences of rock art as it can be safely assumed that an underlying petroglyph is older than one that overlies it. It is not possible, however, to estimate how much older or younger superimposed petroglyphs are, even based on the visual appearance of variability in petroglyph repatination. Also, superimpositioning may be a deliberate stylistic choice meaning that the time elapsed between the making of the superimposed petroglyphs is very short. Superimposition, therefore, only allows for determination of relative age and estimation of the general sequence (Bednarik 2001).

Rock art's proximity to other archaeological resources provides only the most general indication of the age of a rock art assemblage. Such spatial relationships have the potential to provide evidence of rock art's continuing use and relate it to other activities, even if it does not date when a body of rock art was made (and see discussion later in this chapter).

The most reliable relative dating method is iconographic analysis. Identifying time-sensitive artifacts or themes portrayed in rock art allows a broad estimate of age. Unfortunately, it is extremely difficult to identify such subjects in most southern Nevada rock art, other than anthropomorphs with cowboy hats, horses, wagons, and so on, that identify Historic period images. Prehistoric subjects are generally limited to occasional portrayals of triangular forms that resemble projectile points, the bow, and atlatls. Bows can be reliably identified in recognizable hunting scenes. Atlatls in rock art are rarely portrayed in hunting scenes and are often little more than circles bisected by a long vertical line. In any case, identifying atlatls or bows only allows for very broad age determinations. As style is fundamental to ordering rock art data, its use to date rock art is discussed here as part of a more extensive discussion of stylistic analyses of southern Nevada rock art.

STATE OF THE RECORD

Rock Art

The project survey database contains records for 225 rock art sites (Table 8.1 and Figure 8.1); this compares with 239 sites just from Clark County used by Woody (2000:Table 4) in a doctoral dissertation and the 296 sites, also from Clark County only, reported by White (2002:20) for a rock art resource management plan. Woody (2000) reported that only 40 Clark County site records in her sample contained information beyond describing the presence of rock art and its location. Much rock art data have been recorded using outdated and inconsistent methods, and is reported in very summary style. Also, records do not make detailed observations about style types, site size, and other factors, One recording tool that would allow for better recordation is a standardized motif key, which has not been developed to collect these data. Overall, the average site record is often little more than a dot on a map; the presence of rock art is mentioned but not its style, quantity, or context. Photographs and drawings are done of selected, visually arresting panels, not a complete or even representative sample. Existing rock art data, therefore, is generally impressionistic, exemplified by project databases where only 37 site records assign the rock art to a broad culture period, "Anasazi/Puebloan" being the most common.

Table 8.1 Summary of Rock Art Sites in the Project Survey Database

Petroglyph only sites	Pictograph only sites	Combination sites
183	16	26

Although 73 site records note the presence of associated archaeological features and artifacts (Figures 8.2–8.4), inconsistent reporting standards makes it difficult to draw generalizations. Rock art co-occurs most frequently with ceramics, ground stone, middens, and roasting pits. Diagnostic projectile points reported in association with rock art are too few for dating by association (five Elko series, one Corner notched, five Cottonwood, and two Desert Side-notched). The only observations that can be made from these data are that rock art appears to be accompanied by the residues of regular economic routines, but particularly those related to processing vegetal resources and heating.

Spatial variability in site size, style distributions, motif types, associated archaeology, and landscape contexts cannot be quantified or tracked across the southern Nevada region using existing data. Instead, only general observations can be made; they require testing against more empirically based data. In general, sites appear to be small in size compared to elsewhere in Nevada. The two largest single sites in southern Nevada (Sloan Canyon [26CK2240/2261] and Grapevine Canyon [26CK12]) both comprise 300 to 400 rock art panels (Quinlan et al. 2007; Quinlan 2010) but these appear to be exceptions to the general pattern as the next largest sites reported usually contain 60 to 100 rock art panels (e.g., Little Red Rocks [26CK470] [Woody et al. 2008] and Keyhole Canyon [26CK123] [White 1997]). Rock art is often found in concentrations of sites comprising 30 panels or more. Gold Butte, for example, has 42 sites or localities and 379 rock art panels (Gilreath 2010). Other major concentrations of rock art sites include Valley of Fire State Park, Red Rock Canyon, and Arrow Canyon. In comparison, the largest recorded rock art site in Nevada (26ST1) contains more than 2,200 panels (Woody et al. 2009) and to the north in the Reno-Sparks area, 28 recorded sites (out of an estimated 130 known sites) in the Pah Rah Range contain a about 1,000 panels. Southern Nevada rock art is distinguished by a greater diversity of motif types present at its rock art sites and by a greater emphasis on anthropomorph and zoomorphs (Woody 2000). This impression, however, may be due to motif types that are readily identifiable to type that are more visually prominent in the region's rock art.

The relationship between rock art site distributions and the archaeological subregions defined during this project is an important one (Figure 8.1). Because the data are largely dots on a map, it is not possible to correlate site size, styles, or associated contexts to subregions. In general, however, rock art is much less frequent in the Western Region compared to the other regions, where it has been reported in roughly equal numbers. The two largest single sites are located in the southern corner of the Southern

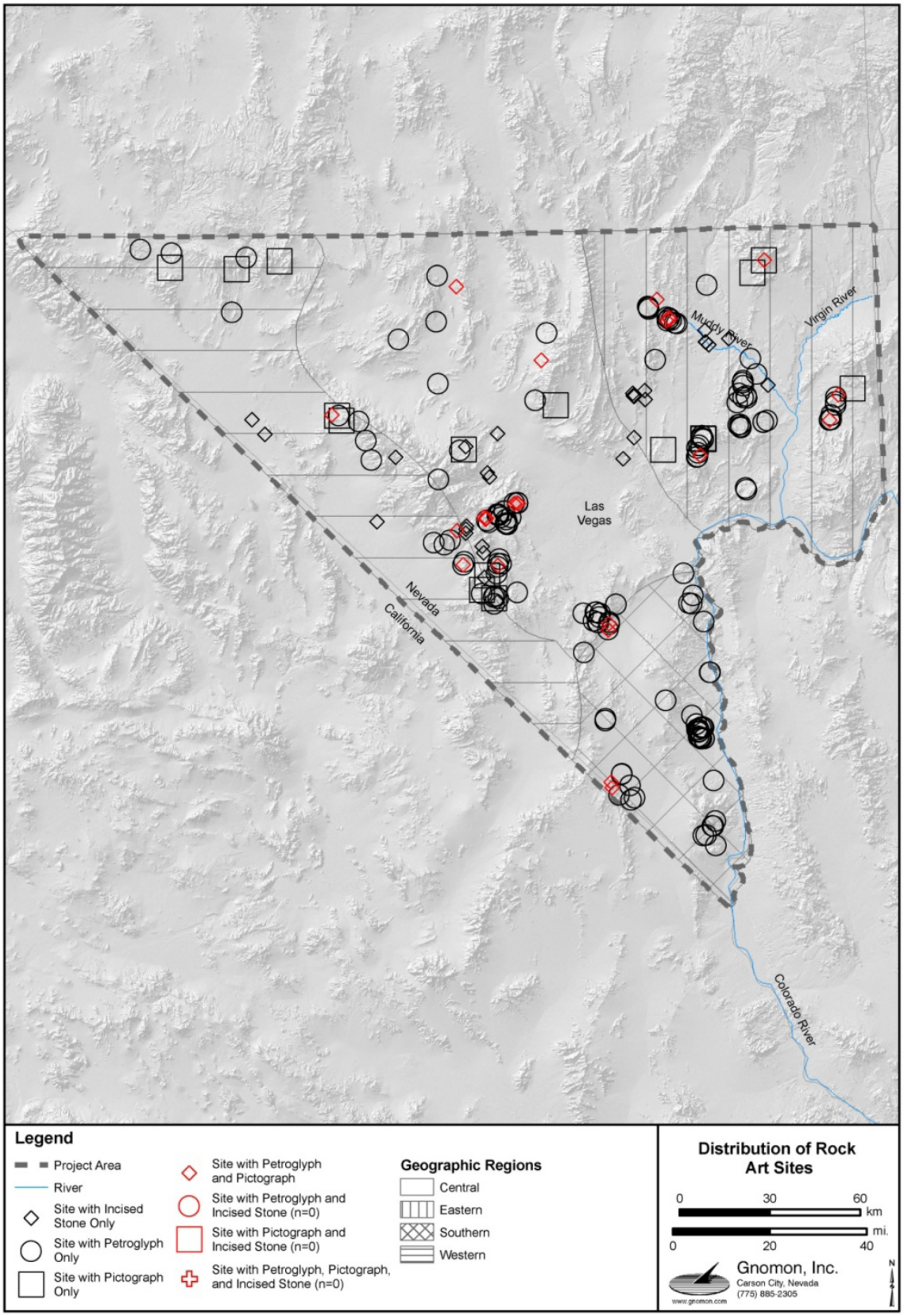


Figure 8.1. Distribution of rock art sites in the project area.

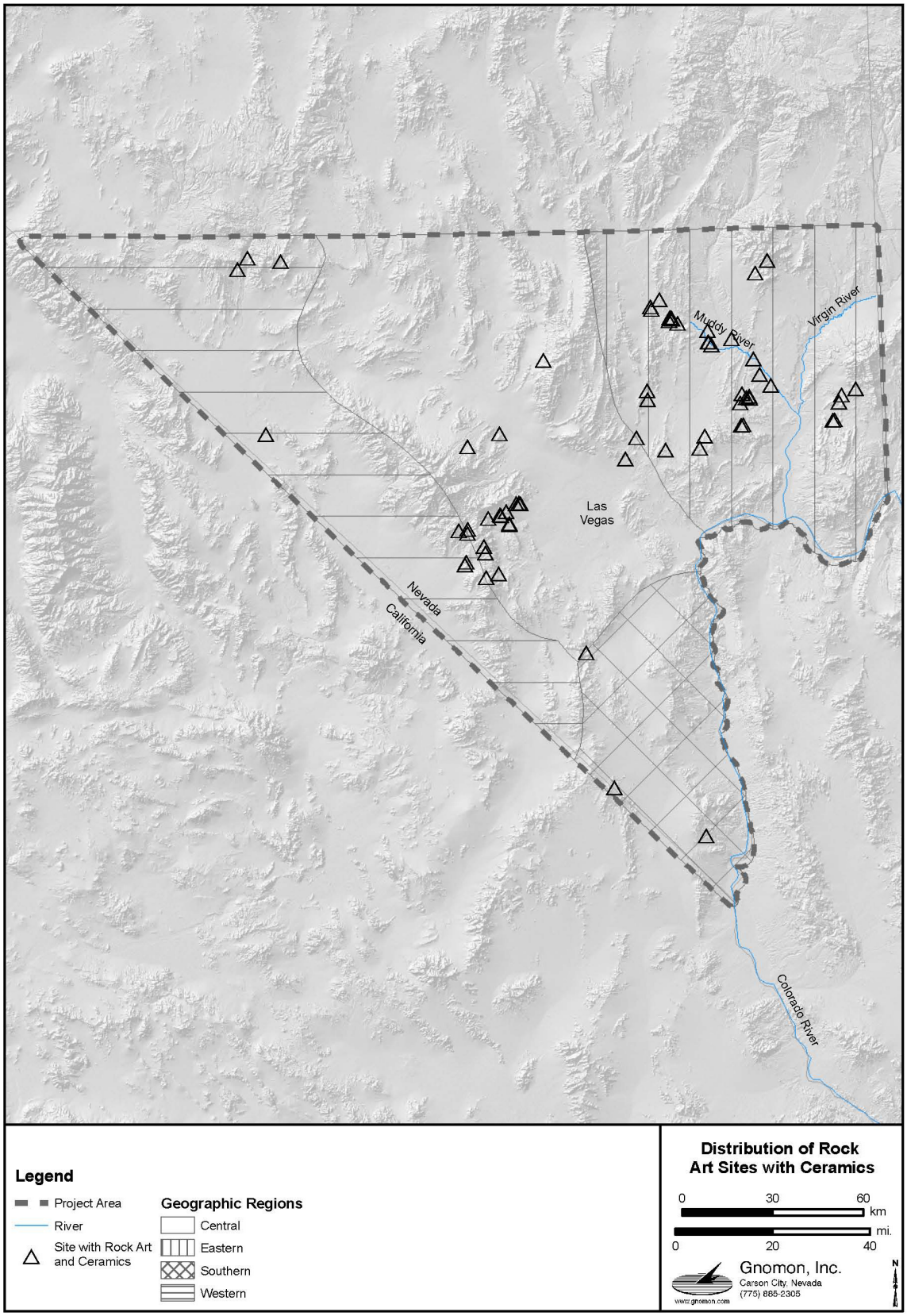


Figure 8.2. Distribution of rock art sites with ceramics.

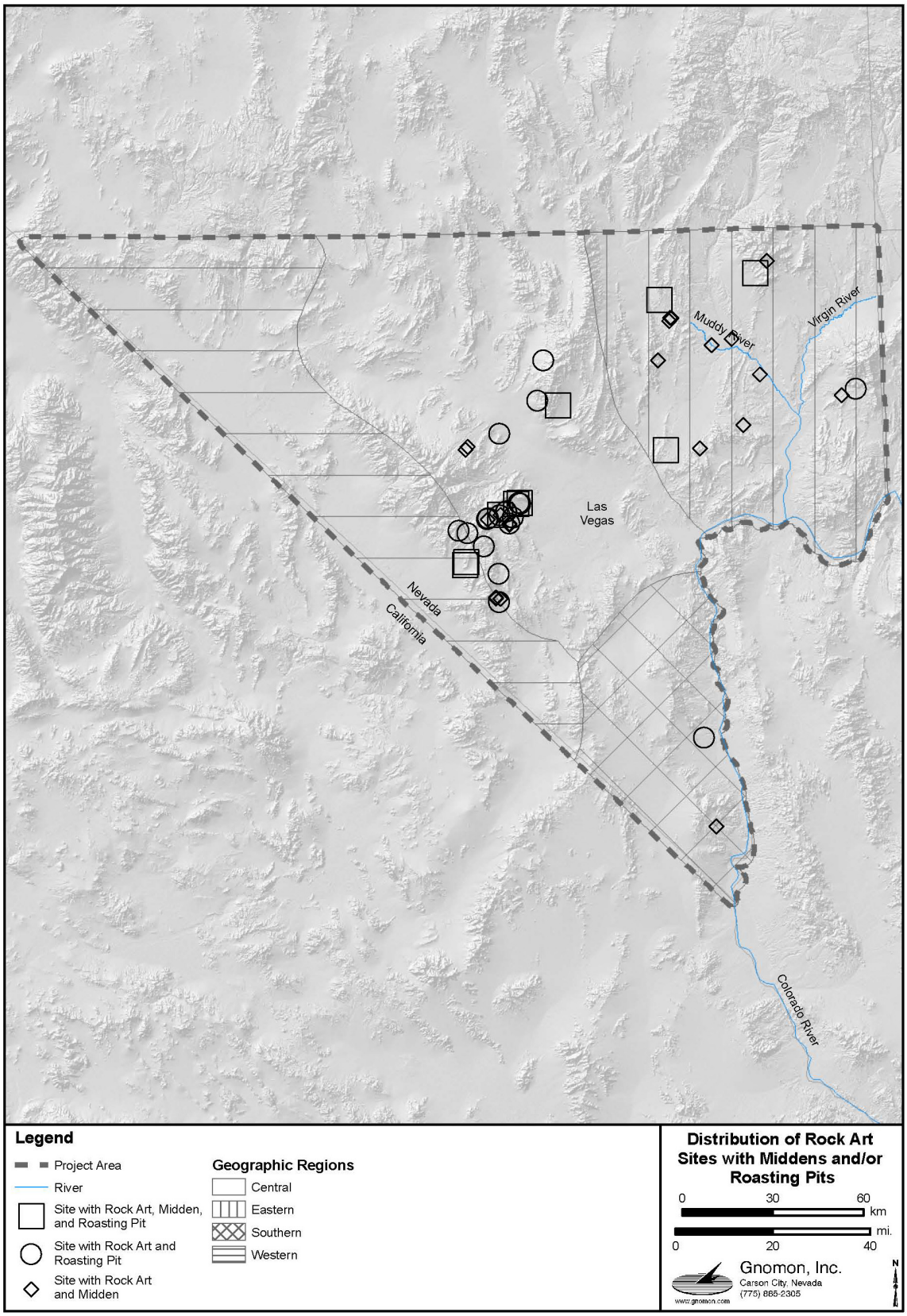


Figure 8.3. Distribution of rock art sites with middens and/or roasting pits.

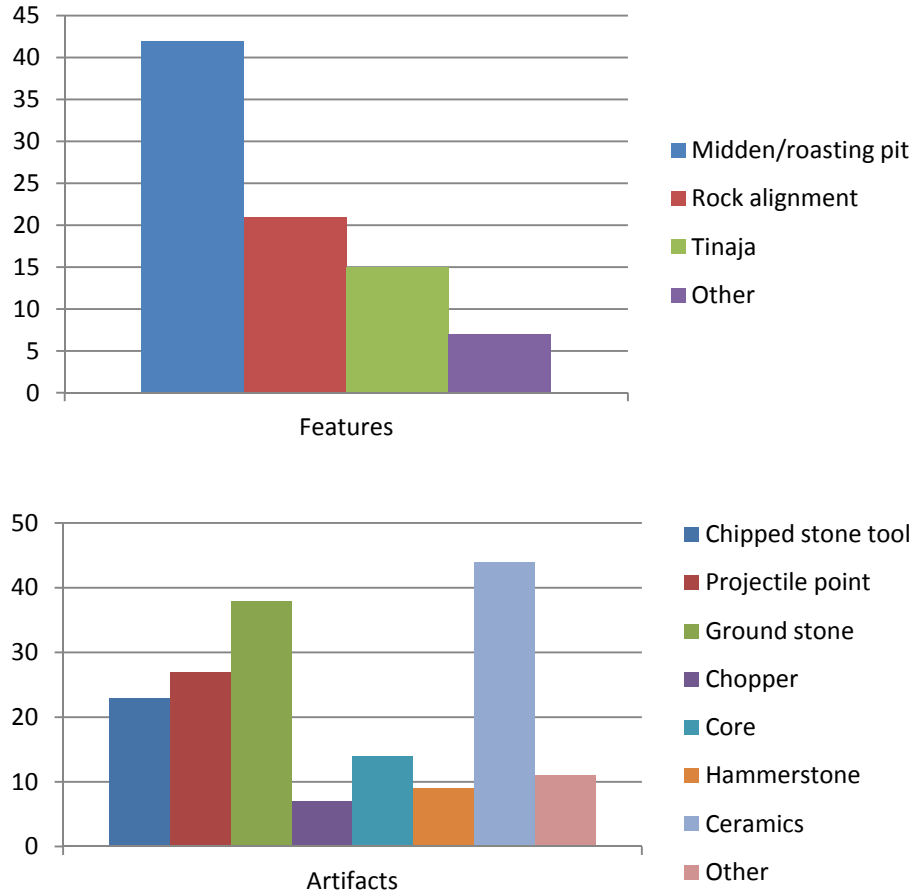


Figure 8.4. Archaeological features and artifact types reported at rock art sites in the project database.

Region (26CK12) and in the south-central section of the Central Region (26CK2240/2621). Significant concentrations of sites are located in the Southern, Central, and Eastern regions but the latter region's site distribution pattern appears focused in three principal areas: Valley of Fire State Park, Gold Butte, and Arrow Canyon. The distribution of major styles in the project regions are discussed in the Style, Time, and Cultural Affiliation section of this chapter.

Incised Stones

Unlike petroglyphs and pictographs, incised stones occur in stratified contexts and their association with other artifacts allows some temporal trends in their use and distribution to be identified. They are widely distributed throughout the Great Basin and have been reported from surface sites and excavations (Tuohy 1986). Southern Nevada has a large number of specimens known from surface collections made by private collectors (Santini 1974). In general, the distribution of incised stones trends toward open sites, though they are also found in caves and rockshelters, suggesting an association with habitation sites (Klimowicz 1988:24 and 27).

In general, southern Nevada incised stones are made on sedimentary rocks, particularly sandstone. Design elements are largely rectilinear or curvilinear geometrics: parallel lines, perpendicular lines, semicircles with externally radiating lines, zigzags, triangles, and dense cross-hatching (Santini 1974:7-9). The distribution of incised stones appears concentrated in the Las Vegas Valley, Spring Mountains, and Sheep Range areas in the Central and Eastern regions (Figure 8.1).

In the Great Basin incised stones occur through the entire Archaic period, but they appear to be most common in the late Early Archaic and the late Middle Archaic-early Late Archaic periods based on associated archaeological materials. Brown ware ceramics, Elko Series, Rosegate Series, and Desert Side-Notched points are the most commonly associated diagnostic artifacts found in association with incised stones (Klimowicz 1988:40; Santini 1974:6). Incised stones rarely co-occur with Puebloan ceramic types (Klimowicz 1988:26) and are not found at Puebloan sites in Moapa Valley or at Virgin Branch sites in Utah (H. Roberts, pers. comm.) indicating that they may be a material culture trait largely associated with hunter-foragers in southern Nevada.

STYLE, TIME, AND CULTURAL AFFILIATION

Although the record for southern Nevada rock art is patchy, stylistic studies have identified general trends and themes relating to chronology and cultural affiliation. The broad cultural context of southern Nevada is generally a long continuum of hunter-forager groups practicing varying economic and settlement systems punctuated by a period of semi-sedentary horticulture (White 2002). Given the general inferences made in the Great Basin and Southwest about population dispersals and their archaeological signatures (Madsen and Rhode 1994), identifying changes in rock art style that can be related to culture history is an important research theme. Researchers have sought to identify specific stylistic traits that relate rock art to the emergence of Fremont and Puebloan cultural systems (Schaafsma 1980, 1994a; Turner 1963), and the dispersal of the Numic language family (Bettinger and Baumhoff 1982; Quinlan and Woody 2003). The relative balance between "representational" and abstract imagery also has implications for understanding the social functions of rock art (Bradley 2000; Layton 2000; Quinlan and Woody 2003) and, for some researchers, is related to ethnic self-identification (Gilreath 2010). It should be remembered that "what style can 'tell' us about *is* not culture or groups *per se*, but the contexts in which group or other social/cultural phenomena are mobilized as process" (Conkey 1990:15).

Style is fundamental to classifying, ordering, and consistently describing rock art data. Styles are traditionally defined based on a combination of method of execution and then a consideration of motif types or themes portrayed. Most stylistic definitions try to relate observable differences in style to different periods or cultural identities that can be related to known archaeological cultural groups (e.g., Schaafsma 1986; Gilreath 2010). Although this method can be useful for broadly determining the age and general sequence of rock art assemblages, stylistic differences are also functional and therefore cannot be equated simply with ethnic identities or chronological periods (Layton 2000; Ucko 1987). Style is a choice of how and what to depict, and in most cultures artists select from a culturally defined set of styles, depending on context (Boas 1955 [1927]; Layton 1977). Styles, therefore, reflect social or symbolic practices that are not necessarily coterminous with cultural boundaries; attributions of cultural affiliation have to be demonstrated using temporal data and not inferred from formal stylistic analyses.

Southern Nevada rock art styles have been defined in the wider context of Great Basin and Southwest rock art studies. These studies generally have characterized the rock art record as ranging from abstract forms to naturalistic ("representational") forms. In fact, it is more accurate to characterize this as an abstract continuum that ranges from purely geometric to schematic forms. The motif types researchers traditionally recognize as "representational" are schematic depictions of things that external analysts can identify the ostensive references of (chiefly humans and animals) and recognize the different choices made by the artist in what to and not to depict (style). Accordingly, distinct styles that have temporal and cultural correlates have been defined based on classificatory criteria that treat schematic motif types as diagnostic traits, separating these from accompanying abstract forms. The potential problems this raises for seeking to explore southern Nevada culture history through rock art are discussed next.

Early Great Basin Stylistic Studies

Steward's (1929) study is the first attempt to systematically describe the thematic and stylistic attributes of rock art throughout the Desert West. Steward summarized data from brief reports and illustrations sent to him by locals. He recorded information on 31 Nevada rock art sites, 18 of which were

in“southern Nevada” (broadly defined to include Clark, Nye, Esmeralda, and White Pine counties). Steward’s study contains an extended summary of the Grapevine Canyon site, reproducing illustrations of motif types that later researchers (Christensen and Dickey 2001) treated as diagnostic of a distinct style affiliated with the Patayan. Steward (1929) identified four general areas of rock art styles and motif types (Figure 8.5). He characterized most Nevada rock art (including southern Nevada) as belonging to “Area A.” The style is comprised of large numbers of geometric designs with curvilinear types the most common and rectilinear motifs more limited in distribution. Naturalistic zoomorphs, principally bighorn sheep, were described as characteristic of the area. Eastern and southeastern Nevada also belong to “Area B,” which shares the same geometric and zoomorphic design types as “Area A” but also includes rectilinear lizards and elaborate anthropomorphs (referred to as “kachina”-like). Steward’s study is the first systematic example of identifying styles by using formal (morphological) variation in motif types in which analysts can identify the apparent referential subjects.

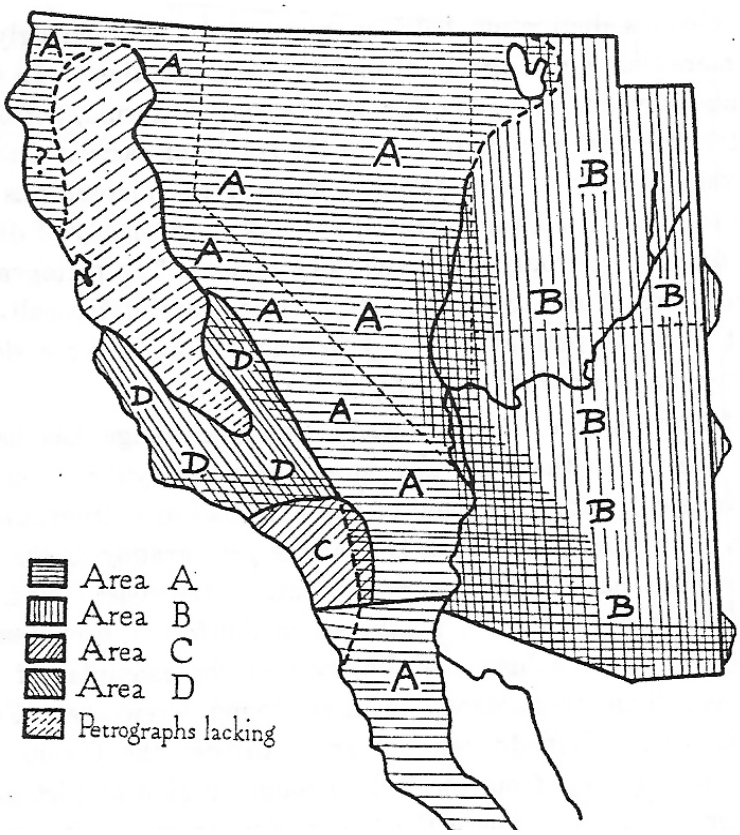


Figure 8.5. Style zones of Western North America (Steward 1929:Map D).

Steward also used a quantitative approach to abstract motif types and themes in characterizing his broad stylistic zones, identifying the important research theme of the ratio between schematic and abstract imagery in rock art assemblages as a characteristic of stylistic variation. This general approach has some promise if quantitative methods are used to identify stylistic zones based on assemblage composition and the varying frequency of motif types at sites in various regions. Whether these correlate to the distribution of morphologically distinct motif types is an important research theme that current data cannot address because motif data have not been collected or counted systematically. With a few exceptions (Duke et al. 2004; Quinlan et al. 2007; Gilreath 2010), most site records for southern Nevada do not tabulate this data. The absence of a standardized motif key is a hindrance to systematic collection of such data.

Despite the inherent flaws in a survey based on impressionistic reports and lacking systematic field inspection, Steward's (1929) study represents an important first step in identifying spatial variability in styles and motif types across the Desert West. His general approach of selecting 50 motif types to identify spatial patterning retains merit, though the motif types would need to be expanded, and his anthropomorph and zoomorph categories subdivided into distinctive subtypes now recognized.

Following Steward (1929), the next major study of Nevada rock art was done by Heizer and Baumhoff (1962), who described summary information for 99 Nevada rock art sites, 16 of which are in Clark County, to theorize on the functions of prehistoric rock art and define a stylistic sequence for the region's rock art. They classified styles principally by technique and secondarily by motif type, making the stylistic assignment of formally identical motif types a matter of whether or not they were pecked, painted, or scratched (Hedges 1982). Accordingly, they recognized five main style groups—Great Basin Pecked, Great Basin Painted, Puebloan Painted, Pit-and-Groove, and Great Basin Scratched—that are further subdivided by degree of schematism (abstract versus representational). In practice, this leads to inconsistency in classing motif types to style (see Figure 8.6). For instance, Hedges (1982) observed that a Fremont-style figure would be classed as Great Basin Pecked Representational if it occurs as a petroglyph, but as Puebloan Painted if it occurs as a pictograph. Likewise, Great Basin Painted includes abstract forms identical to those classed as Great Basin Pecked Abstract curvilinear or rectilinear if made as petroglyphs.

The *Great Basin Pecked* style comprises petroglyph designs made by pecking, carving, or abrading. This style was subdivided into the broad substyles of Great Basin Representational and Great Basin Abstract based on motifs (Heizer and Baumhoff 1962).

Great Basin Representational substyle comprises pecked schematic anthropomorphs ("stick figures") and "naturalistic" zoomorphs, and shares the spatial distribution of their Great Basin Abstract motif types (Heizer and Baumhoff 1962:202–204). Heizer and Baumhoff observed that the distribution of bighorn sheep appeared concentrated in southern Nevada: "there are only four certain occurrences in the north [of bighorn sheep motifs] as against hundreds in the south; to all intents and purposes the element does not occur in northern Nevada" (Heizer and Baumhoff 1962:205). Although this observation was based on very limited information (99 sites compared to 1,037 known sites in 2000), this does appear to be more common in southern Nevada rock art sites (Woody 2000), though supporting quantified data is sparse. The weakness of Great Basin Representational as a substyle is that it includes all petroglyph variants of stylized anthropomorphic forms, which have been classified into regional styles by subsequent researchers (e.g., the Coso style) indicating that the substyle is rather nebulous and too broad to be of much analytical value.

The *Great Basin Abstract* substyle recognized curvilinear and rectilinear motif type as the most common abstract styles (Heizer and Baumhoff 1962:205–207). The curvilinear motif type is defined by the predominance of circular forms (circles, concentric circles, connected circles, etc.), curvilinear meanders, and sinusoidal lines. The rectilinear motif type is composed of linear motifs and elements that are organized in a linear fashion, such as rows of dots, grids, rectangles, squares, triangles, lines, and cross-hatching. Rectilinear and curvilinear motif types co-occur at most Great Basin rock art sites and are widespread throughout the region (Schaafsma 1986) and beyond (Woody 2000). The relative dates assigned to these motif types by Heizer and Baumhoff (approximately 3500–150 B.P.) and their observation that curvilinear forms are older, can no longer be supported but, in the absence of scientific dating, the chronology of these motif types can only be said to span the entire period of rock art production in the region (i.e., from as early as 10,000 B.P. until ethnohistoric times).

The *Great Basin Painted* style was characterized as "circles and parallel lines done in red or white mineral pigment" (Heizer and Baumhoff 1962:207). Presumably, more extensive data would have led Heizer and Baumhoff to subdivide this style into Representational and Abstract substyles in the same manner they did for their Great Basin Pecked style.

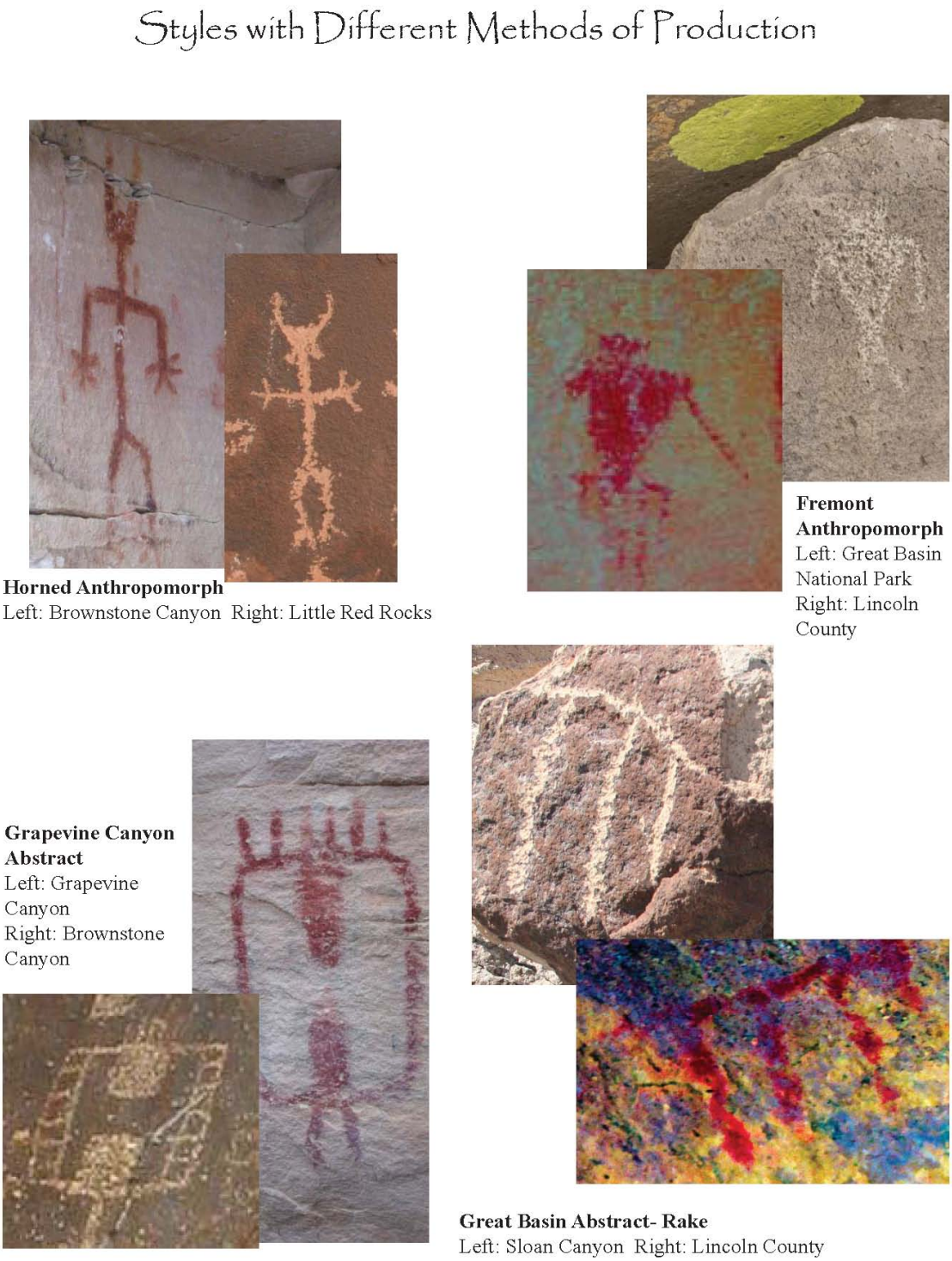


Figure 8.6. Formally identical motif types made using different production methods.

The *Puebloan Painted* style was described as restricted in distribution to southern and eastern Nevada, and as associated with Puebloan and Fremont cultural adaptations (Heizer and Baumhoff 1962:208). Painted anthropomorphs with hourglass shapes or triangular-bodied forms are the characteristic motifs of this style (Figure 8.7).

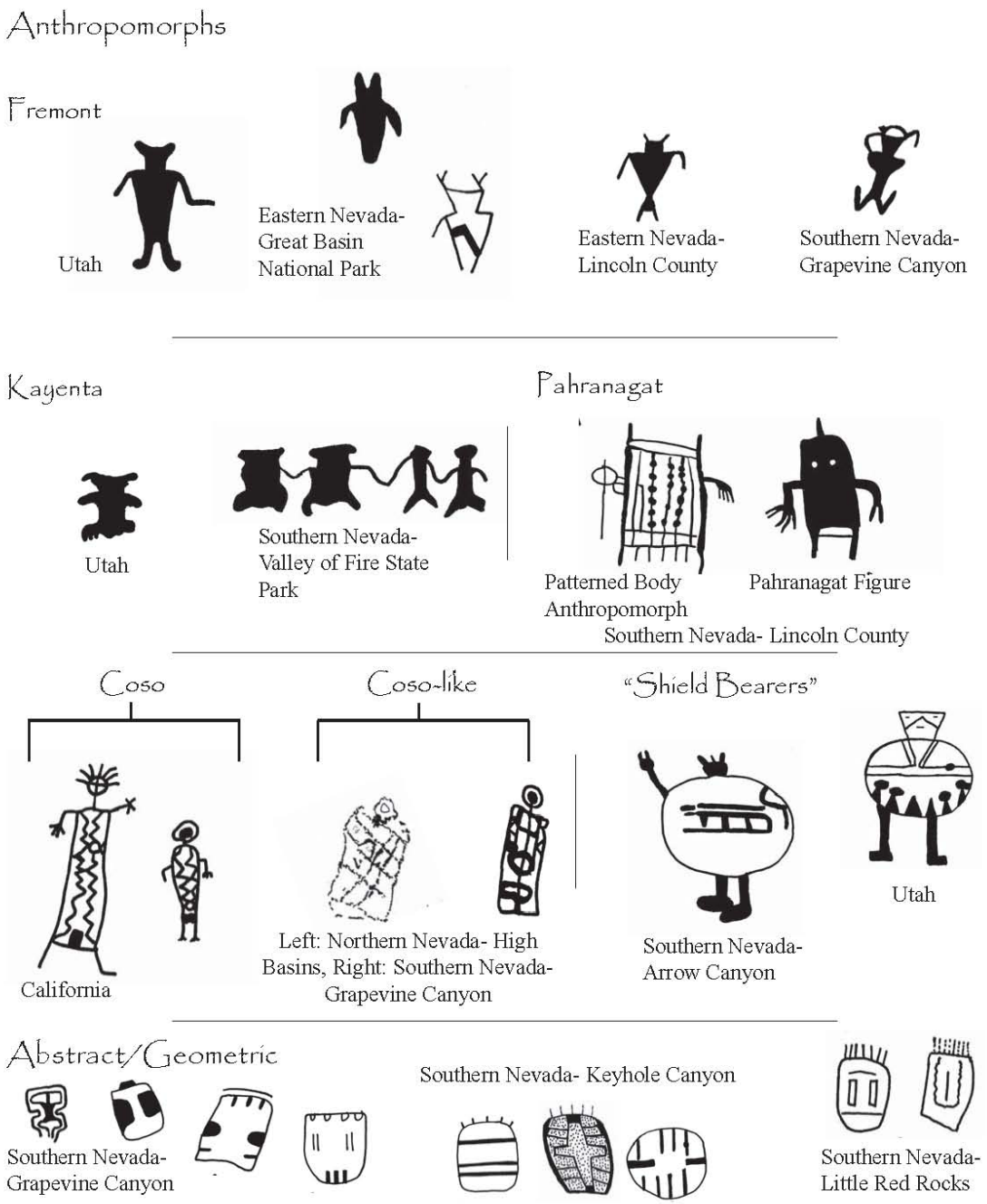


Figure 8.7. Diagnostic motif types in defined southern Nevada rock art styles.

For Heizer and Baumhoff (1962) the "*Pit-and-Groove style*" (or cupules) is the oldest rock art style in the region. This "style" consists of circular depressions, usually a few centimeters wide and deep, pecked or ground on boulders (Grant 1967:27; Heizer and Baumhoff 1962:209). Although distinctive in appearance, using their classificatory criteria, the Pit-and-Groove style or cupules should be classified as a curvilinear motif type of the Great Basin Pecked Abstract style. The apparent potential antiquity of this motif type is highlighted by the Grimes Point site in western Nevada, where cupules on basalt boulders have become completely revarnished and may be 8,000 years old or older (Watchman and Woody 2002). Cupules do not occur in great frequency in southern Nevada. Keyhole Canyon (26CK123) (White 1997) provides an example of cupules co-occurring with pictographs and petroglyph motif types that are

attributed to the Grapevine Canyon style, which appears to be affiliated with Patayan culture (Christensen and Dickey 2001). One location in west Las Vegas Valley (26CK470) contains cupules in association with a site that also contains pictographs and motif elements variously attributed to Ancestral Puebloans, Patayan/Yumans, and the Southern Paiute (DuBarton 2003). The Late Prehistoric and ethnohistoric associations of the rock art and other archaeology at these two sites indicates that the perceived great antiquity of cupules is illusory, at least in southern Nevada.

Heizer and Baumhoff's (1962) *Great Basin Scratched* style comprises incised lines made using a sharp stone tool. It's typical elements are a subset of common rectilinear and curvilinear abstract types (cross-hatching, grids, circles, etc.). This style was assumed to be much more recent in age, dating from 1000 B.P. to the ethnohistoric period (Heizer and Baumhoff 1962). Bettinger and Baumhoff (1982) observed repeated superimpositioning of scratched designs over pecked ones, arguing that the Great Basin Scratched style is associated with the dispersal of Numic peoples across the Great Basin, and were intended to obliterate earlier, pre-Numic rock art. This pattern is not repeated consistently across the region, however, and researchers do not uniformly agree that it can be used to assume that all scratched art is recent in age (Woody 2000:161–162). Scratched art is not common in southern Nevada and usually occurs as minor assemblage component at sites, as exemplified by the few examples found during the Gold Butte survey (Gilreath 2010).

CONTEMPORARY REGIONAL STYLISTIC ANALYSES

Although significant problems are evident in Heizer and Baumhoff's stylistic sequence of Great Basin rock art, it represented an important study in trying to order rock art data. Their work stimulated important research into defining style types in the region that are more distinctive and which have better spatio-temporal resolution. Subsequent researchers have generally emphasized anthropomorph morphology in identifying style types (Figure 8.7), but their treatments of abstract motif types repeat some of the classificatory problems made by Heizer and Baumhoff. With one exception, the regional styles discussed next that are most relevant to southern Nevada have been defined based on what researchers have perceived as morphologically distinct anthropomorphs and zoomorphs.

Anthropomorph and Zoomorph Styles

In eastern Nevada, western Utah, and the Colorado Plateau more generally, these morphologically distinct anthropomorph and zoomorph styles are associated principally with Fremont and Puebloan cultures based on associated site contexts (Schaafsma 1980, 1986, 1994; Turner 1963). Made as petroglyphs and pictographs a number of styles have been defined that are characterized by stylized, trapezoidal, rectangular, and triangular anthropomorphs, often portrayed with bodily adornment (headgear, "horns," or jewelry), internal decoration, and rendered in "frontal" perspective. In the absence of features such as eyes, sexual characteristics, or body ornaments, frontal vs. rear perspective is an assumption (Figure 8.7). As *recognizable* portrayals of the human form in rock art generally limited to "frontal" or profile perspective, this is of limited use as a distinctive stylistic trait. Also, some of the formal attributes of anthropomorph styles attributed to Fremont and Puebloan cultures are very similar (e.g., bodily adornment, rectangular, triangular, or trapezoidal bodies) making their formal discrimination at times very difficult (see discussion below on shield-bearer figures).

The most relevant Fremont rock art style for eastern and southern Nevada is that associated with the Sevier Fremont. This rock art style comprises triangular and trapezoidal anthropomorphs, usually lacking legs, sometimes with arms, and often with horns, headgear, or ear decoration. At their most schematic these have "bucket"-shaped heads and bodies (Schaafsma 1986:218) (Figure 8.7). These complement and contrast with Fremont anthropomorph styles (Classic Vernal, San Rafael) in the Colorado Plateau heartland that are large, elaborately decorated (necklaces, arm bands, earrings), and have rectangular or trapezoidal forms (Schaafsma 1980:171, 175). These more elaborate forms are sometimes portrayed holding circular objects, and in a few cases what have been interpreted as severed human heads (e.g., Simms and Gohier 2010:97). In the San Rafael style, bighorn sheep with square or crescent bodies are also an important element (Schaafsma 1986:223).

An important element of Fremont styles in both the eastern Great Basin and the Plateau is the shield-bearer figure (Schaafsma 1986:223). These anthropomorphic figures include large, circular forms with internal geometric decoration ("shields") that often completely obscure their body—the shields are often decorated with geometric motifs (Figures 8.7 and 8.8). This motif type has not been reported in eastern Nevada where other Fremont-style anthropomorphs occur, though this may be due to the patchy way that motif types are described (Woody 2000:174). But shield-bearer figures are known at sites in the Arrow Canyon area (Figure 8.8), north of upper Moapa Valley. Although this could indicate a Fremont influence in southern Nevada area, similar shield-bearer figures have been identified in the Kayenta region as late Puebloan (Schaafsma 1980:145-6, 148). Their apparent absence from Fremont rock art sites in eastern Nevada (Woody 2000:174) would suggest that this motif type is not a component of Fremont style art in Nevada, implying the Arrow Canyon examples are Puebloan. The presence of stylistically similar motif types in both Fremont and Puebloan rock art styles indicates that cultural identity is only weakly expressed through rock art, and perhaps that these cultures shared similar social institutions and symbolic practices.

Figure 8.8. Shield-bearer figures from Upper Arrow Canyon.

Ancestral Puebloan rock art in southern Nevada is manifested by the West Virgin Kayenta style, and defined principally from sites in western Utah, and in the Valley of Fire and lower Moapa Valley areas in Nevada (Schaafsma 1994a:117–121). Anthropomorphs have triangular, rectangular, or hour-glass shaped bodies, sometimes with "horns" or headgear (Figures 8.6 and 8.7). Most of these formal attributes are characteristic of Fremont anthropomorph styles, implying that discriminating between the two is based more on associated archaeological contexts than on figure morphology. Stick-figure anthropomorphs with exaggerated digits are seen as a development in this style (Schaafsma 1994a:119), though this has also been seen by some as a feature of Patayan rock art (e.g., Hedges 2002) and is not really a diagnostic stylistic trait (Figure 8.9). Zoomorphs in Kayenta-style rock art emphasize bighorn sheep with rectangular or semi-navicular bodies. In addition, curvilinear abstract forms—such as concentric circles, wavy lines, and connected circles—are prominent at West Virgin Kayenta sites (Schaafsma 1994a:119). These cannot be treated as diagnostic of this style, however, as they are common abstract forms that are neither culturally nor time-sensitive and are prominent at most Great Basin rock art sites.

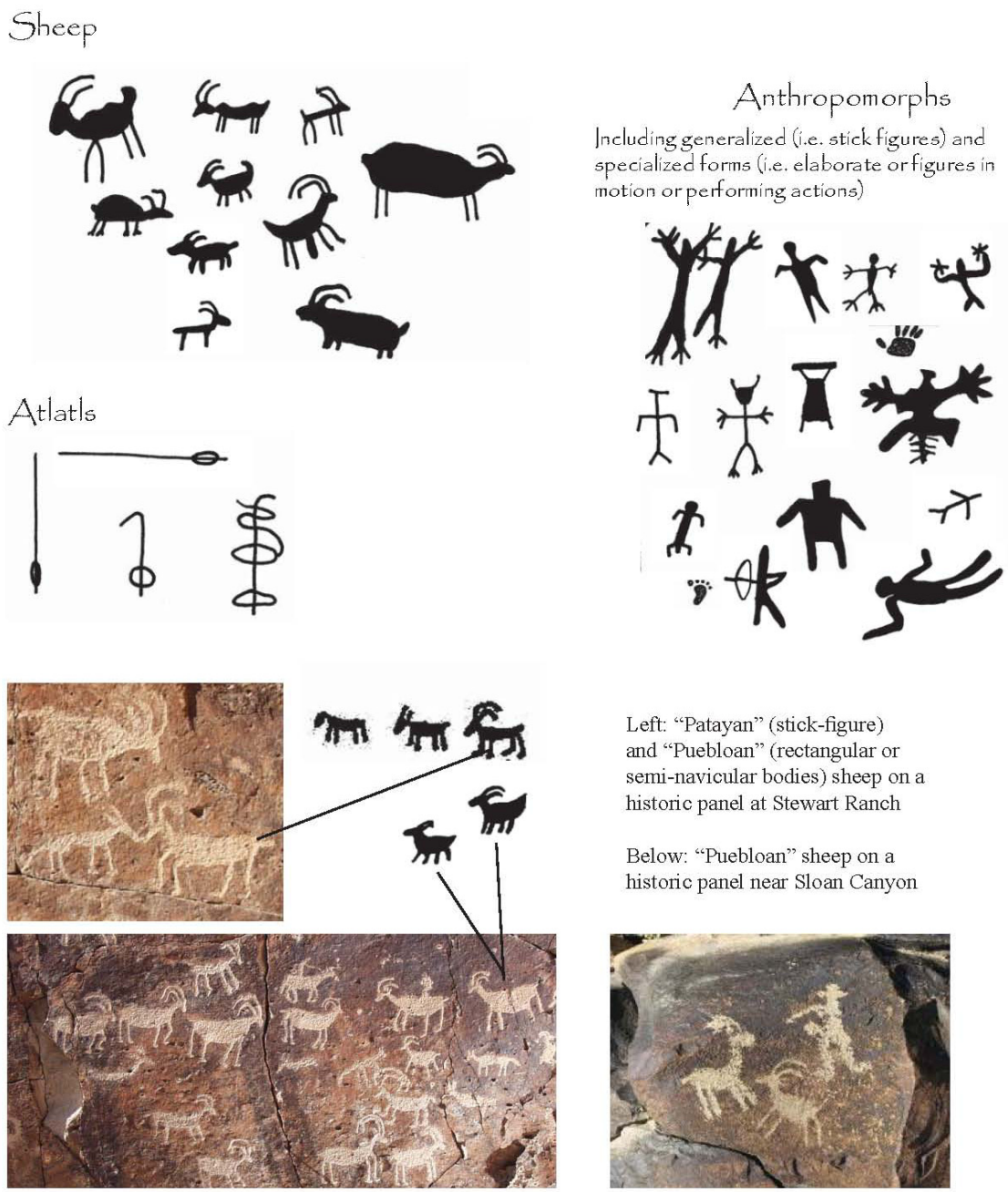


Figure 8.9. Stick figure anthropomorphs and schematic zoomorphs variously attributed to Puebloan and Patayan rock art styles.

The Pahranagat anthropomorph style was first identified at sites in the Pahranagat Valley area (Heizer and Hester 1974; Schaafsma 1986; Stoney 1992), just north of southern Nevada. It may extend into the study area. This style consists of two anthropomorphic variants that frequently occur together (Figure 8.7). The first is a rectangular form internally decorated with grids, dots, or geometric motifs that are "fringed" by short vertical lines. This form often lacks a head but has stick-figure legs and short arms that sometimes hold an "atlatl"-like object. At its most schematic this form lacks limbs and becomes an internally decorated rectangle, making it difficult to identify on formal criteria alone. The second form has a solid pecked ovoid or rectangular body, large eyes (indicated by using negative space), and a line protruding from its head; their arms are downturned and have long fingers. The age and cultural

affiliations of this anthropomorph style is unclear; it is traditionally assigned to the late Middle and early Late Archaic. Possible examples of this style have been reported from the Lower Arrow Canyon site (26CK124) which is approximately 30 miles southeast of one of the type sites for the Pahranagat anthropomorph style (see Eskenazi 2010).

Geometric Styles

The above-described styles should properly be considered anthropomorph styles. In contrast, one geometric style, the Grapevine Canyon style, has been identified for southern Nevada. The style is found in the eastern Mojave Desert of California, along the Colorado River drainage south of Las Vegas, and into the Arizona Strip and Kingman areas (Christensen and Dickey 2001). The type site, Grapevine Canyon in southern Nevada was recognized by Steward (1929) as containing stylistically distinct rectilinear abstract forms. Christensen and Dickey (2001) have characterized a set of symmetrical and rectilinear forms as diagnostic of this style, which they affiliate with the Patayan culture and Yuman speakers. The Grapevine Canyon style comprises complex geometric forms that often skillfully use negative space as essential components of their designs (Figures 8.6 and 8.7). Defining types include visually prominent large rectangular and circular forms that are internally decorated with straight lines, denticulated lines, or wavy lines. The most diagnostic forms are outlined H-like shapes, I-like shapes, and diamond chains. "Representational" forms are minor components at most Grapevine Canyon style sites. Where present, bighorn sheep are depicted as stick-figure sheep and anthropomorphs take the form of stick-figure types (often with slightly broader bodies) but include a larger percentage of digitated figures compared with non-Grapevine sites. This latter stylistic feature was treated as a diagnostic Patayan trait by Hedges (2002). In formal stylistic terms, however, this choice in rendering the human form is found throughout the Great Basin and Southwest (Figure 8.9). These digitated anthropomorphs regularly occur at rock art sites lacking Grapevine Canyon style geometric forms and are well outside the distribution zone of Patayan sites. Similarly, stick-figure bighorn sheep are also widely distributed and, in isolation, cannot be considered diagnostic of this style.

The Patayan affiliation of the Grapevine Canyon style is based on a general assessment of observed intra-site variation in surface repatination, suggesting that it is Late Prehistoric in age and it is found in the general area of Patayan habitation (Christensen and Dickey 2001:193). A number of Grapevine Canyon sites are close to traditional cultural properties recognized by modern Mojave peoples. The Grapevine Canyon type site in southern Nevada is near the origin-spot of the Mojave and one of its central and most imposing panels is believed by the Mojave to, in part, portray their origin myth (Figure 8.10). Grapevine Canyon style motifs have now been identified in west Las Vegas Valley at sites in the Little Red Rocks area (DuBarton 2003) and Brownstone Canyon; south of Boulder City at Keyhole Canyon (26CK123); and in the Gold Butte area (Gilreath 2010). That is, this style is concentrated in the Southern Region and extends west into the California portion of the Mojave Desert. It also has been reported at sites in the Central and Eastern regions. Painted examples of the diagnostic types of this style at Brownstone Canyon (Figure 8.6) could yield important chronometric data on the age of this style.

Southern Nevada Stylistic Schema

The most current outline for a southern Nevada style classification is provided by Gilreath (2010). Her research sought to identify temporal and cultural patterning in rock art of the Gold Butte area in the northeast corner of Clark County (Gilreath 2010). This work suggests a general stylistic sequence and typology that may be applied regionally. With some modifications, the style scheme could be used productively to aid consistent description and stylistic identification of southern Nevada rock art. Gilreath (2010:25) finds that current style types and their chronology are inadequate (e.g., Heizer and Baumhoff 1962; White 2002) because they underplay influences from Hohokam and ancestral Puebloan groups and do not recognize the Grapevine Canyon style as a distinct type. Instead, Gilreath proposed a preliminary scheme of four broad stylistic categories with temporal significance, described below, that emphasize morphological variation in anthropomorph and zoomorph forms, as well as their presence/absence in stylistic classification. Although Gilreath does not relate the results of this formal analysis with associated

archaeological data, the temporal trends identified could be tested against these site data. For example, do Basketmaker-Puebloan rock art localities co-occur with Puebloan ceramics types? One problem that emerges is that inconsistent use of themes and production methods in defining style categories and types could create a misleading picture of the art's relative sequence and temporal context unless this is supported by dating information from associated archaeological contexts.

Figure 8.10. Rock art panel at Grapevine Canyon believed to partly portray the Mojave origin story.

1. *Desert Archaic Abstract (6000–2000 B.C.).* This style consists of pecked, abstract rectilinear and curvilinear forms with curvilinear forms that predominate early. The style was eventually supplanted by rectilinear design types (Gilreath 2010:221). This chronology follows Heizer and Baumhoff's (1962) subjective assessment that the broad abstract categories are temporally patterned. Systematic dating studies are needed to resolve the dating issues. This definition also excludes painted designs that are morphologically identical to pecked ones, a criticism made by Hedges (1982) of Heizer and Baumhoff's formulation (Figure 8.6).

2. *Representational Rock Art (2000–1350 B.C.).* By 2000 B.C. in the Southwest, "representational" art (or, rather, anthropomorphs and zoomorphs) emerges and becomes widespread. Stylistic variation is tracked in bighorn sheep and anthropomorph motifs that are regionally distinct and can be identified as Fremont and ancestral Puebloan (West Virgin-Kayenta style in particular). Elaborate polychrome representational paintings emerge at this time, portraying a similar suite of design elements as contemporaneous petroglyphs (Gilreath 2010:221). Combining petroglyphs and pictographs is inconsistent in this schema, however, as the defining stylistic trait of the Desert Archaic style is method of execution (i.e., pictographs are excluded). But for Representational Rock Art style, motifs (anthropomorphs and zoomorphs) are the defining traits, not method of production. Over time, figures in Representational style shift from "the complex to plain, from large to small, and from exquisite to mundane in execution" (Gilreath 2010:221). This category includes Basketmaker-Puebloan and Patayan rock art styles. Basketmaker-Puebloan anthropomorphs include flute players, "stubby" body forms, rectilinear stick-figures, and stick-figure forms portrayed performing an action. Basketmaker-Puebloan

zoomorphs have rectangular to semi-navicular bodies (see above). Patayan types include Grapevine Canyon style geometric designs and stick-figure anthropomorphs with exaggerated digits and sexual characteristics; zoomorphs are stick-figure types (see above). As Figure 8.9 shows, Puebloan (Kayenta) and Patayan zoomorph types are known from Post-Puebloan or Historic sites in southern Nevada. This highlights why tracking stylistic variation in zoomorphs is difficult. Most zoomorph designs are schematic, so stylistic choices that signify the species of an animal are limited, especially if other features of the animal are not culturally significant.

3. *Post-Puebloan Rock Art.* This style includes Heizer and Baumhoff's (1962) Great Basin Painted and Scratched styles, which are dated from A.D. 1350 to 1800 in Gilreath's (2010) classification and are identified solely on their method of production. In the case of the Scratched style, which consists of common rectilinear and curvilinear abstract types, its exclusion from Desert Archaic pecked (in Gilreath's scheme) is an assumption of age based on relative dating. The attribution of painted art to this category is problematic, as painted anthropomorphs are assumed to belong to the earlier "Representational" style category, but painted abstract geometric forms are not. Inconsistent use of production and thematic criteria can potentially give a misleading picture of the art's relative sequence and its temporal context, as well as inaccurately characterize a style's content and motif types. For example, as Figure 8.6 shows, Grapevine Canyon diagnostic motif types (the "H" design) occur as both petroglyphs and pictographs, Using the formal criteria of Gilreath's classification, these would be sorted into different periods.

4. *Early Historic Rock Art.* This style depicts Euroamerican themes (cowboys, horses, etc.) regardless of execution or style. It should be noted that there are southern Nevada rock art sites (e.g., Sloan Canyon) where historic themes are portrayed as integrated elements in compositions that use representative "Desert Archaic" motif types (Figure 8.11). This illustrates that abstract designs are not necessarily time sensitive. Statistical approaches to identifying thematic variations in assemblage composition may be the best way to identify stylistic change in abstract motifs.

Figure 8.11. Historic rock art panel from Sloan Canyon that is integrated with "Desert Archaic" curvilinear designs.

Gilreath's (2010) schema usefully orders rock art data into a possible temporal order that requires cross-dating against associated archaeological materials. The idea that anthropomorphs and zoomorphs are more frequent in Basketmaker-Puebloan and Patayan rock art is an interesting research theme, but one that requires further study. Because the schema is intended to support formal analyses, identify temporal trends, and determine cultural affiliation independent of associated archaeological materials, Gilreath's experience applying the schema to 42 sites or localities in the Gold Butte area is instructive.

Gold Butte Rock Art

The Gold Butte region of northeastern Clark County contains 42 rock art sites or localities, with a total of 379 panels and in excess of 3,000 motifs (Table 8.2). The rock art appears to be concentrated on a few small islands of Aztec sandstones, which form prominent landmarks and comprise 4 percent of the project area. The rock art is generally conspicuous, suggesting that that the location where it was made was a meaningful choice that would relate the sets of signs and symbols to the. Some sites (such as 26CK6580) have rock art that is difficult to discern, because it occurs on the red rock pavement, rather than cliff faces or boulders. Because of amateur interest in the area's rock art, Gilreath (2010) concluded that most of the rock art in the area has been discovered, despite completing only a 38 percent survey sample of the Red Rock formations.

Table 8.2. Summary of Gold Butte Motif Frequency (percentages are total number of motifs) (data taken from Gilreath 2010:Table 95).

Representational Motif Types					
Bighorn sheep	Anthropomorph	Tracks	Other "Representational"		
12%	6%	3%	5%		
Abstract					
Circular forms	Cone	Shield	Rectilinear	Curvilinear	Other abstract
19.8%	0.8%	0.8%	4%	7.4%	33.7%
Indeterminate					
19.9%					

The rock art at these sites was classified by style; the classification was guided by two key assumptions (1) that all painted designs are Paiute, and (2) early rock art is exclusively abstract. Distinguishing Puebloan from Patayan rock art was more problematic since both include significant amounts of abstract designs (2010:230). This recognizes that abstract designs are an ever-present feature of rock art styles and sites in the region, but implies that geometric curvilinear and rectilinear forms are not time-sensitive. It highlights that morphologically distinct schematic anthropomorph and zoomorph types are most likely to be useful to researchers in making temporal assignments relying only on formal methods , and in practice, it is the former that Gilreath found most useful in ordering the Gold Butte data. For example, identifying a motif as Patayan relied on the presence of stick-figure anthropomorph types or those with broader bodies that have digits or elephantine hands and feet. Stick-figure bighorn sheep were also considered a Patayan trait. The complex geometric types identified by Christensen and Dickey as diagnostic Grapevine Canyon forms (the H and I shapes) were used as secondary criteria (Gilreath 2010:231).

Gilreath found that Gold Butte rock art tends to occur in clusters of six or fewer panels that generally contain less than ten motifs. Large panels more than 2 m in width and containing densely organized designs are present, but the general trend is to small-scale size and motif density. Only ten scratched designs were noted. Petroglyphs dominate the area's art: of these, 53.7 percent are abstract and 26.3 percent are Representational, with the remainder being indeterminate marks (random pecking). Circular forms account for 31.4 percent of abstract motif types; also fairly common are "dot patterns, rakes, and grids." The three most prevalent Representational designs are bighorn sheep (45.8 percent),

anthropomorphs (23.2 percent), and variants of tracks (bird and hand or foot prints) (12 percent) (Gilreath 2010:238). These data indicate that the motif types at Gold Butte are generally in keeping with the general character of southern Nevada (Figure 8.9; Woody 2000).

The archaeology of Gold Butte demonstrates patterned settlement use for 5,000 years, yet rock art was made in only a small part of the area. Yet the "surprisingly few concentrations have appreciable amounts of stylistically different rock art in co-association, figured at less than 20 percent" (Gilreath 2010:238) (Table 8.3). Six localities have Desert Archaic and later style types. Desert Archaic panels contain an average of 7.8 elements per panel. Fourteen localities are classed as Puebloan only, with another 11 co-occurring with appreciable amounts of earlier and later styles. The single style localities have more Representational than abstract elements, not surprising given that the former are their defining trait. These see a shift in panel complexity compared to earlier Desert Archaic ones, with an average of 11 elements per panel. Anthopomorphs include broad-shouldered, tapered body types and hourglass body types. Action oriented stick-figures and highly stylized stick-figures with right-angle appendages that Schaafsma (1994) associates with Puebloan rock art are also present (Gilreath 2010:238).

Table 8.3. Summary of Rock Art Styles Identified at Gold Butte (after Gilreath 2010:Table 96).

	Archaic	Basketmaker/ Puebloan	Patayan	Proto-historic	Historic	Indeterminate
Only well represented	16	14	15	4	1	8
Co-associated well represented	6	11	12			
Minor presence	7	8	6	9		

Patayan localities are similar in number to Basketmaker ones, but are represented by many more panels that contain far fewer design elements and a greater proportion of abstract design types. As noted previously, this style was identified by "simple anthropomorphs with exaggerated digits and feet and skinny zoomorphs" (Gilreath 2010:252) with well-represented abstract elements including "vertical ball-and-string sequences, and open lattice plant and bug-like designs."

Gilreath concluded that the rock art shows that the Gold Butte area experienced waves of use, with Archaic occupants supplanted by southwestern-influenced groups that were in turn supplanted by Patayan groups and then by the Southern Paiute. "The rock art complexity is in good agreement with any number of other local archaeological datasets" (Gilreath 2010:252). It is argued that these data prompt a reassessment of Schaafsma's West Virgin Kayenta style because of the co-occurrence of Basketmaker and Patayan styles. According to Gilreath (2010:257), the West Virgin Kayenta style "is really a mixture of two distinct styles. The West Virgin variant appears simply to be East Virgin with an overlayer of mainstream Patayan elements. With the dismissal of a West versus East Virgin rock art style, cultural unity rather than intra-group differentiation seems to better characterize Puebloan groups in southern Utah, the Arizona strip, and Gold Butte, i.e., an integrated unit standing in contrast to Fremont rock art in northern Utah."Rock art in eastern Nevada also fits this pattern.

Although Gilreath's stylistic categories may, combined with a consideration of associated site contexts, order the Gold Butte data into a coherent temporal sequence that identifies rock art's cultural affiliations, the morphological criteria can be used to produce a different relative sequence from the same data. Assuming that, prior to a Puebloan or Patayan presence, a Desert Archaic that lacked anthropomorphs and zoomorphs characterizes the rock art of hunter-foragers in the region is a large assumption. The use of stick-figure "representational" forms to supplement the diagnostic motif types identified for West Virgin Kayenta and Patayan-Grapevine Canyon styles is also problematic. In isolation from the defining stylistic traits of those styles, the motif types cannot be assumed to be indicative of them. In common with temporal abstract geometric forms, stick-figure design types are widely distributed throughout the Great Basin and Southwest. The designs continued to be made into historic times (as

evidenced by stick-figure anthropomorphs riding horses or wearing cowboy hats). The problem is that both Kayenta and Grapevine Canyon styles appear to be accompanied by a range of motif types that are not unique to the respective stylized anthropomorphs and geometric forms that define those styles. Also, the West Virgin Kayenta style's manifestation at Nevada sites appears to include rare examples of distinctive anthropomorph types, but its zoomorph types are not unique.

In spite of the fact that the Gold Butte anthropomorph data is not broken out into type (i.e., Puebloan vs. Patayan, stick-figures vs. diagnostic types), these only make up 6 percent of the motifs present in the area. Likewise, bighorn sheep motifs (diagnostic and nondiagnostic types) account for approximately 12 percent of all motifs in the project area. Although comparative data is limited, as total motif counts are not regularly done for rock art sites, particularly for large sites or concentrations of sites, these data seem consistent with other southern Nevada rock art sites. At Sloan Canyon, one of the largest sites in the region with nearly 400 rock art panels, anthropomorphs make up 5 percent of the total motifs present and zoomorphs make up 6 percent (Quinlan et al. 2007:Table16). These data undermine the observation that there is a dramatic shift in southern Nevada rock art to an emphasis on zoomorphs and anthropomorphs (particularly as these design types appear to have been made into ethnohistoric times). It highlights the need to develop a quantifiable approach that characterizes rock art assemblage composition in terms of the ratio between abstract and schematic design types as the motif types that researchers rely on to identify stylistic variation are often not well represented in the record.

Statistical prominence does not address whether these design types are visually prominent—their size, placement, and method of execution may dominate the rock art sites where they occur. But, based on the illustration of Gold Butte rock art, these anthropomorphic and zoomorphic elements tend not to be visually dominating. They are often small and accompanied by much larger-sized abstract design types; and they are not necessarily prominently placed in panels.

Conclusions

What Gilreath's (2010) stylistic schema establishes is that seeking to identify chronology in rock art through stylistic variability requires rigorous formal criteria that can be best identified through anthropomorphs and very distinctive geometric designs. Her analyses indicate the potential value of characterizing the relative frequency of geometric design types in site assemblages to determine whether regional or temporal variation is discernible. Method of production (painting, pecking, scratching) should be excluded from style definitions given that the morphologically identical motif forms are made using different techniques. In this sense, we are abandoning style in Hedges' (1982) sense of "how an object is rendered" in favor of identifying preferential selection of themes to be portrayed.

The term "representational" is misleading as stick-figure anthropomorphs and zoomorphs are hardly naturalistic, and more elaborate anthropomorph types, such as Fremont or Kayenta types, are highly stylized, schematic abstractions of the human form. The form they take reflects choices on what to portray and the most appropriate culturally defined style to use to communicate that information. They are not representational in the sense of trying to accurately reproduce the human form, but instead are a portrayal of an idealized form of bodily presentation. Hence, the general trend that is identified in Great Basin rock art from abstraction to "representation" is largely a function of terminology—the emphasis on abstraction remains the same over time, only we as analysts now mistake our ability to identify the *subjects* of one abstract form (anthropomorphs) as the artist's intent to "represent" exactly or strive for naturalism in the art. And, in southern Nevada at least, as the Gold Butte data indicate, these stylized anthropomorph forms usually co-occur with more abstract stick-figure types. Similarly, zoomorphs are no more naturalistic or representational than anthropomorphs, which are stylized abstractions of animal species that vary in the degree of schematism employed to depict them, ranging from stick-figure types to less schematic types with rectangular solid pecked bodies, and so on.

Based on the preceding discussion, it is apparent that there is a need for greater clarity in terminology and stylistic definitions to promote greater consistency in archaeological studies of southern Nevada rock art. I suggest that misperceptions of "representational" have led to a misplaced confidence in

identifying temporal sequences in stylistic changes attributed to the onset of semi-horticultural societies in southern and eastern Nevada. The stylistic attributes of rock art associated with different modes of production should be related to observed archaeological patterning. Because basic geometric design types (i.e., other than the Grapevine Canyon types) are seemingly a universal accompaniment in all stylistic assemblages, this does not imply that these can be neglected because they apparently lack temporal resolution. Instead, purely rectilinear and curvilinear forms need to be treated quantitatively rather than by qualitatively. It is possible that the composition of regional "abstract" assemblages can be quantified, and regional and temporal variations identified through motif counts and inter-site comparison.

Stylistic analyses should continue to closely track formal variation in schematic types for which variation can be tracked because the referential subjects can be identified, for example, schematic portrayals of the human body and animal species. As noted previously, stick-figure types are too elemental to be considered as stylistic traits in comparison to the anthropomorph styles defined by researchers under the rubrics of West Virgin Kayenta, Fremont, and Pahranagat. The ratio between schematic types and geometric forms is a significant theme that has implications for understanding the social functions of rock art. Addressing this theme requires the development of a standardized motif key to describe and class rock art data.

Rock art styles can only indirectly address questions of cultural affiliation, as they are a manifestation of social and symbolic processes that are not necessarily coterminous with cultural boundaries. Attributions of cultural affiliation have to be demonstrated using temporal data and not inferred from formal stylistic analyses. The spatial distributions of distinctive styles may, therefore, indicate shared social practices or symbolic communication that cut across cultural boundaries. Quantitative studies that identify stylistic zones based on assemblage composition appear to be one way that the relationship between archaeological subregions, and rock art styles can be explored through spatial analyses.

MAGICO-RELIGIOUS PRACTICES

Archaeological studies of prehistoric religions have tended to focus on reconstructing prehistoric theology rather than explaining the sociocultural role that magico-religious beliefs may have played. Archaeologists cannot directly study past beliefs, only the material remains of the practices (ritual or ceremonialism) structured and informed by belief-systems that categorized the social and natural worlds according to an ontology that attributed agency and causality to supernatural processes and entities (Quinlan 1993). Over the past 20 years, research from the Old World has shown that studies of monuments and votive deposits can elucidate how prehistoric populations recognized special (or culturally significant) places in their landscapes. These studies have also identified diachronic variation in these places (Barrett 1992; Bradley 1990, 2000). Although a wide range of natural landforms may be recognized as culturally significant (e.g., caves, rivers, mountains), these are not in and of themselves a class of special places; rather, specific caves or mountains may have cultural significance that can only be identified if that significance was recognized by behaviors or practices that leave material remains.

Background

In the Old World, the significance of specific rivers during the Iron Age is manifested archaeologically by deposits of metalwork that are restricted in tool and weapon types and the specialized manner of their deposition (Bradley 1990). Assemblages of signs or symbols (either as material objects or markings) that are specialized in function, distribution, and/or how they entered the archaeological record, have been used as indicating a ritual function for such assemblages and/or the places they occur (Renfrew 1986). By inference, the presence of prescribed sets of signs/symbols in more domestic archaeological contexts indicates a ritual usage for them and perhaps a specialness of place. As Bradley (2000:39) noted, sets of prescribed signs/symbols indicate a relationship between the signs/symbols selected and an appropriate place in the landscape for where they are deposited. Split-twig figurines, which depict a restricted range of animals and are sometimes deposited in large numbers at a single context, are one

example from the Great Basin (Tuohy 1986). Incised stones seem to be similar ritual objects (Santini 1974). And, at Firebrand Shelter, Blair and Winslow (2006) identified a set of artifacts (atlatl darts, branches, and firebrands) specialized in form, deposition, and spatial relationship to the settlement pattern, thus inferring a ceremonial context for the shelter.

Ethnographically, Great Basin and Yuman peoples recognized supernatural power as distributed in patterned ways across the landscape and as potentially residing in animals, plants, or other natural objects (Hulkrantz 1986). It is unlikely that prehistoric populations conceived of the landscape as culturally neutral or exclusively from the perspective of optimizing hunting and foraging (McGuire and Hildebrandt 2005). Stoffle and Zedeño (2001:61) noted that explaining the distribution of cultural features should consider where they were placed in relation to concepts of power. For archaeologists, the evidence of prehistoric symbolic or magico-religious practices may allow the recognition of special places.

Rock Art

The most enduring archaeological feature related to prehistoric symbolic practices (or ritual or ceremonialism) in southern Nevada is, arguably, rock art. Rock art marks only a small percentage of the landscapes prehistoric populations are known to have used (only about 3 percent of prehistoric sites contain rock art). Given this specific, limited use of a large area, is important to determine what makes certain locations appropriate for creating rock art. In reviewing the kinds of ceremonial practices in which rock art is embedded, it becomes clear that relating rock art to settlement patterns and physical environment may provide information about the structure and properties of special places in the landscape and the kinds of social systems and practices that used rock art. This may provide a way of indirectly identifying shared symbolic practices that archaeologists can use to indirectly characterize prehistoric cultural identities (Quinlan and Woody 2003).

Most research into southern Nevada rock art has been descriptive in nature. The few examples of explanatory or interpretive approaches have tended to be rather exotic (e.g., Green and Holmes' [2001] search for Mesoamerican influences). However, southern Nevada rock art data can be accommodated within explanatory approaches developed for Great Basin rock art as these are generalizing, broad, and address anthropological issues rather than reconstructing culture-history sequences.

Hunting Magic

The first theory applied to Great Basin rock was Heizer and Bamhoff's (1962) hunting-magic theory, which was stimulated by their conclusions on the general distribution pattern of rock art of the Desert West. They argued that rock art was made and used in the context of magico-religious practices intended to ensure hunting success and the fecundity of game animals and other critical resources. They perceived a spatial association between rock art locations, hunting archaeology features (blinds, game drive fences), game trails, and ambush spots (Heizer and Baumhoff 1962:224–225). They argued that their data showed that rock art generally was not associated with seasonal campsites and access to plant resources. Based on the preponderance of bighorn sheep motifs over other zoomorph types, Heizer and Baumhoff concluded that bighorn sheep hunting was the primary focus of this magical attention. They implied that abstract motif types symbolized game animals in ways not perceivable to external observers (Heizer and Baumhoff 1962:239), highlighting that it was rock art's landscape context and associated archaeology that disclosed its sociocultural functions. Heizer and Baumhoff's view that rock art, settlement, and foraging activities were spatially separate, constructs the art's audience as male hunters.

Criticisms that this approach neglects the vast number of abstract motif types that make up Great Basin rock art (e.g., Quinlan and Woody 2001:213; Whitley 1998:135–136) are valid, but for Heizer and Baumhoff (1962) style and themes in rock art were only of interest to illustrate the general correctness of their theory. The absence of portrayals of critical resources such as small animals, seeds, or roots could be explained simply as the analyst's inability to identify these. More interesting is the observation that only certain types of critical resources received this symbolic attention in a way that external observers can identify.

Other criticisms of this approach are that it does not fit well with observations of rock art's archaeological and landscape contexts (Rector 1985). None of the rock art sites in the project database report the presence of hunting blinds, but middens and/or roasting pits are reported in 42 records (Figure 8.4). Elsewhere in the Great Basin, milling artifacts are regularly reported at rock art sites (e.g., Pendegraft 2007) and Sloan Canyon, one of the largest rock art sites in southern Nevada, has discrete loci of milling stations and rock art (Duke et al. 2004; Quinlan et al. 2007; White 1997). There is, however, no theoretical reason why magico-religious rituals intended to increase critical resources or secure hunting success should be made at locations where animals were hunted or critical resources located. Hunting-magic theory was first used in the Old World to explain Ice Age cave art, a context where hunting is precluded (Quinlan and Woody 2001). The real problem is that hunting-magic theory is not capable of falsification, a problem shared with all explanatory approaches to rock art.

What Heizer and Baumhoff's hunting-magic approach did was to prompt important research on the relationship between rock art sites and their natural and cultural environments (e.g., Gilreath 1999; Matheny et al. 1997; Nissen 1982). For example, how does rock art made at locales used mainly by hunters differ in style from rock art at domestic and other sites? What makes the hunting landscapes that are marked by rock art different from hunting landscapes that do not have rock art?

Shamanism

Currently, the shamanistic approach (Lewis-Williams and Dowson 1988) pervades Great Basin rock art literature. Researchers argue that certain geometric rock art motifs and elements portray mental imagery (entoptic phenomena) that are experienced as visual percepts during trance states (Whitley 1992). More figurative motifs are interpreted as depictions of shamanistic themes, or they have shamanistic properties because they incorporate elemental entoptic forms (Lewis-Williams and Dowson 1988:205). An association with shamanism is made based on the importance of trance states in the practices of that cultural institution (Lewis-Williams and Dowson 1988). It is argued through cross-cultural metaphors used by shamans to describe their trance experiences that these elements find expression in rock art. Avian imagery has been interpreted as a metaphor of shamanic soul flight or the transmogrification of shamans into birds (e.g., Hedges 1985; Schaafsma 1994a). Ethnographic descriptions likening trance states to "dying" have led to images of death (e.g., hunting scenes, anthropomorphs falling, etc.) being interpreted as visual metaphors for entering trance states (e.g., Lewis-Williams 1982, 1997).

For the Great Basin, David Whitley's (1992, 1994, 1998) work exploring the shamanistic associations and use-contexts of rock art is of particular importance. Whitley argued that re-reading regional ethnographies revealed information reported in cryptic and metaphoric fashion that rock art was made by male shamans to record visionary experiences (Whitely 1992, 1998). Rock art sites were places where power could also be acquired and, therefore, also functioned as vision-quest locales. Because a shaman's spirit-helper gives the shaman instructions and various powers during trance, much zoomorphic art is argued to depict spirit-helpers. In the Coso Range, hunting scenes involving bighorn sheep were argued by Whitley to be visual metaphors of shamanic trance because they portray dying. He argued that the famous Coso elaborate patterned-body anthropomorphs incorporate unique geometric motifs and are depictions of shamans wearing clothing decorated with designs of entoptic phenomena experienced during trance (Whitely 1998). Because rock art sites are envisioned as vision-quest locales, they are interpreted as being some distance from settlement or domestic activity areas and would only have been visited by shamans (Whitley 1998a). For example, Grapevine Canyon is argued to be the place where Mojave shamans went to secure power through trance episodes, evidenced by abundant entoptic motif types in the art and the site's significance to Mojave origin tales (Whitley 1996:128–130).

Criticisms of this approach include its weak basis in Great Basin ethnography (Quinlan 2000; Hedges 2001) and its failure to model the archaeological properties of shamanistic rock art other than by reference to its imagery. The model's basis in regional ethnography is a criticism of internal logic. The presence or absence of ethnographic precedents does not, in itself, mean that the approach is theoretically implausible for prehistoric contexts. Over-reliance on ethnographic precedents for analogy carries the

implication "that we can never discover in the data of the past any generalizations that we do not already know" (Bailey 1983:174). Neglecting to model shamanistic rock art's archaeological and landscape contexts is a serious criticism, though from Whitley's research and the general anthropology of shamanism it seems that special places recognized by shamans tend to be remote from settlements and located in hard-to-reach places. Accordingly, evidence of domestic archaeology in association with rock art would suggest that not all rock art played the shamanistic functions envisaged by Whitley.

Interpreting the meaning of the art as invariably shamanistic is a significant problem that neglects the symbolic properties of rock art and its inherent ambiguity. Without indigenous commentary, archaeologists cannot "read" the meanings of rock art imagery. And, as Sperber (1975: 28 and 48) noted, indigenous commentary is an extension of symbolic meaning as the pairing of exegesis to symbol is arbitrary and cannot be predicted despite the appearance of motivation.

The Settled Landscape

In common with hunting-magic approaches, Whitley's shamanistic theory does imply that rock art is specialized in its distribution. Rock art that is remote from settlement and economic activity areas, or that is hidden in the landscape, presumably marks places that were culturally significant and meant for a restricted audience. Identifying whether these localities share common landscape features and whether their rock art shares stylistic properties, are important to determining how domestic rock art differs from that associated with hunting locales.

If both hunting-magic and shamanistic approaches identify research themes relating to the marking of special places in the landscape, the association between rock art and mundane settlement and economic activities seems to relate to the negotiation of daily routines by reference to an enduring symbolism. As noted previously, the relationship between rock art and settlement, resource procurement, and resource processing places is increasingly referenced but not quantified in the literature (with a few exceptions, e.g., Pendegraft 2007; Cannon and Ricks 2007). Research that describes variability in rock art stylistic and site density variation according to associated archaeology site types is critical for characterizing whether a distinct "style" of domestic rock art can be identified and contrasted with that on travel routes, resource procurement areas, and so on. Are different artifact classes such as ceramics, accompanied by a distinct rock art type, and how are these locations regular from non-rock art find spots for these artifact types?

This kind of research would identify settlement and economic locales that are marked in some way by rock art. Quinlan and Woody (2003, 2009) have outlined a general theory of the relationship between the lived experience of daily life, symbolism, and social reproduction that explicates the juxtaposition of rock art and settlement archaeology. Symbolism, such as rock art, often becomes the object of a special knowledge, and control of that knowledge a potential source of power. Access to rock art's "meanings" or commentaries may be controlled by the form it takes. Geometric forms, in particular may have little resemblance to the things they depict but have greater capacity to depict several things simultaneously, potentially establishing a hierarchy of meanings and commentaries (Layton 1991: 139-140, 186). As the remains of symbolic acts that endure as marks on the landscape, rock art becomes "a visible sign of past performances to future social agents, and cited by them in their own performances" (Quinlan and Woody 2009:34). Of particular significance is describing the spatial contexts where anthropomorphs are placed as "the deployment of images of the human body [is] a significant exercise of agency, making choices to depict, and to patronize the depiction of idealized models of human bodily being" (Bachand et al. 2003:239).

Because the residues of prehistoric settlement and economic activities in southern Nevada are variably accompanied by rock art, this relationship indicates that the need for social communication protected by the legitimating power of material indices of past performances or by supernatural entities and processes was spatially or temporally contingent. For example, the stylized anthropomorphs associated with Fremont and West Virgin Kayenta rock art styles are distinctive for their use of bodily

adornment to present the human body. These may depict symbolic treatment of new social roles or identities that developed in association with sociocultural changes attending changes in economy (Quinlan and Woody 2003). These social roles may have been legitimated through practices and theories of being that stressed rock art's connection to past performance, thereby manifesting the past in the present and providing authority for both ideological presentation and the lived experience of new social roles (Quinlan and Woody 2009).

MAGICO-RECONCLUSIONS

Researching spatial variability in rock art styles, themes, archaeological contexts, and landscape contexts allows archaeologists to identify places and activities where it was appropriate for rock art to be made and the sets of signs/symbols appropriate for that location. This provides a model for other specialized archaeological features and artifacts that served a ceremonial function to be identified, potentially allowing the description of the structure of culturally significant landscapes recognized by prehistoric populations. Identifying temporal and spatial patterning in the landscape features recognized as culturally significant and the actions performed there, may be a way of indirectly identifying different systems of social reproduction that relate to cultural affiliation. McGuire and Hildebrandt (2005) noted that the social practices of prehistoric hunter-foragers played an important role in how resources and environments may have been categorized and used. The archaeological residues of magico-religious behaviors indicate that natural environments were not understood through optimal foraging efficiency alone. Although the specifics of prehistoric belief systems are not recoverable from archaeological data in isolation, their associated social and ceremonial practices survive as material residues and landscape modifications that shaped the lived experience of social life.

CHAPTER 9
INTAGLIOS, ROCK ALIGNMENTS, AND TRAILS

Kevin A. Rafferty

The second appendix of the previously published *Archaeological Element* (Dansie 1982, in Lyneis 1982a) dealt with a wide variety of what Dansie defined as "earth surface features." These included "pebble mound complexes" found in northern Nevada, intaglios, cleared areas, trails, rock alignments, cairns, trails, cleared spaces, and "sleeping circles." The analysis presented in this volume combines a variety of different archaeological and cultural features that performed numerous functions.

The purpose of this chapter is to focus on three specific varieties of these earth surface features: intaglios, rock alignments, and trails. In many circumstances we find intaglios and rock alignments associated with each other in the same complex of features. In some areas rock alignments and intaglios have been recorded without reference or association with one another, particularly in the northwestern portion of the Mojave Desert. Trails are associated with all of the other feature types, providing linear routes of travel that allowed access between these features.

The information that we have on cultural features such as intaglios, rock alignments, and trails in Nevada is limited. There are a number of reasons for this lack of data. One is that, for many years prior to the writing of the *Archaeological Element* (Lyneis 1982a; Dansie 1982), the majority of the intaglios and rock alignments known and studied in the Mojave Desert were from the California and Arizona portions of the region. A few intaglios had been recorded in the vicinity of the extreme southern tip of Clark County, but outside of the state boundaries.

In general, the rock alignments found in southern Nevada were casually recorded, with only one known to have received more intensive study (cf. Leavitt 1982). Early archaeologists considered them to be in the "enigmatic, ceremonial" realm of the past, and believed that it would be difficult, if not impossible, to extract any meaningful information from them

Trails also received only peripheral notation by early archaeologists, generally being considered merely routes of travel from "point A to point B," and were not considered informative about the past.

The study of these features, especially intaglios, was hindered by preconceptions of cultural affiliation. For example intaglios were considered to have a cultural-specific identification as a feature. The majority of the primary researchers into these phenomena consider them to be associated with Yuman-speaking groups, particularly the prehistoric Patayan and historic Mojave (cf. Solari and Johnson 1982; Johnson 1985). Their traditional territories were not considered to have penetrated deep into southern Nevada, stopping more or less where the present-day Fort Mojave Reservation south of Laughlin now exists.

Much has changed since 1982, a period of nearly 30 years. In terms of physical resources, at least six intaglios have been recorded in the southern Nevada study area: three on the Fort Mojave Reservation (Rafferty 1990b), one in the Las Vegas Valley proper (Rafferty 1992; Woodman and Valentine 1999), one in the Lake Mead area near Boulder City (Daron 1995), and one in the Pahrump Valley (Roberts and Lyon 2009). At least three geoglyphs/rock alignments have been recorded in the Coyote Springs Valley in northern Clark County (Leavitt 1982; Leavitt and Rafferty 2006), and multiple trail segments have been recorded in Clark County by various projects (cf. Robert et al. 2007). There do not appear to be any major intact trail complexes, as far as this author can discern.

Our understanding of the interplay of prehistoric and Post-Puebloan cultures has changed as well. It is becoming more recognized that the Patayan and Mojave peoples penetrated southern Nevada at least as deeply as the Las Vegas Valley (cf. Hatzenbuehler 1992, 1995; Rafferty 1984a, 1990c, 2008; Roberts and Ahlstrom 2000; Seymour 1997) and the Gold Butte region of eastern Clark County (McGuire et al. 2010). These two groups left their mark, not only in the form of habitation and subsistence sites but

ceremonial sites as well. Detailed archaeological evidence and discussions of the prehistoric Patayan settlement of Las Vegas can be found in Rafferty (2008).

Each type of earth surface feature will be discussed as a separate topic, with the recognition that the three types of features are hopelessly entangled and interrelated with one another in many areas and many ways. In the section for each topic the class of feature will be defined as a type and construction techniques will be discussed. Then the history of research for each type of feature and the pertinent ethnographic background will be discussed, with particular attention to the information pertinent to the southern Nevada region. Individual sites containing one or more of each feature type will be used as examples within this section. Finally, issues related to this research will be examined and pertinent research questions will be posed for each type of archaeological feature. It is hoped that this will help guide future research into each of these types.

INTAGLIOS

Definition and Past Research

Humans modify the landscape to suit their cultural needs. These needs may be related to subsistence, concerned with housing and shelter, or may have a spiritual/religious purpose. As such, archaeological sites of any kind are both physical manifestations of man's impact on the local environment and symbols within a "built environment" that imitates or represents conscious or subconscious aspects of life as perceived by a particular cultural group. They become visible physical expressions of culture and can serve a communicative role by embodying and conveying meaning for individuals within a group, and convey messages between groups. They often demonstrate how the built environment corresponds to idealized conceptions of social, political, and religious life (Lawrence and Low 1990:466).

Since 1985, researchers along the Colorado River and throughout the Mojave Desert have encountered and recorded many of these features. Although some (Von Werlhof 1995) use the term "geoglyphs" to describe these features, a significant percentage of researchers in the region call these features "intaglios" (cf. Ezzo and Altschul 1993c; Ezzo 1994; Doolittle and Ezzo 1995; Altschul and Ezzo 1995), a term that is in general use in the southern Nevada region. For the purposes of this document they will be referred to as intaglios.

The naming and definition of these features has caused some small controversy over the past few years. Johnson (1985: 6–7) concedes that the term intaglio was in general use prior to his publication about these features. He has argued that the term is too vague for describing different earth figure phenomena found in the Mojave Desert. Instead the term geoglyph (or earth figure) should be used to identify and define all man-made alterations of the desert surface that is considered purposeful and possibly imbued with cultural meaning or significance. For these features, Johnson identifies three major construction techniques:

1. selective displacement of the surface gravels to reveal the lighter colored desert surface underneath,
2. tamping of gravels down into the subsurface soils, and
3. patterned foot traffic that creates a trail or foot path image.

There are other processes that add to the geoglyph construction including the heaping of stones or gravel into piles or cairns and the alignment of rocks into larger earth patterns. All of these processes may be used to create larger patterns in the desert pavement (Johnson 1985: 7).

Johnson subdivides intaglio figures into two categories based on their functional origin and use. Some figures were created for a specific purpose, usually with distinct representations of life forms or geometric designs. Many of these types of figures have been found along the Colorado River. At these sites, the presence of footpaths that lead to various features, or circular dance pattern areas, which

comprise a portion of the overall figure pattern, may not have been intended to be a part of the original figure (Johnson 1985: 6–8).

More specifically, an intaglio is a design, of varying size and morphology, created on desert pavement surfaces by scraping away or removing the dark pavement to reveal lighter soil underneath. The scraped area creates a negative image (Von Werlhof 1995) that forms the design, which is often bordered by rocks or stones that create ridges outlining the figure. They inevitably are situated on terraces covered with desert pavement, making the juxtaposition of the lighter figure with the darker surrounding desert pavement. The result is a dramatic presentation of the message being conveyed by the figure. These figures come in a variety of shapes: zoomorphic, geometric, anthropomorphic, or more abstract designs. The designs tend to resemble rock alignments, petroglyphs, and ground paintings found in the Patayan/Yuman tradition (Solari and Johnson 1982: 419; in Woodman and Valentine 1999: 9). In a number of locations there are groups of these figures associated with trails, cairns, gravel mounds, and rock alignments that can be defined as complexes (Dansie 1982:282).

Rogers (1966) noted that the Inyo County intaglios were associated with lithics and cairns. Numerous other intaglios in the California Desert have also been associated with cairns, artifacts, trails, and other features (Davis and Winslow 1965). Von Werlhof's (1987) work in the northern Mojave Desert also noted an association with intaglios and cairns, along with trails, lithics, rock circles, and other alignments. He argues that "earthen art sites are rarely isolated finds" (Von Werlhof 1987:1).

Several researchers (Johnson 1985; Rafferty 1992; Woodman and Valentine 1999: 10–12) have summarized previous intaglio research, which has been adapted and augmented here in light of recent research. The earliest reports of such features are those of Captain Lorenzo Sitgreaves in 1851 and William Blake in 1853 (G. Smith 1983: 89). Later, Bourke (1889) discussed specific intaglios he recorded along the Colorado River and recounted stories and mythology told to him by Yuman-speaking companions about these specific locations. Rogers (1939, 1966) recorded a number of intaglio features in the Blythe area along the Colorado River in the 1920s. During his research on these figures, Johnson (1985:3) stated that he could not relocate some of the intaglios originally recorded by Rogers and fears that they may have been destroyed by gravel quarrying. Intaglios became better known in the 1930s when a pilot, George Palmer, photographed the "Blythe Giants" and brought them to the attention of Arthur Woodward of the Los Angeles Museum. Woodward then publicized them in various sources (Woodward 1932). The Blythe figures were also observed from the air in 1943 by Generals H.H. Arnold and George Marshall. The latter published an article on these figures with Frank Setzler of the Smithsonian Institution (Setzler and Marshall 1952).

Research on these features has continued intermittently since the 1950s. Harner (1953) and Gerald Smith (1974, 1983) recorded and attempted to discuss numerous intaglios along the Colorado River as has Haenszel (1978, 1981, 1982). Boma Johnson (1985) and Von Werlhof (1987) have since contributed heavily to our knowledge and understanding of such features. Outside of the Great Basin/Southwest region, but nearby, Hayden (1982) recorded similar features in the Sierra Pinacate region of northwestern Sonora, Mexico.

Since the early 1990s a significant amount of work has been conducted along the Colorado River that has recorded numerous individual intaglios and several complexes of features that include intaglios. "Classic" terrace intaglios can be found in locales such as Pilot Knob (Ezzo and Altschul 1993a), Senator Wash (Ezzo and Altschul 1993b), Ripley (Holmlund 1993), Parker (Rogers 1966), Needles (G. Smith 1983), and near the ruins of Fort Mojave.

Research in Nevada has not yielded any intaglios as large or associated in complexes as they are found in California. On the Fort Mojave Reservation, three separate sites with several intaglio features and other associated features, including a small anthropomorphic figure, footpaths, depressions, pits, and circular pathways, have been recorded (Rafferty 1990b). The intaglios in the Las Vegas Valley (Rafferty 1992; Woodman and Valentine 1999) consist of a single figure associated with a number of habitation sites and trail segments just north of the figure along Las Vegas Wash that could have been employed by Patayan/Mojave peoples (Roberts and Ahlstrom 2000). Unlike the other intaglios, those from the Lake Mead area (Daron 1995) and the Pahrump Valley (Roberts and Lyon 2009) appear to be isolated features.

Not enough is known about the distribution of archaeological sites near either of these sites to come to any definitive conclusions.

Ethnographic Background

The intaglios, and many other rock alignments and trail complexes located along the Colorado River and in the Las Vegas Valley region, appear to be related to Native American groups who have resided along the Colorado River for the last several hundred years, at least. Specifically they have been identified as belonging to the Patayan/Yuman cultural tradition. The one exception may be the Pahrump figure, the ethnographic context of which will be discussed shortly. These groups were in place at first contact with Europeans (the Spanish) in the 1500s. Previously recorded intaglios occur in "traditional" Patayan/Yuman territory in the Mojave Desert and along the Colorado and Gila rivers (Rogers 1945; Johnson 1985). They were a physical representation of their spiritual world view and served as dance and ceremonial centers used to recount tribal creation and origin myths (Johnson 1985). In this vein they served as identifiers of social identity, symbols or signs that the group employing them shared a common cultural or ethnic identity. They also served to distinguish members of the group from outsiders while carrying intra-group significance (Royse 1982:7). They appear to be related to the cosmological or world view belief systems of these peoples, and were part of ceremonial or religious practices. These practices could include the creation rite, healing or curing rites, rites of passage for girls, purification ceremonies, scalp or war dances, and various ceremonies involved in the agricultural or subsistence cycles (Knack 1981; Johnson 1985: 15-16).

The following ethnographic overview is derived and adapted from Stone (1991) and Baksh (1994). Yuman-speaking groups inhabited a significant portion of the Southwest and Mojave Desert, including southern and Baja California, western Arizona, and southern Nevada. This overview will focus on the Mojave, whose traditional territory Kroeber (1974) said took in the river margins extending from the Parker Valley in California to the Cottonwood Valley in Nevada, where Lake Mojave is now. Based on recent evidence, several researchers (Rafferty 1984a, 2008; Seymour 1997) now suggest that the traditional Mojave territory may have extended as far north as the Las Vegas Valley.

Ethnographic research (cf. Roberts 2010) has emphasized the close spiritual bond that the Mojave have with the Colorado River and the lands on either side of the water. The river and land ranging from Black Canyon to Needles Peak in Arizona are seen as the lifeblood of the Mojave. Roberts (2010:5) describes it as their circulatory system, suggesting that smaller side rivers or washes could be seen by analogy as part of the system. Prior to the building of Hoover Dam, within the Mojave Valley most ranchería (village) settlements were located along the river's edge. Annual Spring flooding deposited fresh silt that was exploited for agricultural purposes. Traditional crops included maize, beans, pumpkins, sunflower, cotton, and gourds. After European contact they added crops such as wheat and watermelon (Castetter and Bell 1951; Ebeling 1986).

The Mojave also derived a large percentage of their subsistence from hunting and gathering activities. Fish in the river, honey and screwbean mesquite, agave, pine nuts and some wild grasses were exploited, while hunting of rabbits, deer, and mountain sheep in the nearby mountains supplemented the diet. Hunting was not considered to be a major component of the diet (Forde 1931; Castetter and Bell 1951; Stewart 1983). Outside of the valleys, settlements included seasonal camps, travel camps, and refuge settlements, many of which were associated with the exploitation of natural resources. The complexes of intaglios, rock alignments, and trails also form a component of Mojave settlement, involved in travel, trade, warfare, and religious pilgrimages.

The Mojave participated in or dealt with economic and political alliances, both friendly and hostile, which involved them in local and long distance trade, and regular warfare. The trade networks involved groups throughout southern California, northern Mexico, Arizona, and Nevada. Well-established trails, which likely included many of the recorded trails and trail segments in Nevada, allowed the Mojave to serve as middlemen in this trade. Local trade included exchanges between river and upland or desert groups, and consisted of an exchange of domesticated foods and manufactured items for raw materials

and wild foods. Long-distance trade brought marine shell from the California coast, for items such as pottery, cotton, and woven blankets from as far away as northern Arizona (cf. Kroeber 1935; Bolton 1930; J. Davis 1974; in Stone 1991:36).

There were two fairly extensive networks of alliances that linked the various tribes across the Mojave Desert in both peaceful and hostile relationships. Stone (1991: 37–38, Figure 3-2), based on data from White (1974: 128), constructed a map of the alliances that prevailed in historic times. She notes that the Mojave, Quechan, and Yavapai frequently allied with each other against the Cocopa, Maricopa, and Pima, all groups that were situated along or near the Colorado or Gila rivers. Locally the Paiute were allies of the Mojave, while the Hualapai and Havasupai in nearby northwestern Arizona were allies of the other alliance. Stone further suggests that warfare, which appeared to be both persistent and endemic, was likely grounded in competition for resources. The struggle for control of the trade with the Spanish for horses and slaves very likely intensified this warfare in size, organization, and geographical extent (cf Dobyns et al. 1957; Bee 1983). Altschul and Ezzo (1995) have suggested that the endemic nature of warfare along the Colorado River may have contributed to the construction and use of complexes of ceremonial figures, including intaglios, geoglyphs, and trails, as components of a *keruk* (mourning ceremony) pilgrimage trail that stretched from Pilot Knob in California to the Newberry Mountains near Laughlin, Nevada.

Cleland (2005:131–132) has recently reiterated the importance of dreams in Mojave life. People acquired power and received many skills through dreaming. Stone (1991:19) notes that "dreams, leadership, curing, religious activities, myths, and stories about creation and warfare, and other aspects of daily life and world view are intricately connected." Cleland (2005:131) emphasizes, based on Kroeber's (1925:754–755) research that mythology and dreams are emphatically set in the world of everyday experiences, that there is a "strong personal linkage between mythology, dreaming, material existence, and the cultural landscape" (Cleland 2005:132). Myths tended to be long, extremely detailed, and included geographical specifics, including "the exact spot at which each character journeyed or slept or stood or looked about" (Kroeber 1925: 755). Native American consultants that Cleland worked with told him that the entire landscape was meaningful to them and so must be understood in its entirety.

Kroeber (1925:770; in Roberts 2010) defined three types of Mojave stories that were linked to the landscape. The first was the origin myth. The second were narrative epics that include migration legends and clan traditions. The third were short stories (coyote stories). These are usually linked to local landmarks or man-made objects like the intaglios, geoglyphs, and trails. Cachora (1994:14, in Cleland 2005: 132), a Quechan consultant, has stated that spiritual activities and events were "deeply associated with numerous intaglios, petroglyphs, trails, lithic scatters, and cleared circles." Cleland (2005) indicates that the trail systems, intaglios (geoglyphs), rock features, cleared circles, and other cleared areas are important in understanding the relationship of Yuman-speaking peoples to their natural and cultural environment, and that they tend to be concentrated at areas of traditional significance.

One of the most important myths was about *Mastamho*, the culture hero who created the Colorado River, the sacred mountain *Avikwaame* (Spirit Mountain in the Newberry Mountains), and men and animals. He figures prominently in their sacred beliefs, alongside a number of other supernatural and natural beings.

Rituals and ceremonies revolved around puberty initiation, warfare, healing, curing, and death or mourning. One of the most significant of the ceremonies was the *keruk* or mourning ceremony. This ceremony included symbolic battles; the destruction of property and ritual objects; a re-enactment or commemoration of the death of the creator; and stories about the creation of the world (cf. Stone 1991; Altschul and Ezzo 1995 for a summary). As noted previously, Altschul and Ezzo (1995) suggest that the construction and use of complexes of ceremonial figures, including intaglios, geoglyphs, and trails, were components of a *keruk* (mourning ceremony) pilgrimage trail that stretched from Pilot Knob in California to the Newberry Mountains near Laughlin, Nevada. Could the intaglios in the Las Vegas region could have been part of that larger complex? To the contrary Von Werlhof (1995) has argued that the model suggested by Altschul and Ezzo is too site specific and that most of the intaglios (geoglyphs in his terminology) probably predate the *keruk* ceremony.

Elaborating on this argument Von Werlhof (1995:63) argues that geoglyphs (intaglios and other features) played a central part in Yuman sacred activity and mythology. The assorted sacred activities included:

1. depiction and celebration of the creation myth;
2. struggle with anti-social forces, such as Elder Brother in physical triumph over his evil twin;
3. the mythical past;
4. the *keruk* ceremony;
5. initiation rites for boys, and possibly girls; and
6. cultural renewal with traditional singing and dancing.

Baksh (1994:31–40) has discussed categories of ethnohistoric information that may be useful in the interpretation of intaglios and rock alignments. He discusses several types of intaglio patterns and other types of features or cultural information that he suggests may be of use in interpreting specific features or patterns in the Quien Sabe/Big Maria Terrace area of Riverside County, California. The figures or symbols that may be pertinent for research into intaglios and rock alignments in southern Nevada, are discussed in cursory form below. There is data on several categories of information that were not included based on our current state of knowledge concerning these features in southern Nevada. The reader is referred to Baksh (1994: 31–40) for a complete list and more detailed information.

Giant Humans

Baksh (1994:31-32) finds the giant human intaglios like those found at the Blythe Intaglio site to perhaps be the most intriguing of all these figures. He references Kroeber's (1951) document, *A Mojave Historical Epic,* of being particular interest here. Two giant figures in this story, *Hipahipa* and *Amai-lye-vave-kwilyehe,* carried their people across the Colorado, as did another figure *Umase'aka*. In addition *Hipahipa* could grab and hold rattlesnakes without being bitten. One site along the Lower Colorado River, CA-RIV-877, shows a man holding what could be lightning or a snake, so perhaps someone could have been referencing *Hipahipa* with that figure. It is possible that similar figures, if found in southern Nevada, may also be related to cultural mythology.

Twins

Twins and brothers are regarded as being of supernatural origin (Bourke 1889:186) and in mythology can represent good and evil or be competing against one another. Sites that contain sets of anthropomorphic figures may be related to this concept among Yuman-speaking peoples.

Snakes

Baksh (1994:33) notes that snakes are important in Yuman world view. They are spoken about in the creation myth and many other tales. *Kumastamxo* slays a huge snake and creates a number of natural features from him: gold, silver, gravel, and the ocean (which is the snake's urine) (cf. Forde 1931: 176-177, in Baksh 1994:33). There is also a myth with a giant sky rattlesnake as an important element (Kroeber 1925:775). Baksh notes that one of the Blythe Intaglio giants may have been holding a snake and says that one serpent site in California (CA-RIV-2363[UCR]) might be interpreted in light of such stories. Researchers encountering such figures in southern Nevada may need to refer to these stories to assist in interpreting them.

Shamans/Doctors

Baksh (1994:32) cites several ethnographic sources (Bourke 1889; Forde 1931; Laird 1980) that demonstrate the importance of shamans or 'doctors' among Yuman-speaking groups, most significantly snake doctors and rainmakers. These individuals obtained their powers through dreaming. Snake doctors not only cured snake bite, sometimes over long distance, but could also pick them up and talk to them without being bitten. Rainmakers not only made rain for crops but also produced storms to confuse

enemies. They used lightning as a tool. Baksh (1994:33) refers to a site along the Lower Colorado River, CA-RIV-877, showing a man holding what could be lightning or a snake, and suggests that perhaps this site may be referencing rain or snake doctors, if not *Hipahipa.*

Spirals

Baksh (1994:34) notes that such figures are common at intaglio and petroglyph sites, as well as motifs on ceramics, throughout the territory of Yuman speakers. Unlike the previous figures he does not recount any mythological references for these figures.

Other Figures

Baksh (1994:34–35) discusses other designs that appear to be limited to specific intaglio locations along the Colorado River in California. These include horses and hair. He cites no specific mythological references to these designs but speculates they represent objects (horses) or individuals (anthropomorphs associated with the hair) who may have been esteemed or well liked.

Ceremonies and Dances

Baksh (1994: 35–36) suggests that large circular shapes associated with intaglio figures may be the result of ceremonial dances held by Yuman-speakers. He cites ethnographic literature that testifies to the fact that dancing was important in a number of ceremonies, particularly ceremonies for the dead (the *keruk)* and dances before and after warfare. Altschul and Ezzo (1995) have also suggested that the endemic nature of warfare along the Colorado River may have contributed to the construction and use of complexes of ceremonial figures, including intaglios, geoglyphs, and trails, as components of a *keruk* (mourning ceremony) pilgrimage trail that stretched from Pilot Knob in California to the Newberry Mountains near Laughlin, Nevada.

Baksh also discusses events that involved feasting and dancing, such as harvest feasts that lasted for days and brought a large number of people together in a ceremonial location. Symbols or features can be seen as part of a 'built environment' that expresses the main tenets of the culture to the people who built the feature (Lawrence and Low 1990). In Mojave culture the concept of *puha* (power or energy) may be significant in connecting intaglios or ceremonial areas with cultural meaning. *Puha* came into being at the time of creation and suffuses everything with its power, and is why everything in the universe is alive and capable of independent will and activity. Stoffle et al. (2004:17) suggest that in western terms the idea of a *living universe* is the best way to understand this world view. To the Mojave, any gathering of humans, who are "central figures in an interacting system of power holders" (Bean 1976: 408, in Stoffle et al. 2004:18; Miller 1983), will concentrate *puha*, and closed dance circles can contain the power for a significant amount of time.

Certain localities may exhibit concentrated power, which produces "powerful places." These localities are then recognized and utilized by human beings. Stoffle et al. (2004:24) argue that three general types of localities can be identified in southern Nevada as foci of such power for Numic and Mojave peoples: creation places, ceremonial places, and residences. Ceremonial places consist of two subtypes, those created and used for acquiring *puha* and those made for using *puha* to heal or to balance the powers of the universe. Johnson (1985) suggests that, among the Mojave, earth figures or intaglios could be involved in several ceremonial functions: healing ceremonies, tribal origin myths, or creation myths and associated ceremonies. Intaglios in southern Nevada may have functioned as a special locations where *puha* was focused for ceremonial functions.

Southern Nevada Intaglios

The six sites already recorded within the study area will be discussed separately, and only limited interpretation of them will be attempted. It is likely that more of these features exist and have not yet been recorded by archaeologists. The recorded sites and their descriptions will serve as a baseline dataset for future research into these features and their place in southern Nevada prehistory.

The Fort Mojave Intaglios

There are three sites, 26CK4381-4383 (Rafferty 1990a), located on the Fort Mojave Reservation at the tip southern tip of Clark County. They are situated on the lower alluvial terraces overlooking the Colorado River on its western bank. Site 26CK4381 consists of two features situated within a larger opportunistic quarry (26CK4143). The northernmost of the two, Feature 1 (Figure 9.1), is an anthropomorphic figure with a dimly outlined body, a badly eroded head, and a dimly perceived right arm and leg. Its overall measurements are 18 m long (NNW-SSE) by 7 m wide. South of the anthropomorph is a trail segment that leads to a trench or depression 5.5 m long by 1 to 2 m wide, designated as Feature 2 (Figure 9.2). When the feature was recorded, there was a large lizard burrow that obscured part of the feature. This burrow is to the south of the depression and north of two short segments which were perhaps originally part of a larger figure or design obscured by the burrow. One segment is 4 m long and is oriented towards the northeast while the other is 6 m long and is oriented towards the southeast. Their terminal points are approximately 9.5 m apart.

The second site, 26CK4382, is located approximately one-half mile north of 26CK4381 and is also situated within the boundaries of an opportunistic quarry. It has two defined Loci, A and B. Locus A (Figure 9.3) contains six features (A-F; Figures 9.4-9.7) within an area 38 m long (N-S) by 31 m wide (E-W). The features include:

A. Feature A (Figure 9.4): This consists of a circular depression connected to a doughnut-shaped figure by a small path or cleared area, so that it vaguely resembles a figure 8. The two circles measure *in total* 4.5 m long (E-W) by 2 m wide (N-S). The depression has a 3-m long footpath proceeding from it in a southeasterly direction, while the doughnut has a footpath proceeding from it in an easterly direction.
B. Feature B (Figure 9.5) consists of a shallow pit with a dirt berm on its western edge, measuring 2 m (N-S) by 1 m (E-W). Two short footpaths or limbs originate from its eastern side. One starts at the northeastern corner and proceeds northeast for 5 m, while the other originates at the southeastern corner and proceeds 6 m to the southeast.
C. Feature C (Figure 9.6) consists of two small cleared areas or depressions separated by a dirt berm. The westernmost depression measures 2 m (N-S) by 1 m (E-W) with two linear cleared areas that originate from its eastern side. One starts at the northeastern edge and proceeds for 5.6 m in that direction, while the other originates on the southeastern margin and proceeds 3 m in that direction. The second depression is east of the first and measures 1.5 m (N-S) by 1.25 m (E-W). Just northeast of the depressions is a sinuous footpath, 8.5 m long, oriented in a southwest-to-northeast direction.
D. Feature D (Figure 9.7) contains two figures: a curved depressed line or trail segment 14 m long (SE-NW) and a 1-m diameter cleared area or depression with two line segments that proceed from its eastern side. One is oriented to the northeast and is 5 m long while the other is oriented to the southeast and is 6 m long. Just southwest of the depressions is a sinuous, 14-m long footpath that is oriented in a southwest-to-northeast direction.
E. Feature E (Figure 9.6) is a circular doughnut approximately 2 m in diameter. Just northeast of it is a small curved linear segment of depression.
F. Feature F (Figure 9.7) is a depression or cleared area measuring 2 m (N-S) by 1 m (E-W) with two linear segments that proceed from it, one from the northeastern corner and one from the southeastern corner. The former measures 11 m long and the latter measures 8 m long.

Locus B (Figure 9.8) is a circular pathway with an overall measurement of 15 m in diameter. Within its interior are two smaller features: a 3.5 m diameter circular feature and a 1 m diameter cleared area. The former is near the northern edge of Feature B while the latter is in the southwestern quadrant of Feature B.

The final site on the reservation, 26CK4383 (Figure 9.9), consists of two faint, circular pathways located 100 m northwest of 26CK4381. The overall size of the two circular features is 5 m (N-S) by 2.2 m (E-W).

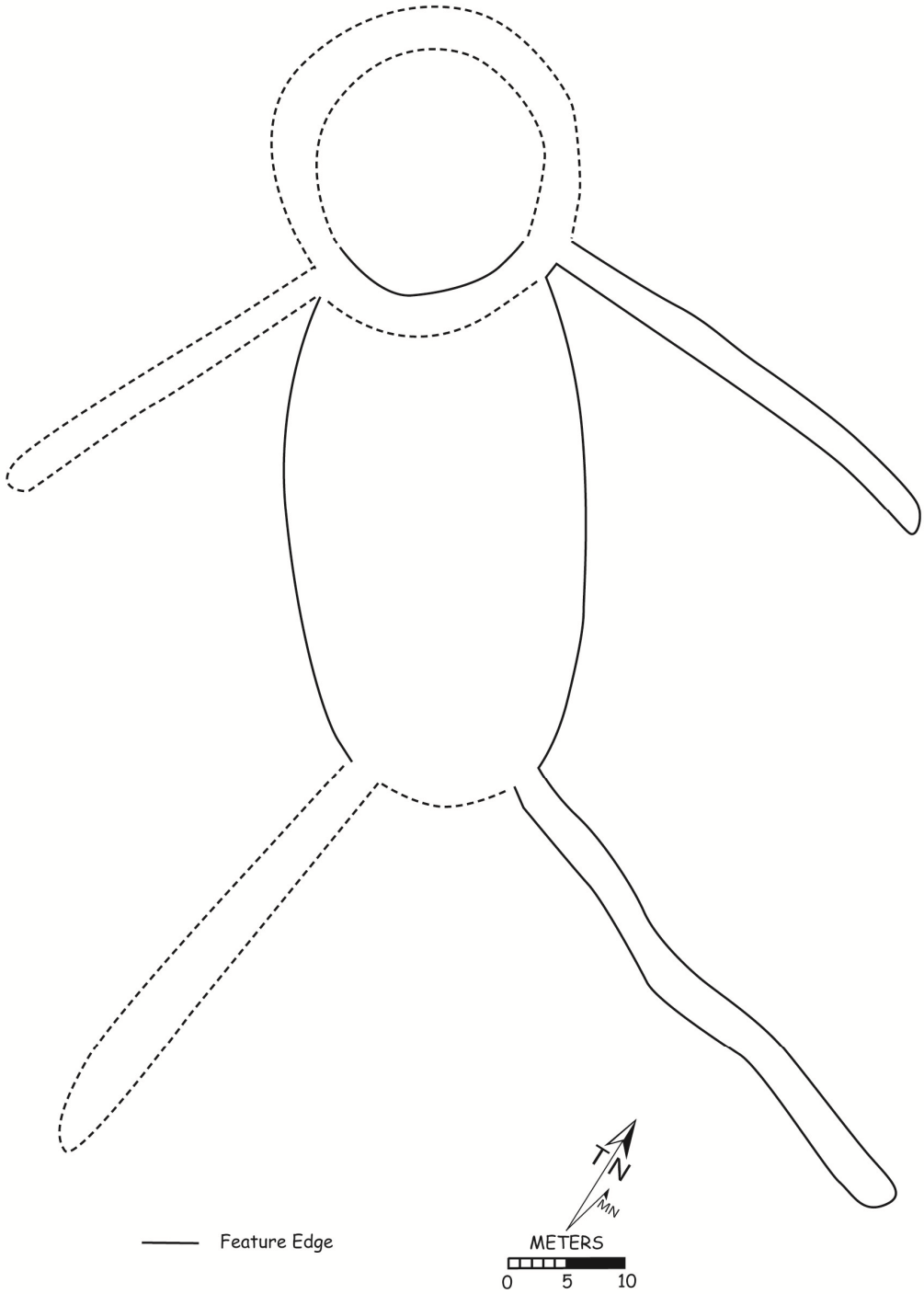


Figure 9.1. Anthropomorphic figure, 26CK4381/AZ-050-1822, Fort Mojave Reservation (original sketch provided by Boma Johnson, Yuma District Office, BLM).

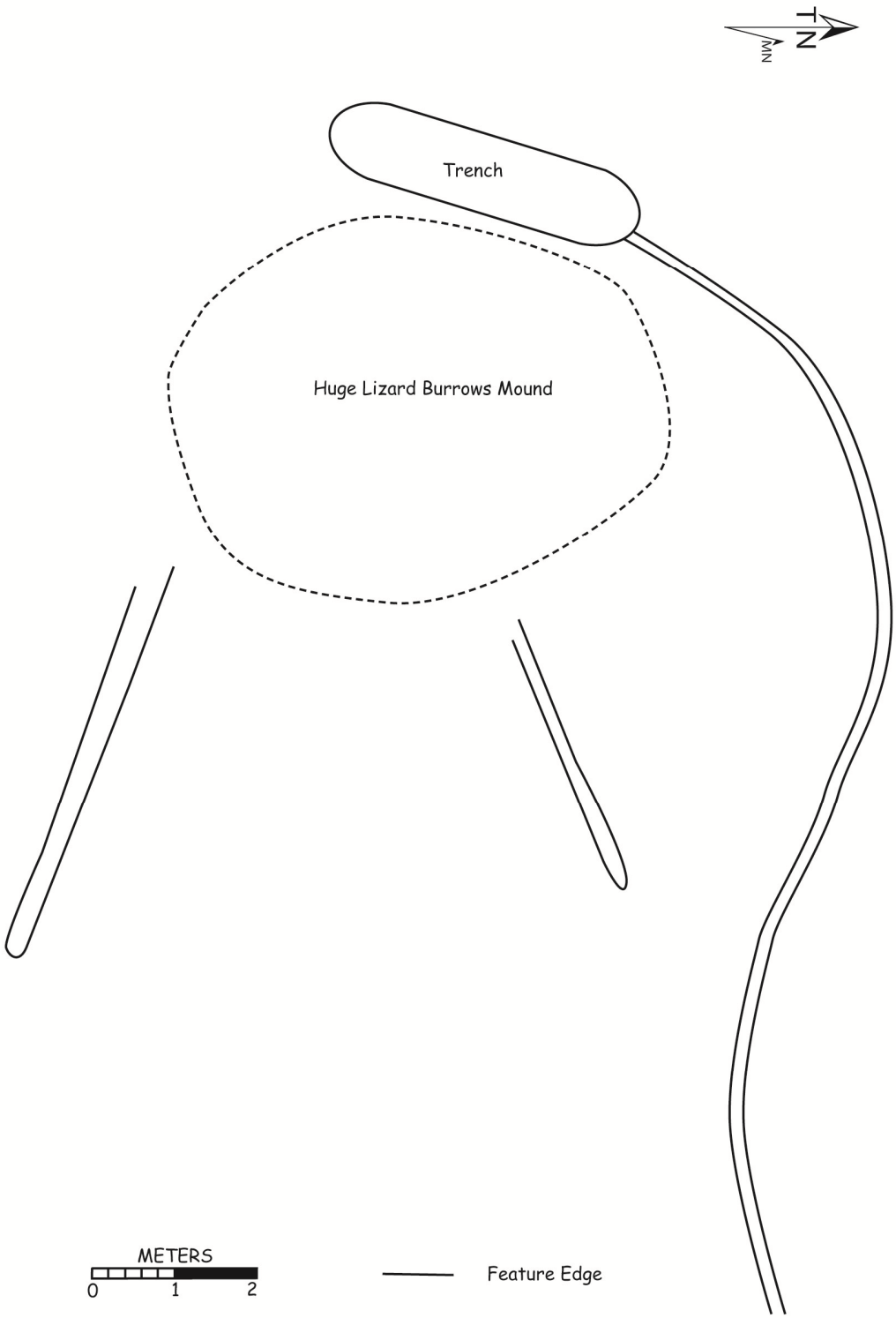


Figure 9.2. Pit or depression with paths, 26CK4381/AZ-050-1822, Fort Mojave Reservation (original sketch provided by Boma Johnson, Yuma District Office, BLM).

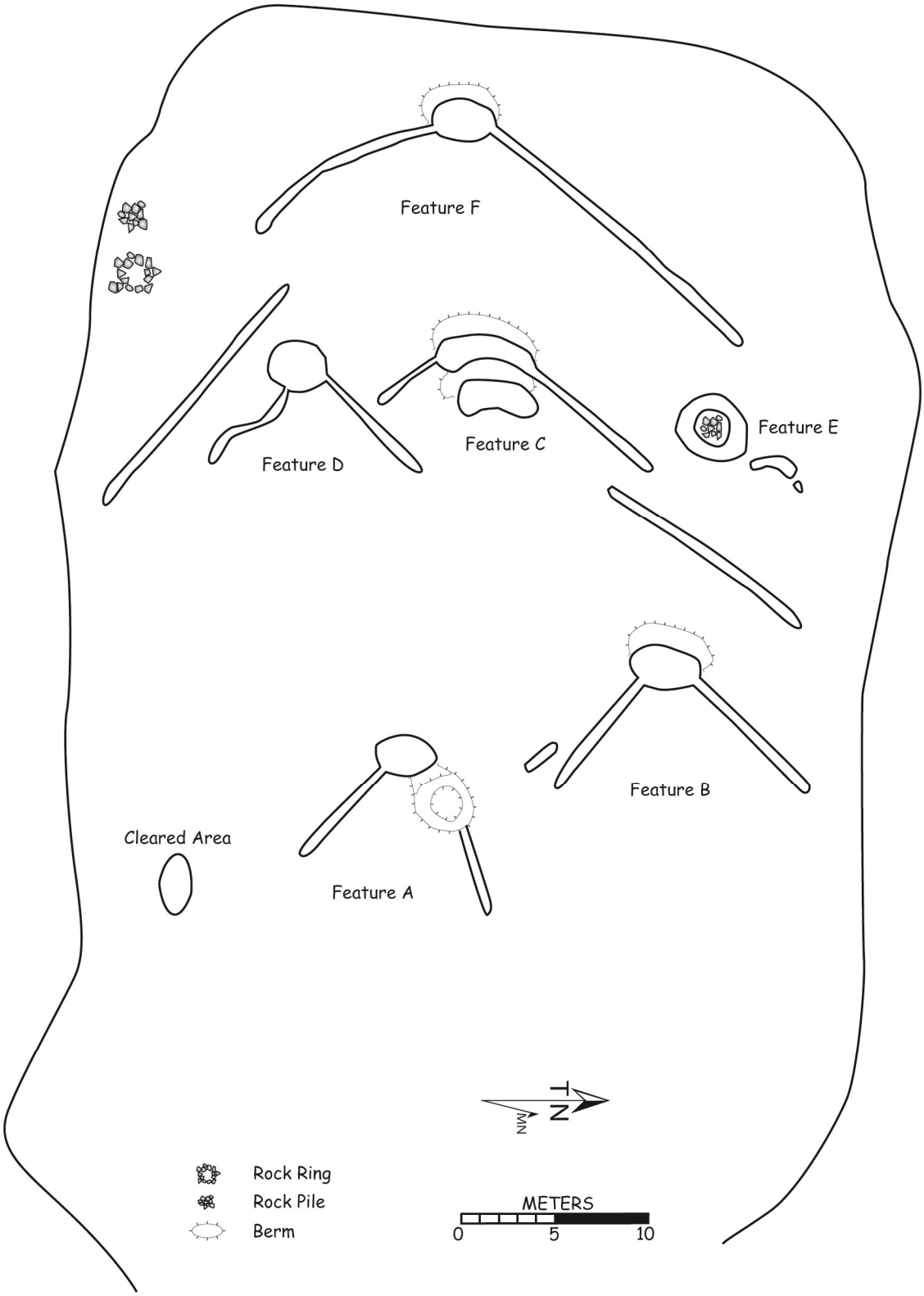


Figure 9.3. General map of Locus A, 26CK4382/AZ-050-1823 (original sketch provided by Boma Johnson, Yuma District Office, BLM).

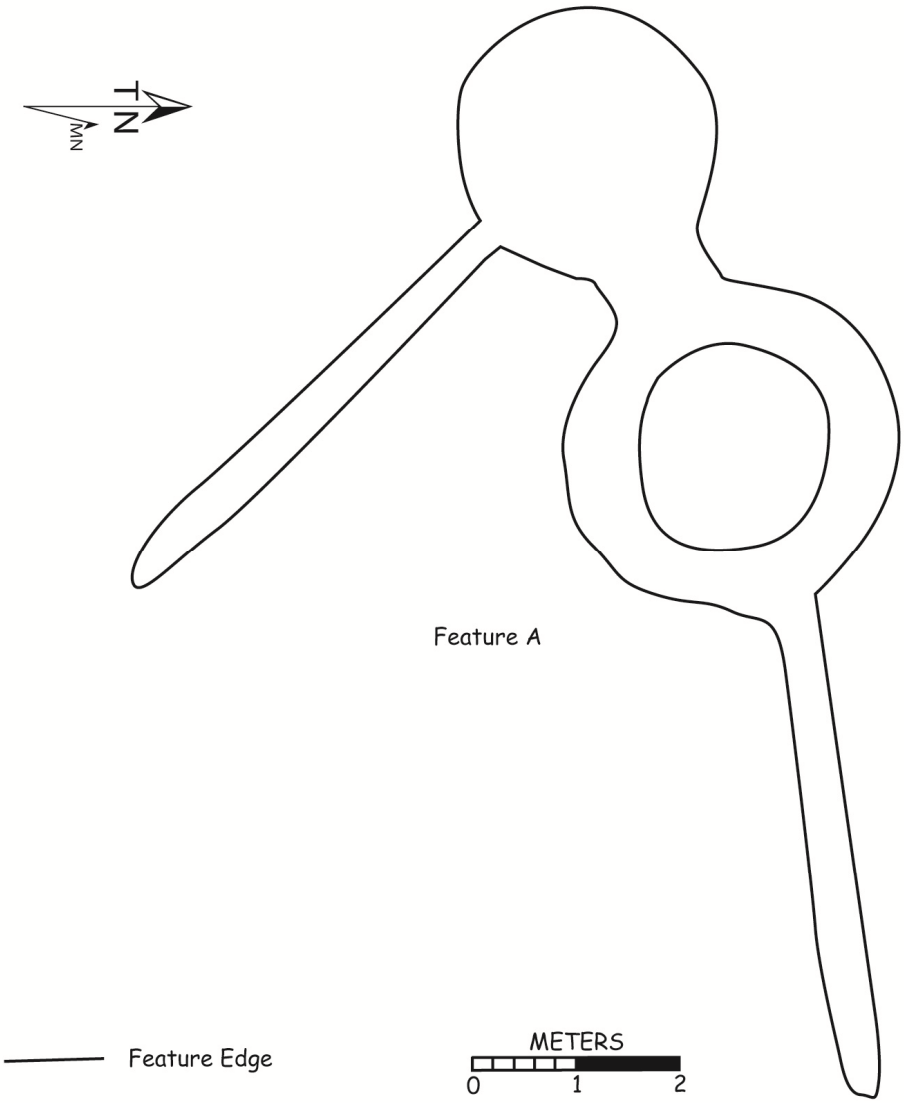


Figure 9.4. Feature A, Locus A, 26CK4382/AZ-050-1823 (original sketch provided by Boma Johnson, Yuma District Office, BLM).

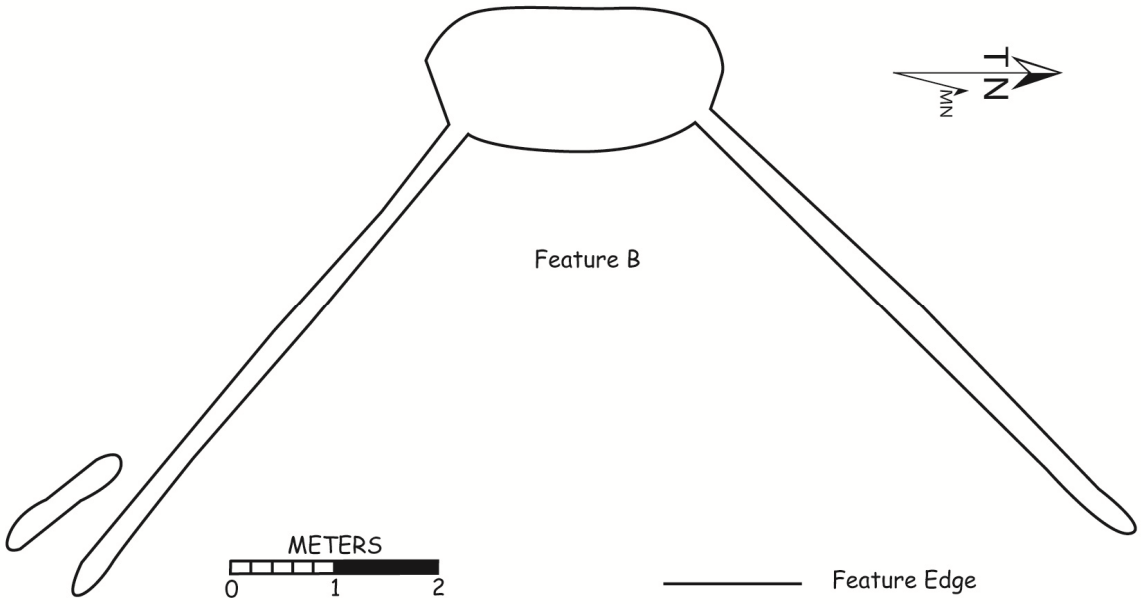


Figure 9.5. Feature B, Locus A, 26CK4382/AZ-050-1823 (original sketch provided by Boma Johnson, Yuma District Office, BLM).

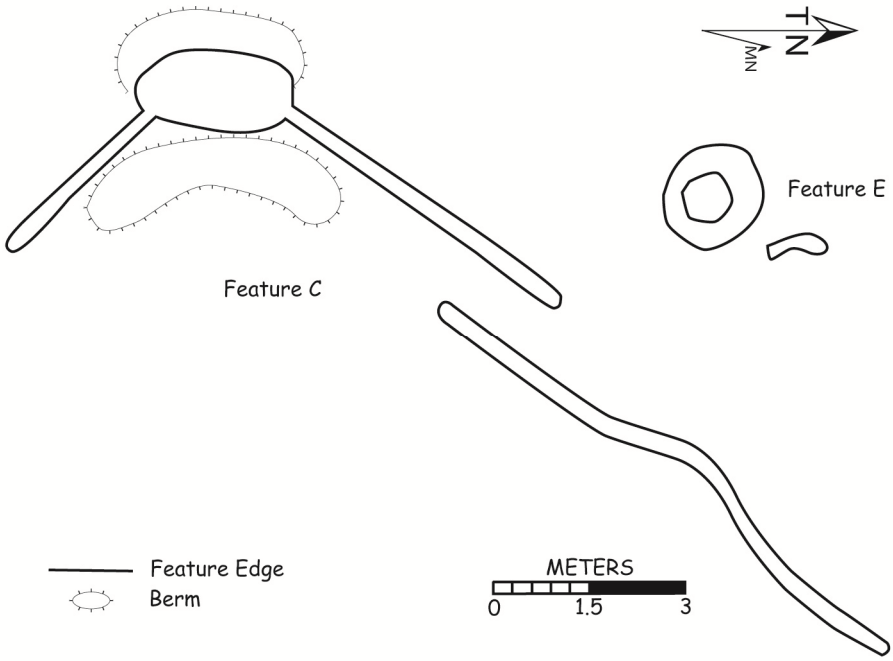


Figure 9.6. Features C and E, Locus A, 26CK4382/AZ-050-1823 (original sketch provided by Boma Johnson, Yuma District Office, BLM).

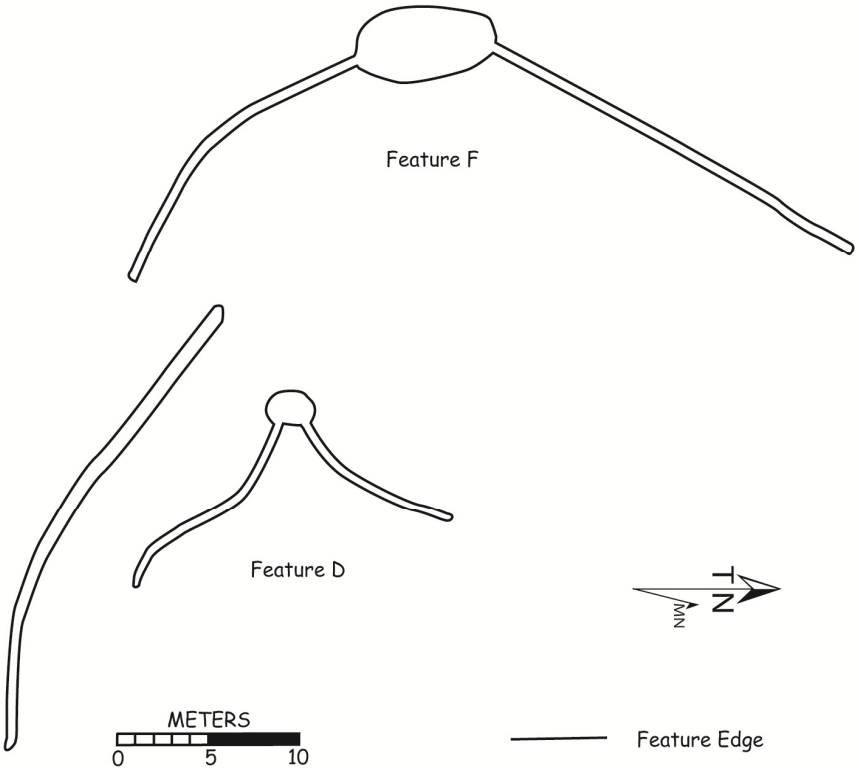


Figure 9.7. Features D and F, Locus A, 26CK4382/AZ-050-1823 (original sketch provided by Boma Johnson, Yuma District Office, BLM).

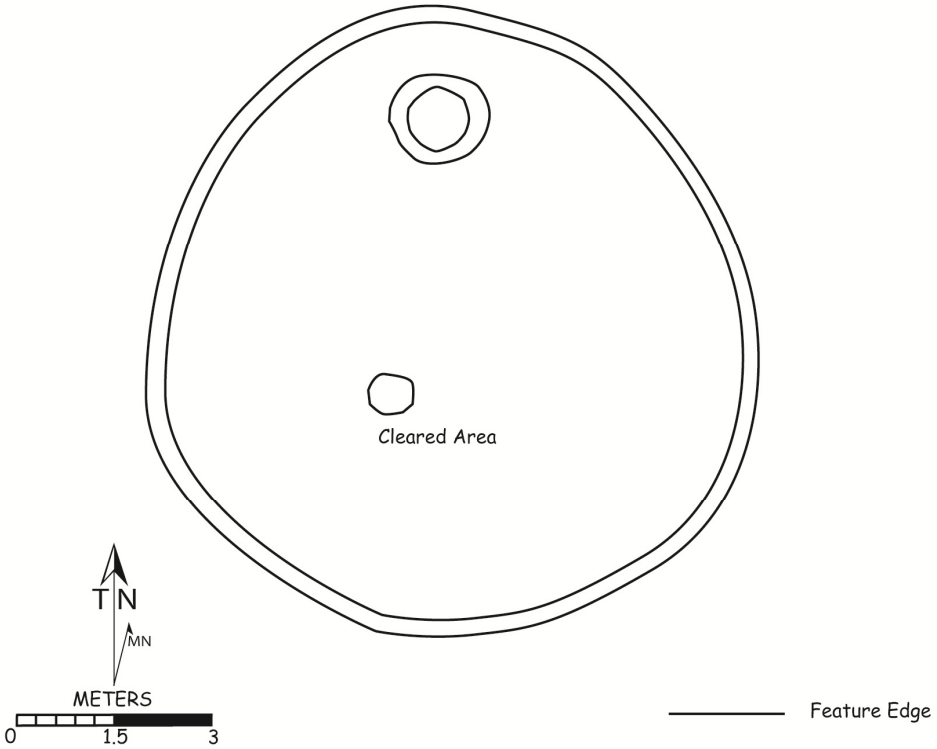


Figure 9.8. Locus B, 26CK4382/AZ-050-1823 (original sketch provided by Boma Johnson, Yuma District Office, BLM).

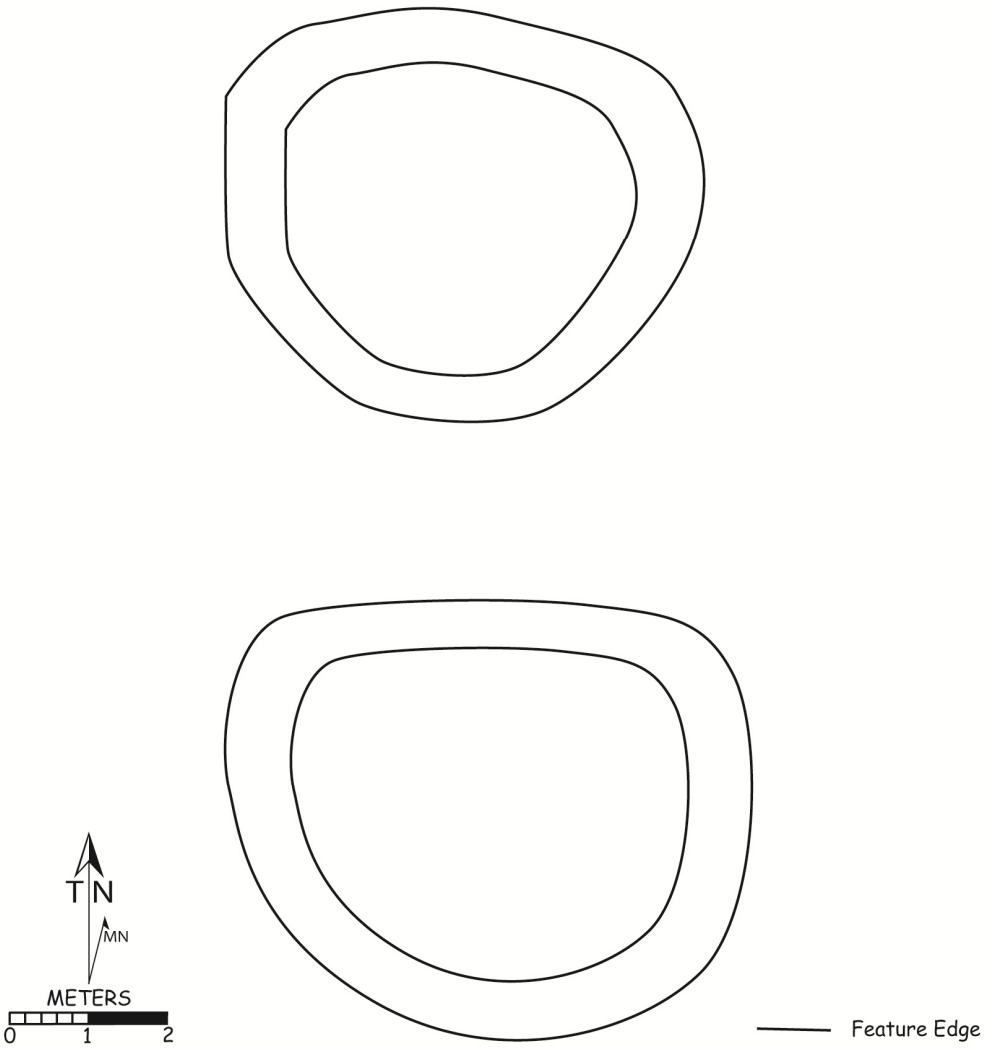


Figure 9.9. Overview map of 26CK4383/AZ-050-1825 (original sketch provided by Boma Johnson, Yuma District Office, BLM).

Las Vegas Valley Intaglios

The Las Vegas Wash Intaglio (26CK 4509; Figure 9.10) is the first intaglio feature recorded in the Las Vegas Valley area of southern Nevada. The feature is located on a low-lying alluvial terrace just 2-3 m above an active bed of the Three Kids Mine Wash. This feature was first recorded in September 1990 (Rafferty 1990b; Figure 1, Plate 1) and was subsequently reinvestigated and re-recorded (Johnson field notes 1991; Woodman and Valentine 1999).

The feature was originally defined as being roughly humanoid in shape, with a pointed head 4 m in diameter and 8 m long on the south end of the feature (Figure 9.10). Woodman and Valentine (1999: 14) note that the scraped area ranged from 1 to 6 cm deep in different areas. Johnson (1985; field notes 1991) suggested that the head was actually part of a loop trail. It was associated with a cairn located at the eastern edge of the loop. The "torso" is approximately 30 m long and averages 65 cm in width where the desert pavement and gravels have been removed to reveal the lighter colored soil underneath. Approximately 17 m north of the "head" is a small arm or phallus that is 9 m long. It points towards the west or northwest.

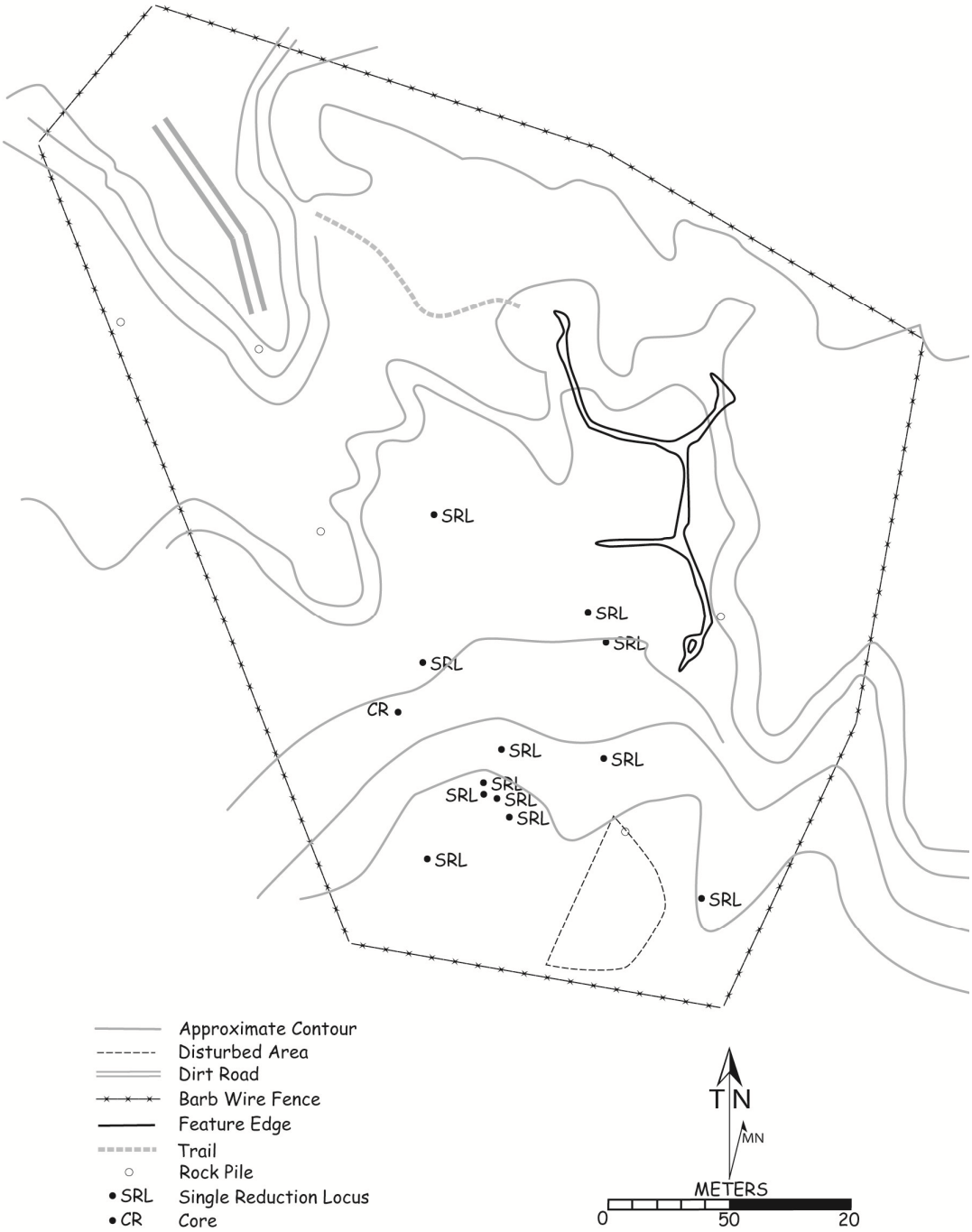


Figure 9.10. Map of the Las Vegas Wash Intaglio.

At the base of the torso is a pair of splayed or separated "legs." The eastern leg is 10 m long and ends at an oval 3.75 m in maximum diameter, which has a small (2 m long) abutment on its north end. Johnson (field notes 1991) suggests that this may be a small dance cul-de-sac associated with dance ceremonials of the historic Mojave. The western leg is 8 m long along the terrace, then dips into a small side wash and reappears on the northern side of the wash 1 m away, then continues to the northwest for another 12 m (Woodman and Valentine 1999: 14). On the south side of the wash are the remnants of another cairn, and at the juncture of the wash and the northern extension of the "leg" is a linear feature of rock that cross-cuts the leg. Johnson (1985; field notes 1991) calls the linear rock barrier a "spirit break."

Other loci of cultural activity are associated with the intaglio. There are several different types of rock piles. The first rock pile (RP-1), adjacent to the head of the intaglio, consisted of more than 38 boulders and measured 1 m tall and nearly 1.5 m wide. Scratched on this pile is the legend WM/-19/MS and appears to represent a mining claim marker. Rock Pile 2 is a smaller pile of 12 boulders or cobbles less than 1 m high; it may also be a mine claim marker. Rock Pile 3 is an additional pile of more than 33 boulders or cobbles. It is less than 1 m high and, like Rock Pile 2, may be a mining claim marker. Rock Pile 4 is a collapsed cairn, and Rock Pile 5 consists of roughly 42 boulders or cobbles that is more than 1 m high and wide (Woodman and Valentine 1999; Figure 2). Several isolated artifacts occur near the intaglio and atop the desert pavement are numerous chalcedony and welded rhyolite tuff nodules, that Woodman and Valentine (1999: 17) suggest were opportunistically quarried at more than eight separate locations.

At the "foot" of this leg, an additional system of trails continues along the edge of the wash for an additional 30 to 40 m at a minimum, crossing over several small erosional rills cut into the embankment of the main wash terrace. At two areas, small side trails abut the main trail heading north and terminate in the wash itself. Johnson (1985; in Woodman and Valentine 1999: 14) describes such trails as being part of a "trail pattern" figure, composed of paths or trailways used in Mojave ceremonials to commemorate migrations or sacred journeys of their ancestors.

As noted previously, figures such as these were most often located alongside the Colorado River within the traditional Mojave/Patayan homelands, and were usually associated with ceremonial or religious functions. One such function was a dance ground or pattern involved celebrations or, more importantly, healing ceremonies. Certain anthropomorphic figures found among historic Mojave groups are connected with the creator figure of myth and thus are involved in healing ceremonials as central factors in the cure. These religious concepts may be similar to those found among the Navajo who employed sand paintings to create a sacred healing ground for the cure (Johnson 1985). The Las Vegas Wash geoglyph may fall in this category.

More likely the figure may represent *Mustamho* (*Kumustamho*), the Creator God of Mojave legend and the source of all culture for the Mojave. He was the origin of all truth and knowledge and was the creator of the heavens and Earth. He taught the people farming and how to live in peace, and then went to the eastern sky with a promise to return someday in the future (Harrington 1908; in Johnson 1985).

Betty Cornelius of the Colorado Indian River Tribes recently visited this site in conjunction with Pat Hicks and Laurie Perry of the Bureau of Reclamation. She made an observation that the figure was probably *Mustamho (Kumustamho)*. She also believed that it was significant that the head of the figure pointed south towards the Mohave homeland and that the figure appeared to be facing the west, looking towards Snow Mountain (Mount Charleston), the mythic point of origin of the local Southern Paiute bands (Pat Hicks, personal communication, 2012).

The Lake Mead/Boulder City Intaglio

Site 26CK5221 was recorded in 1995 by personnel of the National Park Service, Lake Mead National Recreation Area (Daron 1995). The intaglio consists of a single figure with several components oriented along a north-south axis (Figure 9.11). It appears to have been created by tamping areas of the desert 1 one to 2 cm deep and 20 to 25 cm wide. The circles and lines have no pebble or rock ridges outlining them, suggesting to Daron that they were not scraped into the desert. It is described as a geometric design consisting of a circle 2.9 m in diameter with a line bisecting it (Line A).Two additional lines (B and C) originate at two large concentrations or mounds of rock situated at the northern edge of the circle and then they proceed outwards from the circle and rocks that appear to have been placed there deliberately to indicate the line juncture. Line B runs north for 8.5 m and hooks at the end, nearly surrounding two large stones that appear to have been placed there deliberately. Line C runs east from the circle and a juncture with Line B for a distance of 2.5 m. There were no artifacts found in conjunction with the figure.

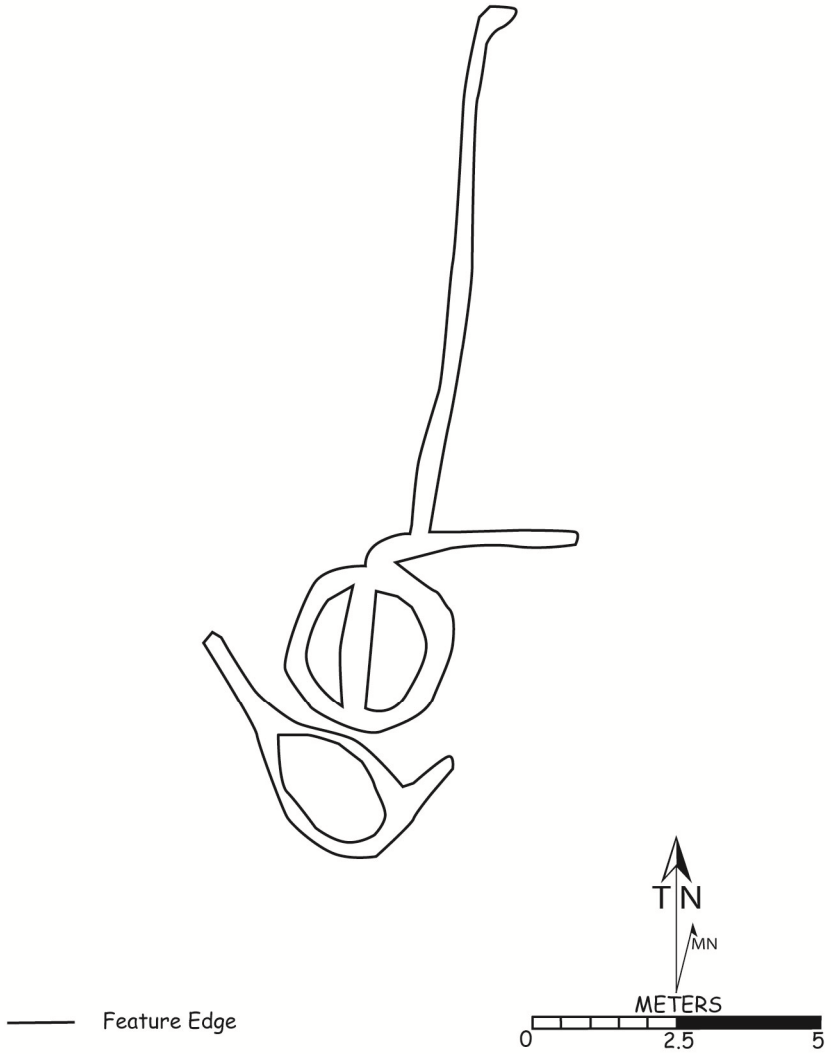


Figure 9.11. Map of Lake Mead/Boulder City intaglio at site 26CK5221.

The Pahrump Intaglio

This site (26NY13533) is located in the eastern Pahrump Valley below the foothills of the Spring Mountains. Roberts and Lyon (2009) describes the intaglio as a 7.5-m diameter circular path situated in the desert pavement. The southeastern edge of the intaglio was destroyed by a four-wheel drive two-track (Figure 9.12). There was also a small cluster of cobbles located approximately 125 m northeast of the intaglio. No artifacts were found in association with the feature

This site is unusual in several respects. First it is located outside of the Las Vegas Valley, in the Pahrump Valley that borders the western flanks of the Spring Mountains. All others have been found in the environs of the Las Vegas Valley or in extreme southern Nevada. Also unusual is that it appears to have been used by the Paiute, not by the Patayan or ethnohistoric Mojave populations. It seems to have been made fairly recently. Roberts and Lyons (2009) report that two Southern Paiute informants told Roberts that the intaglio was used by local Paiutes as a Rabbit Dance Circle and that the father of one of the informants refreshed the circle with a shovel when she was young. Roberts estimates that this may have happened in the 1940s or 1950s. The informants also told her that this is the place where Rabbit taught the Paiutes the Circle Dance. So there are direct references to its historic use and it was tied into Paiute mythology and religious ideas, unlike the other intaglios recorded so far in southern Nevada.

Figure 9.12.Photo of the Pahrump intaglio at site 26NY13533.

Intaglio Themes and Research Directions

One of the most critical issues in dealing with intaglio features is the limited database we have on these features in southern Nevada. To date, only six such features have been recorded in the southern part of the state. All have been recorded since 1990, after the publication of the previous *Archaeological Element* (Lyneis 1982a; Dansie 1982). In the meanwhile numerous such features have been recorded along the Colorado River in California and Arizona. It is important that such features are sought out, recorded, and preserved in the near future since they are fragile and nonrenewable.

There are several basic key research questions that need to be pursued in order to understand intaglios and their role in the life of the prehistoric Post-Puebloan inhabitants of the region. The first is quite basic: What is the age of these features? Given their purported relationship with Yuma-speaking populations it has been a sort of unspoken assumption in Nevada that they date no earlier than around A.D. 800 (Patayan I) and continued to be made and/or used into the historic period. More specific dating has employed associations of artifacts (ceramics mostly) with intaglios or the association of the intaglios with nearby sites containing Patayan artifacts. This generalized dating technique has been called into question because of attempts to directly date the features by using rock varnish cation ratios and AMS radiocarbon techniques (cf. Down et al. 1992). Using this method, Von Werlhof et al. (1995) have argued that the intaglios were made over an extended period, from before 900 B.C. to approximately A.D. 1200. Other researchers (Cerveny et al. 2006) have radiocarbon dated pedogenic carbonate and rock-varnish laminations on rock alignments and rings in Searles Valley, California. Their conclusions are that some of these features may be early Holocene or terminal Pleistocene in age. Although these methods are controversial and have been the source of much dispute, the results suggest that the associative approach to dating may require some rethinking in Nevada.

Proper dating of these features may help to resolve a problem regarding the relationship of intaglios and Yuman migration. Von Werlhof et al. (1995) note that there are two conflicting models concerning the migration of Yuman speakers. The first places the original Yuman homeland to the north of the Colorado River Valley and suggests that Yuman speakers migrated south and west into the

Colorado River Valley and the west coast (Fowler 1983; Sutton 1992, in Von Werlhof et al. 1995). In the second model glottochronological and lexicostatistical models suggest that the ancestors of the Yumans occupied sections of north-central Baja California, and expanded northward, reaching the Lower Colorado River-Gila River area circa A.D. 0. Von Werlhof et al. (1995) argue that their dates are consistent with this model since the oldest dates are in Imperial County, in the southern portion of Yuman territory, while the younger ones are along the Colorado River. Dates from the Nevada intaglios may help resolve this issue.

Another problem involves the actual cultural affiliation of intaglios. As already noted, they are assumed to have been constructed by Yuman speakers. The Pahrump Valley intaglio (26NY13533) built by the Southern Paiute suggests that the cultural assignment of such features may not be as cut-and-dried as first assumed. If the Southern Paiute made one dance circle feature, might they not have made others? If they did how do we differentiate those from the ones made by Yuman speakers? Or did they just appropriate those constructed by Yuman-speakers and adapt them for their own purposes and rituals?

The next research issue derives from the previous one. What does Paiute use of such features say about the intensity and directionality of cultural influence in contact situations between the Paiute and Yuma- speaking populations? The Paiute were allies of the Mojave in both warfare and trade alliances (White 1974:128; Stone 1991:38, Figure 3-2). What did this mean as a practical issue? How much direct contact did the two groups have? Did this contact influence religious, social, and other cultural institutions among both cultural traditions? Research into early ethnographic records, notes, and historic documents may shed light on this issue.

Altschul and Ezzo (1995) note that concentrations of intaglios, trails, and other features appear to exhibit differences in style that could have served as markers of ethnicity and territoriality between groups that shared common religious beliefs and ceremonies, though hostile to one another. Are the intaglios in Nevada, especially those in the Las Vegas Valley, different in style from those found elsewhere? If they are, does this represent a recognition of ethnic or territorial differences?

Both Johnson (1985; Solari and Johnson 1982) and Woods (1986) speculated that there was a *keruk* (mourning ceremony) trail that extended from Pilot Knob in California to the Newberry Mountains north of Needles, California. Following up on this suggestion Ezzo and Altschul (1993b; Altschul and Ezzo 1995) posited that the major intaglio complexes along the Colorado River are part of a larger pilgrimage trail that began at Pilot Knob, with local *keruks* being held at smaller complexes until the Newberry Mountains were reached. They also suggest (Altschul and Ezzo 1995) that the concentrations at the center of the Yuman *keruk* ceremonial trail would be most elaborate, with those farther away being simplified forms that reflected local ritual. Could the Nevada intaglios be seen as being part of this *keruk* trail, with local groups practicing simplified and/or localized versions of the ceremony? The intaglios at Fort Mojave are the most concentrated and complex ones in Nevada while the Las Vegas and Pahrump intaglios are single examples and are farthest away from the ritual heartland along the Colorado River.

Stone (1991:79) states that these figures offer unusual opportunities to study the linkages between mythology, oral history, and cultural practices. The basic questions really revolve around two things: What do these figures represent, and how did they function within the social, religious, and mythological world views of their constructors? To answer these questions, ethnographic information concerning Mojave and Paiute religious practices needs to be sought out in both the published material and researcher's unpublished notes. Native American consultants should be utilized for material they feel comfortable revealing to researchers.

It is likely that there are other questions that can be posed regarding intaglios in Nevada. These questions should be seen as a starting point, not as the only one that can or should be asked. These questions will reveal themselves as more work is done on the intaglios we have, and on new ones that may be uncovered.

Intaglio Management Needs

There are serious management issues in dealing with the intaglios of southern Nevada. These include:

1. Protection of known intaglios in southern Nevada. These measures include detailed recording of all known sites, protective signing, and fencing where appropriate. The Las Vegas Wash Intaglio (26CK4509) is an example of this approach where the figure has been fenced off, but the planned interpretive signs and visitor viewing platform to view the entire figure were never installed.
2. Nomination of all intaglios, presently know and those to be recorded, to the National Register of Historic Places.
3. Relocation and proper recording of possible intaglios (and/or rock alignments, rock rings, or other features) at sites whose early site records merely indicate features such as "rock alignment" or "rock ring."
4. Identification and recording new intaglio sites. Such features should be expected to be found, for the most part, on desert pavement-covered terraces overlooking major permanent or semi-permanent water sources in southern Nevada, particularly those that drain into the Colorado River drainage system. This is typical of such features in California and Arizona and so should be anticipated in Nevada as well.

These figures can be searched for by using several different approaches: ground survey integrated into already planned projects; surveys aimed specifically at locating these features along drainages; examination of aerial photographs taken by agencies such as the Natural Resources Conservation Service (formerly the Soil Conservation Service) during the course of their regular activity, and stored in federal offices, museums, and other data repositories; and examination of older USGS maps, looking for notations such as "ruins"; examination of GLO plats and other federal documents.

When located, careful field recording is vital. White (1980:67, in Stone 1991:80) recommended that at least 12 variables be recorded: (1) depth, (2) dimensions, (3) configuration or shape, (4) density, (5) number of rocks, (6) rock sizes, (7) percentage of thermally cracked rocks, (8) raw material, (9) constituents or fill, (10) placement of different rock types or sizes, (11) associations, and (12) environmental context. Other data that should be recorded includes the relationship of individual features or loci to one another at sites; and the relationship of the site(s) to the landforms/geomorphological context in which they are recorded.

Intaglios may be somewhat enigmatic at the current time, but like all archaeological phenomena they can be placed within proper environmental and cultural context. Eventually we will acquire new insights into their functioning and meaning, and enrich our ability to understand and interpret the past.

ROCK ALIGNMENTS

Definitions and Past Research

Rock alignments are the second category of ground figures found in the deserts of southern Nevada (Davis and Winslow 1965). They have been given a number of different designations: relief figures (Rogers 1939), fragile pattern areas (Hayden 1965), rock alignments (Davis and Winslow 1965; Dansie 1982; Johnson 1985), geoscripts (E. Davis 1983), and as part of a larger category called earthen art (Von Werlhof 1987). To avoid confusion this document accepts Dansie's (1982: 288, Table 1) definition of these features as rock alignments: "rocks artificially aligned to form a shape or line. Three or more aligned rocks qualify." Given Dansie's definition there are many natural alignments that could possibly be misconstrued as being cultural. Care should be taken to take the context of any alignments into consideration. Are the alignments embedded within a larger site? Are there multiple alignments in

association with one another? Careful observation and recording is essential to avoid the misidentification of natural features as being cultural.

Dansie further subdivides rock alignments by construction techniques. There are those made of a single course of rocks that can be either contiguous one-on-one alignments where the rocks are touching or figures that are spaced, single alignments where there are gaps between the rocks in the alignment. Then there are "multiple course rock alignments" or "walls" that are two or more stones high.

Von Werlhof discusses rock alignment construction techniques in more detail. He defines five different types of construction techniques (Von Werlhof 1987: 10, 11, Fig. 1, c-g):

1. *Butted* — the boulders are cobbles are placed directly against one another. This technique was employed in a variety of designs.
2. *Spaced* — A gap is left between boulders or cobbles to create a "more airy effect to the design" and was only rarely used in large designs.
3. *Lapstraked* — Flat stones were leaned or straked against one another, overlapping them to form a heavier appearing line. Von Werlhof states that this was never a sole construction technique for a figure but could be used in portions of a design.
4. *Chinked* — Smaller stones or pebbles were wedged between larger cobbles. It makes the line appear more solid. Von Werlhof suggests that this technique was employed to "strengthen" a line's appearance where rounded or uneven angular stones were used in construction.
5. *Poured* — This technique poured handfuls of pebbles between the main rocks of the alignment. It gave the line a "stronger appearance" and at spots where a change in design alignment left gaps in the line. Von Werlhof also notes that this method was used to fill in spaces that had been deliberately left in the initial construction phase of the alignment.

Ancient terrace surfaces that contained sufficient cobble-sized rocks were the preferred location for these features. It also appears that elongated boulders and cobbles were selected for construction over rounded ones and that the construction material was stockpiled into cairns (Von Werlhof 1987:10).

Von Werlhof (1987: 2–4) summarized previous rock alignment research that has occurred in the California deserts, which is adapted and augmented here in light of recent research in the Mojave Desert region of California and Nevada. Regionally, as was the case with intaglios, Rogers (1966:17, in Dansie 1982: 283, Figure 4) appears to have been the first professional archaeologist to record these features. Begole (1973, 1974) recorded alignments in Anza-Borrego State Park in California, which Von Werlhof (1987:3) says are the westernmost such features. Much additional knowledge, at least as far as recording and locational information, was derived from work in Death Valley in the 1950s and 1960s (Clements and Clements 1953;Wallace and Taylor 1955, 1956; Wallace 1955, 1958; A. Hunt 1960; C. Hunt 1975). In areas like the Panamint Valley, Emma Lou Davis (1981, 1983; Davis and Winslow 1965; Davis et al. 1980) recorded alignments and attempted to place them in chronological and cultural context. She had varying degrees of success and acceptance by the archaeological community. Researchers from the Great Basin Foundation (Brott et al. 1984; McCarthy 1986) followed up on her work in the region. Von Werlhof (1987:3) notes that there have been a number of alignments or earthen art figures recorded in the Mojave River Basin region of Inyo County, California, just south of the Nye County line. Von Werlhof (1987) attempted to synthesize and discuss the earthen art of what he calls the "north desert" (which includes the Panamint, Eureka, Death, and Greenwater valleys) in the California portion of the Mojave Desert.

Closer to southern Nevada, Johnson (1985; Solari and Johnson 1982) noted and discussed the association of rock alignments and intaglios along the Colorado River in California and Arizona, as did many of the recent researchers in the region (Ezzo and Altschul 1993a, 1993b; Holmlund 1993; G. Smith 1983).

In southern Nevada, only a few such features have been officially and formally recorded. The earliest work includes two fragile pattern sites (26CK1936 and 1937; cf. Ezzo 1996) that have been cursorily recorded in the Muddy River Valley. Unfortunately, as noted in the intaglio section, it is uncertain as to whether these sites contain intaglios, rock alignments, rock rings, cleared areas, or any combination thereof. These were recorded on site sheets in 1979 based on information provided by R.F. Perkins (1979a, 1979b) who had encountered those sites many years before any information was put down on paper. These sites may or may not still exist and need to be ground-truthed and re-recorded.

Other poorly recorded alignments have been reported in association with Mesa House (Schroeder 1953a, in Hunt 1960) and the Steve Perkins site (26CK91; Olsen 1978), both Virgin Anasazi sites in the Muddy River Valley. Sullivan (1974) recorded a series of line patterns in the Hidden Valley area south of Las Vegas. The most extensively recorded and interpreted site in Clark County is 26CK294, a feature in the southern portion of the Coyote Springs Valley, situated in northern Clark County. Leavitt (1982) attempted to interpret the feature in light of the astronomical knowledge of ethnographically known Southern Paiute groups.

Since 2000, three additional alignments have been recorded in southern Nevada. The first (26CK6511) is a linear rock alignment in the northeastern portion of the Las Vegas Valley (Ahlstrom et al 2004). Two additional alignments have been recorded in the northern portion of Coyote Springs Valley, 26LN4992 and 26LN5008 (Leavitt and Rafferty 2006). They are not actually within Clark County but are just north of the county line. They are, however, within a hydrographic basin (Coyote Springs Valley) that lies mostly within Clark County and therefore was probably included within the territory of a prehistoric or Post-Puebloan aboriginal group that did not establish political or ethnic boundaries in the same manner as we do today.

Site Descriptions

The sites already recorded within the study will be discussed separately, and only limited interpretation of them will be attempted. It is likely that more of these features exist and have not yet been officially recorded. The recorded sites and their descriptions will serve as a baseline dataset for future research into these features and their place in southern Nevada prehistory.

The Hidden Valley Site

This site, although not in the SHPO database, has been published in a peer-reviewed journal (Sullivan 1974) and so will be discussed as part of the currently available data. Located in Hidden Valley, approximately 20 miles south of Las Vegas, this site was located via aerial photographs taken from a U-2 flight. Sullivan noted what he described as “odd lines” around the margins of the valley. There are at least 18 lines, relatively evenly spaced, that extend for 4 miles on the west side of the valley. There are some linear features on the southeastern margins as well. There are several sites in the immediate area of the lines including “rock circles, hearths, and grinding surfaces” (Sullivan 1974:116).

Ground proofing revealed a series of discontinuous rock alignments averaging 1 to 2 feet wide (30 to 61 cm) and 6 to 18 inches high (15 to 45 cm). Sullivan suggests that these alignments appear to have retarded rainfall runoff and provided conditions for good plant growth. He further speculates that they may have been used to encourage the growth of grasses such as Indian rice grass (*Oryzopsis hymenoides).* Since there has been no work done at the features since the 1970s, the author feels comfortable including them in the rock alignment category until further information becomes available.

Site 26CK294

This alignment (actually a complex of alignments), also called the Perkins Rock Alignment (Williams 1967; Leavitt 1982), is located in the southern Coyote Springs Valley on the western terrace overlooking Pahranagat Wash, a tributary of the White River. It is 210 feet (64 m) long along its northern axis, and consists of at least eight separate features, so it is actually a complex of alignments. The description of the complex provided here is somewhat vague since the feature was not described in detail

by Leavitt (1982) in his master's thesis, and Leavitt's map of the feature that was later attached to the original site sheet (Williams 1967) is at a large scale, and difficult to derive measurements from with certainty (Figure 9.13).

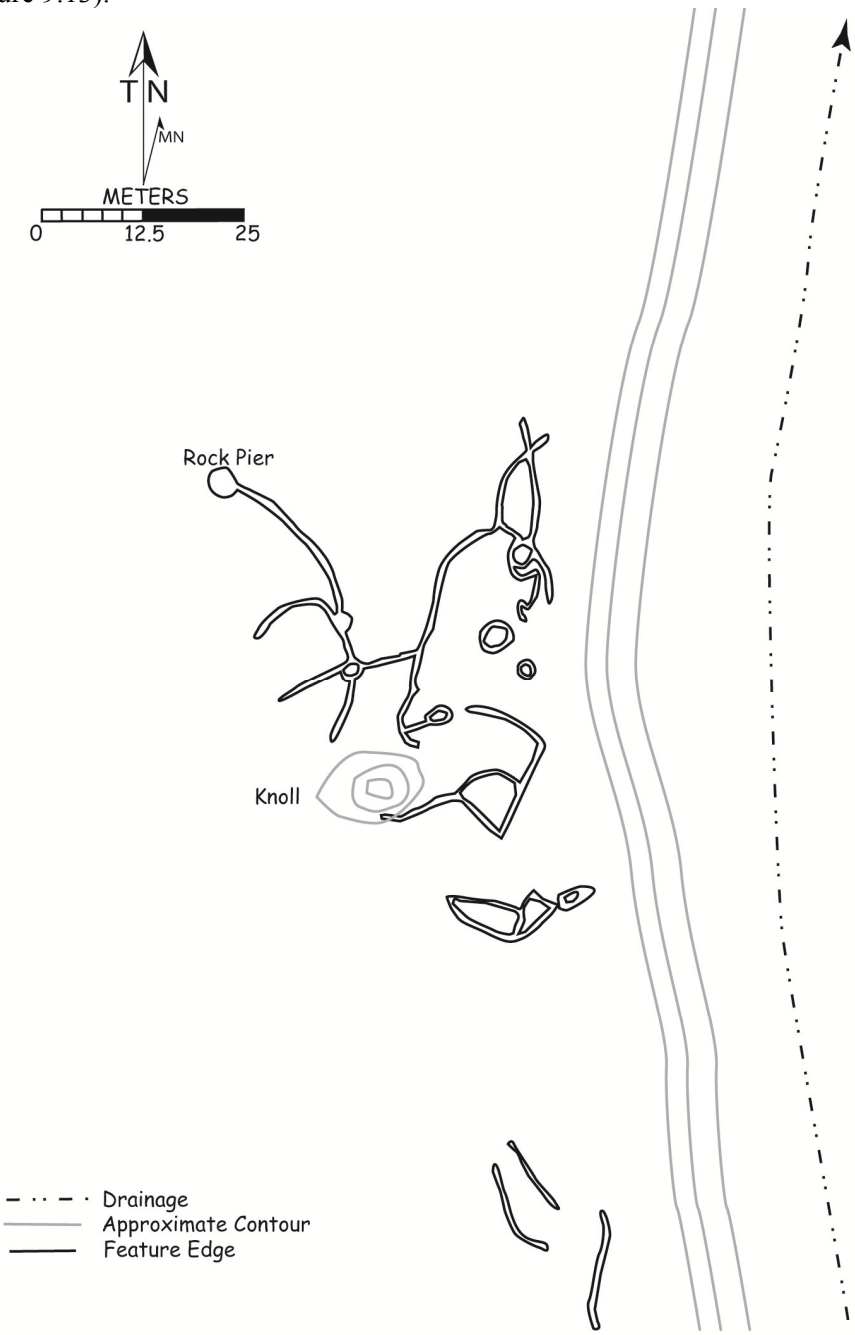


Figure 9.13. Plan map of the Perkins Rock Alignment, site 26CK294 (Leavitt 1982).

The largest and northernmost element of the complex consists of an abstract figure with multiple arms and four rock circles embedded within the element, located north of a small knoll. There are two small, detached rock rings at the southeastern edge of this figure.

The fourth feature consists of a roughly shaped equilateral triangular figure located south of the first three elements and east of the small knoll. The triangle has a convex base, and the apex of the triangle faces to the south. Two "arms" proceed from the corners of the convex base. The first arm

extends in a slightly sinuous manner towards the west from the northwest corner of the triangle and terminates just south of the knoll. The second arm extends from the northeast corner of the triangle in a northeasterly direct and then curves to the west, terminating near one of the rock circles embedded in the first feature.

South of the armed triangle is a fifth element or motif consisting of two attached and slightly flattened triangular figures. The westernmost element of this feature has its apex pointing towards the northwest, and its base is comprised of the western side of the second triangle. This second element has its apex pointing to the southwest and its concave base on the northeastern side. Three poorly defined rock limbs radiate from the eastern apex of the base.

Finally, there are three linear alignments south of the dual triangles. Two run roughly parallel to one another and are oriented to the northwest. The third is sinuous line oriented roughly north-to-south; it is southeast of the previous two alignments.

The alignment is at the northern edge of a concentration of sites that included rockshelters or overhangs, roasting pits, and lithic scatters. Less than 10 miles to the north the terraces along the western periphery of Coyote Springs Wash contain dozens of large, opportunistic lithic quarries, campsites, trails, rock alignments, and hundreds of isolated artifacts. The artifacts range in age from the Lake Mojave period (ca. 10,000–7500 B.P.) to the Historic period, with the majority dated by time-sensitive artifacts associations to the Archaic period (ca. 7500–2000 B.P.; cf. Leavitt and Rafferty 2006, 2009 for a general summary).

Leavitt (1982) examined Southern Paiute astronomical myths (see below) and compared the feature to petroglyphs in Valley of Fire that have been argued to be representative of star patterns (Mayer 1975). He tentatively concluded that, although the alignment does not match any star patterns that Euroamericans recognize on a one-to-one basis, the figure appears to be a larger version of designs at the petroglyph site. He suggests that the best hypothesis to explain the figure is that the pattern represents "socially-agreed-upon star patterns laid out as mirror images to celestial phenomena" (Leavitt 1982:51).

Site 26CK4553

This is a large and fairly complex figure located on a bench or terrace overlooking Meadow Valley Wash near Farrier, Nevada. It is just south of the Clark County-Lincoln County boundary. It was originally recorded by Burkholder (1990a) and was described as an alignment that "includes a distinct rock circle with a diameter of 71" and a circular pile of rocks that was probably collected for use in constructing the alignment." She also stated that "no representational outline [was] recognized."

It was rerecorded in 2001 (Harper et al. 2002). The updated data paints a more complex picture. The figure is embedded in a larger (250 m by 70 m) diffuse lithic scatter whose assemblage is dominated by cores and flaking debitage composed of cryptocrystalline silicates. The artifactual material recorded suggests the use of the location as an opportunistic quarry for the acquisition and reduction of toolstone. The rock alignment is 190 m long (N-S) broken into two segments. The southernmost segment is a single line of rocks 90 m long with a small rock circle situated at the southern terminus of the line. The northern 100 m of the feature broadens out and consists of four rock circles which serve as hubs for lines that radiate out from them (Figure 9.14).

Site 26CK4631

This is a smaller rock alignment figure located on a bench or terrace overlooking Meadow Valley Wash near Farrier, Nevada. It is just south of the Clark County-Lincoln County boundary and is nearly a third of a mile south of 26CK4553. It was originally recorded by Burkholder (1990b), who described it as containing two parallel, north-to-south oriented lines of football-sized stones with miscellaneous "indecisive" appendages coming off them. The western line measured 34.67 feet (10.6 m) long while the eastern line measured 34.67 feet (11.5 m) long. Approximately 6 feet (1.8 m) west of the western line was a scraped circle defined by a berm of small pebbles that measured 13 feet (4 m) in diameter. Also noted was a pile of stones and south of the alignment along the terrace was a "pile" of stone tools. No map of the alignments accompanied the site sheet.

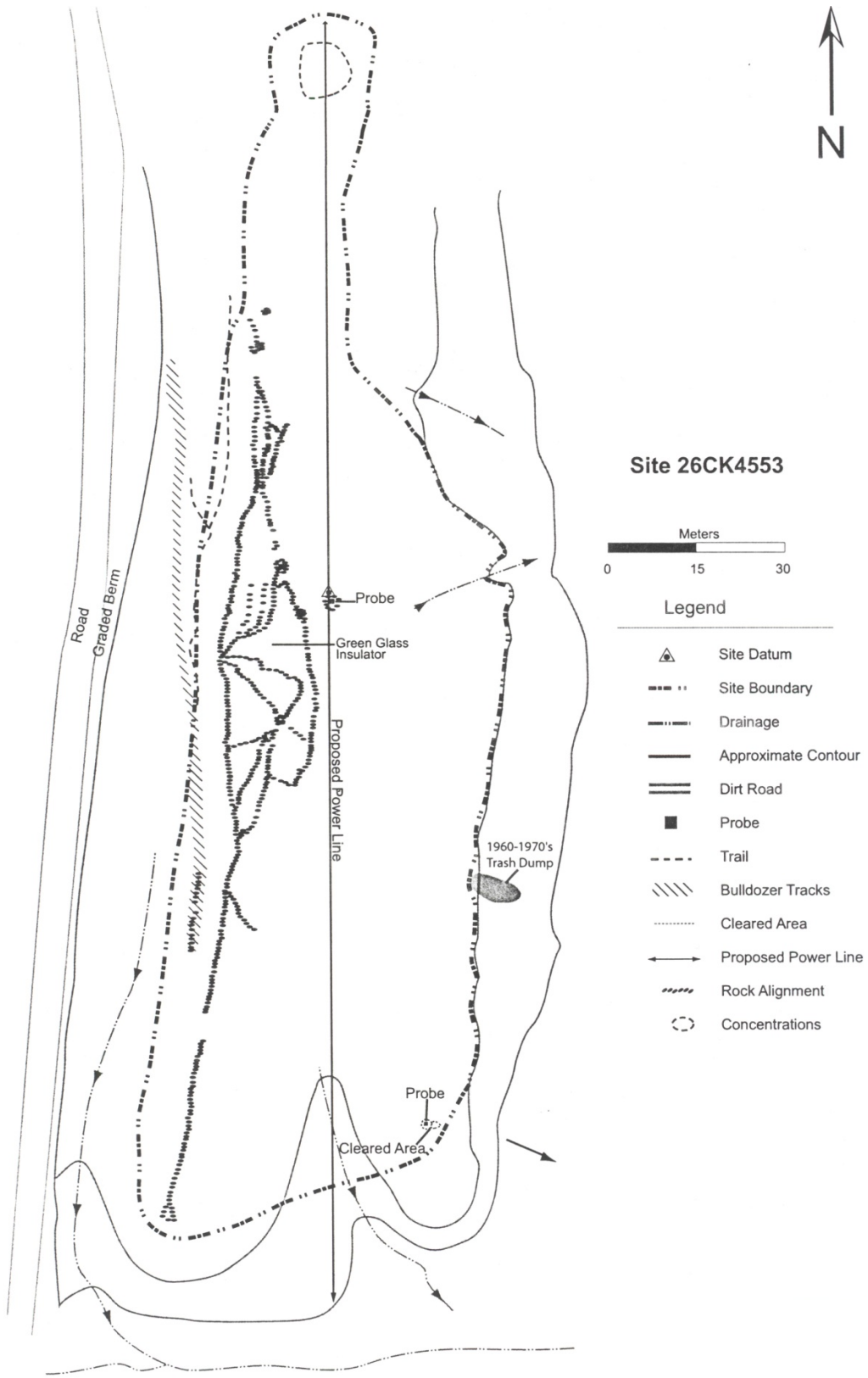


Figure 9.14. Plan map of site 26CK4553 (Harper et al. 2002).

Site 26LN4992

This small feature, consisting of five spaced but aligned vesicular basalt stones, is embedded within a larger lithic quarry and activity area located on the eastern bluffs of Pahranagat Wash in the Coyote Springs Valley. Although small, it fits Dansie's (1982: 288, Table 1) definition of an alignment as consisting of three or more aligned stones. It is at the eastern edge of the site (Leavitt and Rafferty 2006; Figure 9.15). It is less than 20 miles north of 26CK294.

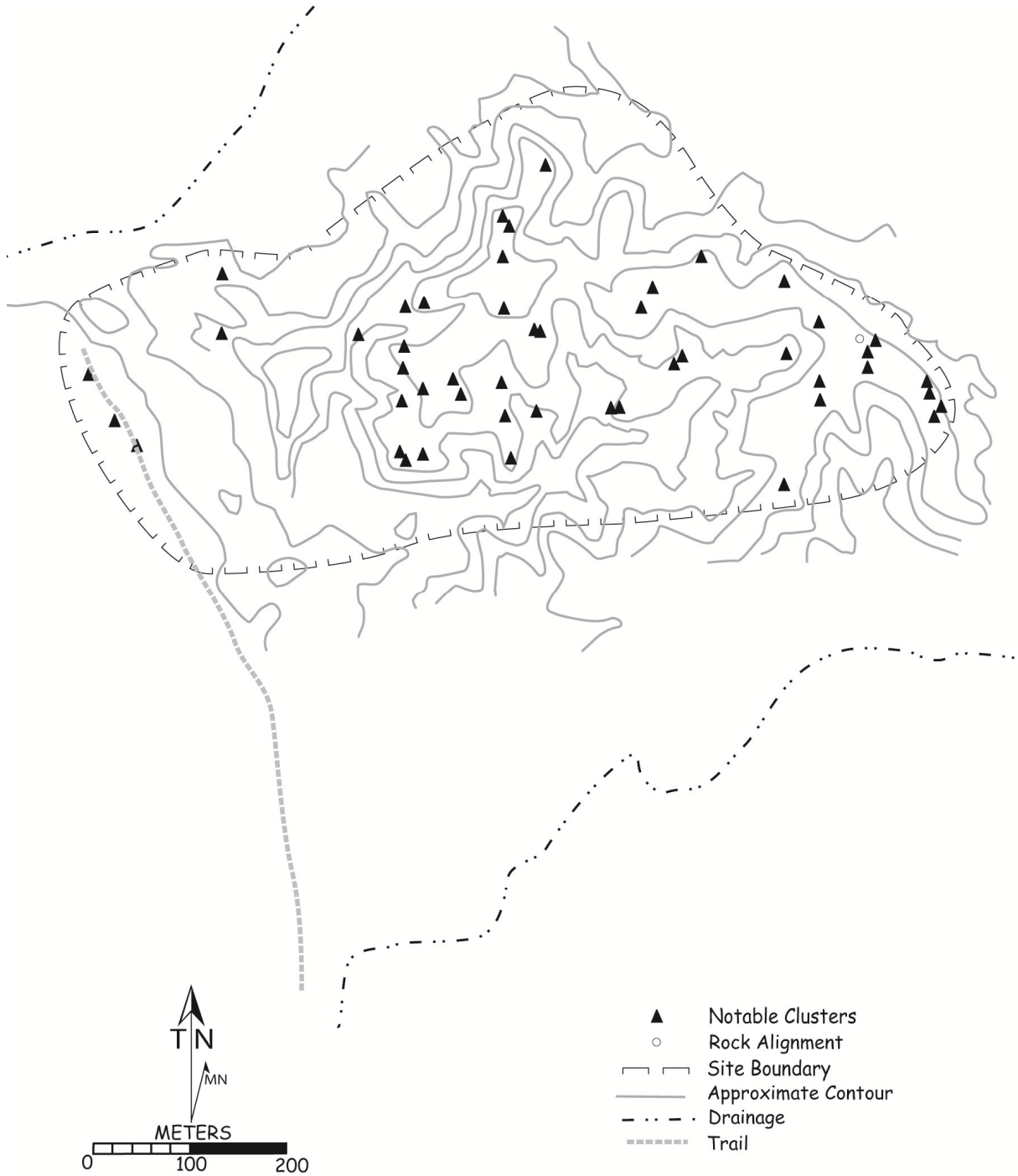


Figure 9.15. Site map of 26LN4992.

Site 26LN5008

This site is a serpentine rock alignment situated on the eastern bluffs of Pahranagat Wash. It consists of 280 spaced rocks measuring 29 meters long (SW-NE) by 23 m wide from end-to-end (Figure 9.16). The majority of the rocks in the alignment are vesicular basalt, with a smattering of rhyolitic and carbonate rocks included in the figure. It was associated with a thin scatter of obsidian flakes. Site 26CK294 is approximately 31 km (19.4 miles) to the south (Leavitt and Rafferty 2006).

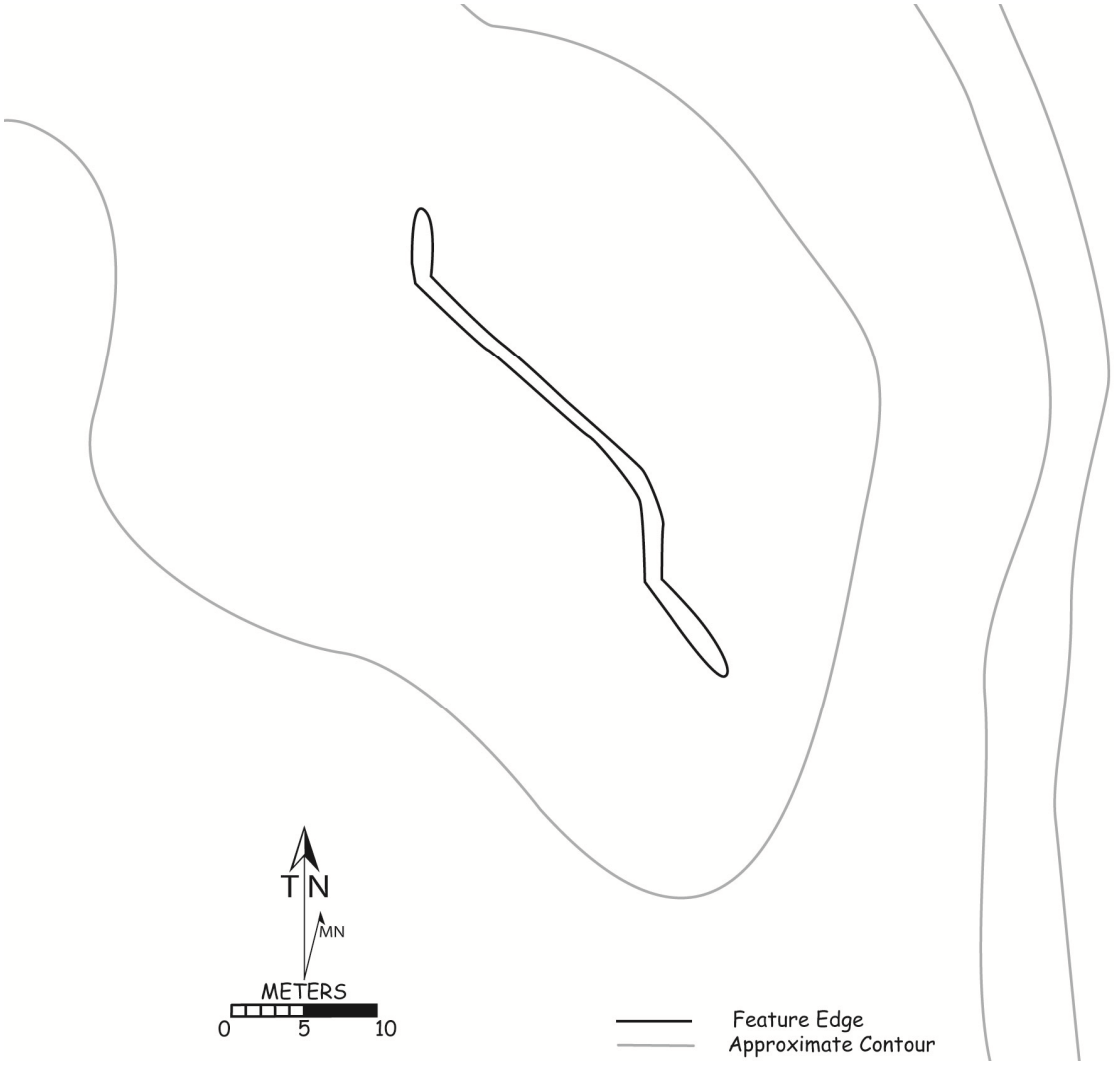


Figure 9.16. Site map of 26LN5008.

Site 26CK6511

The last site is a single linear rock alignment on a desert pavement-covered alluvial terrace located south of Las Vegas Wash in the northern Las Vegas Valley. It measures 25 m long and consists of numerous cobbles that range in size from 10 to 20 cm in diameter. They are loosely aligned and largely abutted end-to-end, but there are spaces between some of the cobbles. The alignment is slightly bent near its center and the eastern end terminates at a cluster of cobbles that may or may not be natural (Ahlstrom et al. 2004; Figure 9.17). The records indicate there are a number of sites situated to the north and the south along the terraces of Las Vegas Wash but it is uncertain whether they are related to the alignment in any significant way.

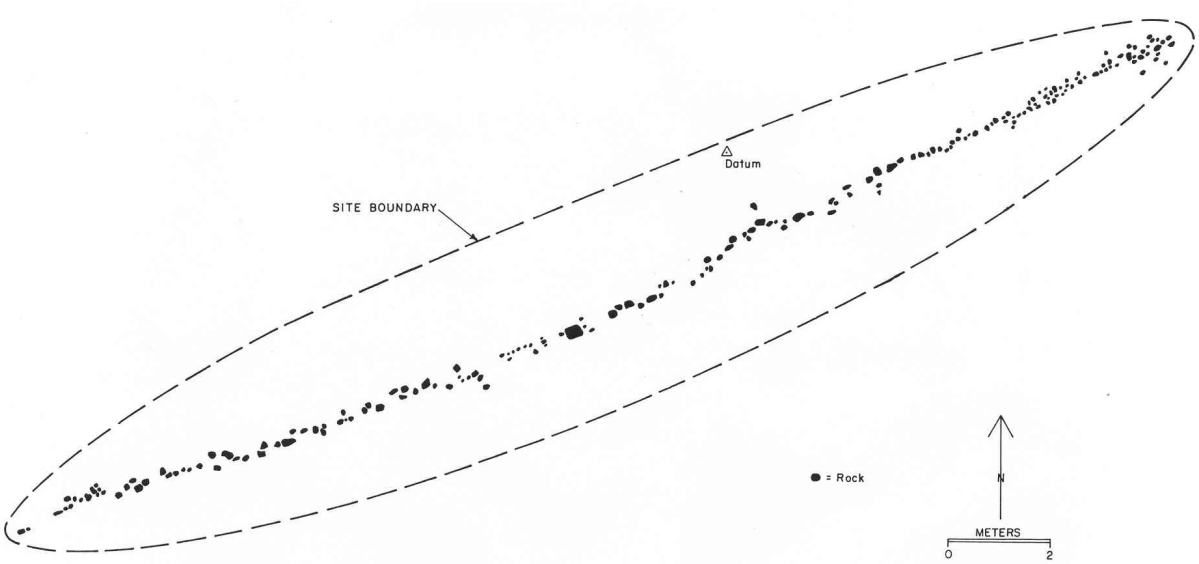


Figure 9.17. Site map and photograph (view to east) of 26CK6511.

Cultural and Ethnographic Background

Some of the more difficult issues to resolve regarding rock alignments include determining their age, cultural affiliation, and meaning. Proper chronological control is vital before real solutions regarding cultural affiliation and potential meaning of these features can be sought.

Rogers (1966) speculated that some of these alignments may be the oldest cultural features in the Mojave Desert. Emma Lou Davis (1981, 1983; Davis et al. 1980) has argued that at least two such figures in the Panamint Valley region date to the Pleistocene/Holocene transition, one she calls the Three Serpents figure and the other the Panamint Condor (see also Clements 1956:187). She bases her conclusions on bracketing radiocarbon dates of 10,500 to 10,000 B.P. from campsites she says are directly associated with the Three Serpents figure. Other researchers (Cerveny et al. 2006) have radiocarbon-dated pedogenic carbonate and rock-varnish laminations on a cruciform rock alignment in Searles Valley, California, and concluded that the minimum age of the feature was 4110±40 years B.P. These methods are controversial and have been the source of much dispute. If Davis (E. Davis et al. 1980) and Cerveny (Cerveny et al. 2006) are correct, however, then several of the rock alignments in Nevada may also date to the Pleistocene-Holocene transition and into the Archaic period.

This may be the case with three known alignments recorded in the Coyote Springs Valley (see descriptions above). These features are either embedded within or are in spatial association or proximity to sites that date to the Archaic period (ca. 7500–2000 B.P.). This may indicate that these particular features were built by and were important to populations of this era, at least in the Coyote Springs area (cf. Leavitt and Rafferty 2006).

There is an alternate explanation regarding the age of these features, at least from the Las Vegas Valley southward to the Nevada-California state line. Given their purported relationship with intaglios in California and Arizona, and the relationship of these features to Yuman-speaking populations, an assumption could be made that rock alignments in Nevada date no earlier than around A.D. 800 (Patayan I times) and continued to be made and/or used into the Historic period.

The sticking point to the possible age determination of the alignments located in the Las Vegas region is that they are in an area known to have been occupied by a succession of cultural groups over the last 13,000 years. Thus these could be related to any of the cultural traditions that resided in the region, and thus could range in age from the Paleoindian period (ca. 13,000–10,000 B.P.) to the prehistoric and Post-Puebloan Patayan and Mohave occupations.

Given the problems inherent in dating these features, this makes discussing any sort of ethnographic or historic context of these features extremely problematical. Without more accurate dating techniques context cannot be developed with certainty for any of the features. This does not mean that there have not been any attempts at developing such contexts. One feature-specific context and interpretation comes from Emma Lou Davis (Davis et al. 1980: 301–321) who argues that the Three Serpents alignment represents the earliest New World example of serpent iconography, which was associated with fertility and water, and with the sun. Davis argues that the iconography of the Three Serpents alignment (she uses the expression ikonography) fits that of a paleolithic religion oriented around the exploitation of wild plants and animals. She further argues that paleolithic religion was shamanistic and that serpents were an important element of Siberian and North American shamanism, which are related over thousands of years of time to the original paleolithic shamanistic religious beliefs. One has to assume that she would argue that the earliest immigrants into North America would have brought these paleolithic shamanistic religious systems with them and applied them to the new environmental contexts in which they found themselves.

If the Three Serpents alignment is truly late Pleistocene or early Holocene in age, it (and occupation sites associated with it) was constructed at a time when lakes were drying up, forests and other floral resources were receding, and the associated game was also becoming in short supply. That meant that the Paleoindian hunter-gatherers in what is now the Mojave Desert were facing a severe change in their environment and thus in their adaptation to the changing resource base. Davis attempts to make the case that the Three Serpents figure was an invocation to the gods or spirit world by paleoshamans for

water and resources. She further argues that the Panamint Condor was used as the symbolic messenger who bore the pleas for the renewal of important resources upwards to the heavens. Ultimately she seems to suggest that the main function of rock alignments in the Mojave Desert were shamanistic in nature (Davis et al. 1980; Davis 1981, 1983).

Leavitt (1982) attempted to use both ethnographic data and archaeoastronomical approaches to possibly interpret one of the alignment features in the Coyote Springs Valley, 26CK294 (see description above). The argument he uses is complex and cannot be repeated in detail in this document. The essence of it appears to be the following: Based on the examination and citation of numerous ethnographic studies of various Great Basin culture groups there apparently was not any well-organized concept of religious belief or ritual among or between groups in the Great Basin. Rather religious ideas and practices were, to cite a source that postdates but supports Leavitt's (1982) research, "diffused throughout the culture but did not constitute a set of defined beliefs, values, or rites" (Hulkrantz 1986:631). Leavitt (1982:26) argues that knowledge concerning astronomical phenomena among Great Basin ethnographic groups would be found mainly in their mythology.

This knowledge did not seem to be well organized or comprehensive. There are myths that speak about the moon; Orion's belt, which represents mountain sheep; the Pleiades, which appear to be Coyote's female relatives with whom he tried to have incestuous relationships and who subsequently flee and become stars; and the tale about "Cottontail has a fight with the Sun," among others. Leavitt cites a number of authorities, including A. Smith (1940), Kelly (1964), and Fowler and Fowler (1971); their data appears to be bolstered by Hulkrantz's (1986) article in the Great Basin volume of the *Handbook of North American Indians*.

Once Leavitt provides this background he then turns to archaeoastronomy and previous applications of the concepts of this field to Great Basin rock art. He discusses the work of Mayer (1975) who looked for asterisms or star groups with definite visual patterns that could represent astronomical phenomena. Mayer (1975) concluded that 53 rock art sites had stellar patterns, including at least 1 at nearby Valley of Fire. Once he concluded that prehistoric Great Basin populations probably recorded stellar phenomena he applied seven methods to examine site 26CK294 (Leavitt 1982:46–47):

1. an accurate map of the figure;
2. a description of the surrounding topography (horizontal situation);
3. an analysis by competent earth science personnel;
4. overnight visitation of the site;
5. acoustic analysis of the site;
6. a review of the nature of the other sites within the area; and
7. a review of the decorative motifs, mythology, and folklore of possible constructors of the site.

Leavitt (1982) visited the site at the summer and winter solstices, and computed the azimuths for the sunrises at the location. He speculates that if the solstice dates were culturally important for tracing the movement of the sun, then the placement of the feature in relationship to mountain ridges situated east of the site would be ideal for calculating solar movements. He also checked the alignment pattern against Mayer's (1975) motif criteria for rock art and concluded that the ground pattern was a larger version of the design found at a petroglyph site in Kane Springs Wash, which is at the northern end of the Coyote Springs Valley.

Attempting to employ archaeoastronomical concepts to prehistoric phenomena is not new. Archaeoastronomy is the study of ancient astronomical observances (Aveni 1993, 2008). It was initially used for the examination and interpretation of large architectural features in Europe, such as Stonehenge. In the southwestern United States it has been argued that Anasazi peoples at sites such as Hovenweep Pueblo in Colorado employed sun-sighting windows to determine the summer and winter solstices, while the nearby site of Holly House contained petroglyph panels with motifs representing the sun and other celestial phenomena (Cordell 1997).

Perhaps the most important complex of sites where astronomical concepts are argued to have been employed was at Chaco Canyon in New Mexico. It has been argued that the road system radiating out of Chaco Canyon may have had cosmological significance, and that certain petroglyph elements at places like Fajada Butte's sun dagger site were situated to track the solstices (see Fagan 2009: 425–429 for a summary).

In the areas closest to the study area, the concepts of archaeoastronomy have mostly been applied to the examination of rock art and its role in astronomical observations. This approach has been used regionally at various sites in Arizona (Thiel 1995:55), Utah (Bowen 1992; Bush and Bush 1993) and southern Nevada (Mayer 1975; Burkholder 1995, 2000). Assuming that astronomical observations may have been important to the aboriginal inhabitants of the Great Basin and northern Southwest, it is not too much of a stretch to investigate the possibility that rock alignments in southern Nevada may be physical representations of astronomical phenomena that were culturally significant from a mythological or practical perspective, or both.

Rock Alignment Themes and Research Directions

One of the most critical issues in dealing with rock alignments is the limited database of features found in southern Nevada. The author has discussed the only seven that he knows of in the study area, although it is almost certain that more probably exist. All but one (26CK294) have been recorded since 1990, after the publication of Lyneis's (1982a) *Archaeological Element* (see Dansie 1982 in that volume). Numerous rock alignments have been recorded elsewhere in the eastern Mojave Desert (see Von Werlhof 1987 for a summary of the north Mojave Desert material), either singly, as part of larger complexes of rock alignments, or in concert with intaglios and trails (Johnson 1985; Ezzo 1994; Ezzo and Altschul 1993a, 1993c; Altschul and Ezzo 1995). It is important that such features be sought out, recorded, and preserved in the near future since they are fragile and non-renewable.

There are several basic key research questions that need to be pursued in order to understand rock alignments and their role in the life of the prehistoric and Post-Puebloan inhabitants of the region. The first is quite basic: What are the ages of these features? As noted previously, the dating of these various features has become mired in great controversy. Better dating techniques or approaches are needed to effectively place each of these features, both known and those recorded in the future, in chronological context, after which questions of meaning, interpretation, and cultural affiliation can be approached.

Another problem involves the possible cultural affiliation of rock alignments. If Davis is correct, some of these feature may date to Paleoindian times and into the Archaic period or later.

Altschul and Ezzo (1995) note that concentrations of intaglios, trails, and other features appear to exhibit differences in style that could have served as markers of ethnicity and territoriality between groups. Are the rock alignments in Nevada different in style than those found elsewhere? If they are, does this represent an aspect that defines ethnic or territorial differences?

Stone (1991:79) states that intaglios offer unusual opportunities to study the linkages between mythology, oral history, and cultural practices. The same may be said of rock alignments, if any can be demonstrated to have been made by Post-Puebloan populations (the Paiute or Yuman speakers). The basic questions really revolve around two things: what do these figures represent, and how did they function within the social, religious, and mythological world views of their constructors? Emma Lou Davis (Davis et al. 1980; Davis 1981, 1983) argued from analogy with Siberian shamans that these features were likely related to "desert" shamanistic practices that reflect age-old shamanistic beliefs employing icons involved with water, earth, sex, and lightning (which implies ideas of water, rain, and fertility). Although an interesting concept, it is an unprovable or unsupportable linkage, so we may need to seek supporting data for interpretation of these features elsewhere.

Leavitt (1982) has employed ethnographic data from Southern Paiute culture to examine one specific site (26CK294; see above) and suggests an association with astronomical phenomena. There may be more data in notes and obscure articles concerning Paiute astronomical knowledge and how it relates to their material culture. To my knowledge no one has examined the corpus of ethnographic data extant

on Yuman-speaking populations regarding their traditional astronomical beliefs, and then tried to apply them to the rock alignments associated with intaglios. To answer questions regarding cultural meaning and significance, ethnographic information concerning Mojave and Paiute religious practices needs to be sought out in both the published material and in researcher's unpublished notes. Native American consultants should be utilized for material they feel comfortable revealing to researchers.

Leavitt (1982) also used concepts from archaeoastronomy and field observations at site 26CK294 to try and interpret site function. It may be useful to employ similar techniques and theory at other alignments in southern Nevada to test for any sort of relationship to astronomical or solar phenomena.

It is likely that there are other questions that can be posed regarding rock alignments in Nevada. These questions should be seen as a starting point, not as the only ones that can or should be asked. Newer and more adequate questions will reveal themselves as more work is done on the rock alignments we have, and on new ones that may be uncovered.

Rock Alignment Management Needs

There are serious management issues in dealing with the rock alignments of southern Nevada. These include:

1. Protection of known rock alignments in southern Nevada. These measures include detailed recording of all known sites, protective signing, and fencing where appropriate.
2. Nomination of all rock alignments, presently known and those recorded in the future, to the National Register of Historic Places. This might be appropriate either as individual features or as features embedded within other cultural resources. 3. Relocation, re-examination and proper recording of possible alignments (and/or intaglios) at sites 26CK1936 and 1937, Mesa House, and the Steve Perkins site (26CK91), and in Hidden Valley. The latter site may represent agricultural, or even natural, features so reexamining this site would clear up any confusion as to categorization.
4. Identification and recording of new rock alignment sites. Such features should be found, for the most part, on desert pavement-covered terraces overlooking major permanent or semi-permanent water sources in southern Nevada. All known alignments currently recorded in southern Nevada appear to be associated with water sources. Many of these are seasonal, like washes. Several different approaches can be used to identify the alignments including: ground survey integrated into already planned projects; surveys aimed specifically at locating these features along semi-permanent or seasonal drainages; examination of aerial photographs taken by agencies such as the Natural Resources Conservation Service during the course of their regular activity that are stored in federal offices, museums, and other data repositories; examination of older USGS maps to look for notations such as "ruins"; examination of GLO plats and other federal documents.

Once a new alignment is located, careful field recording is vital. Variables that should be recorded include: dimensions of the figure, configuration or shape, the number of rocks, rock sizes, percentage of thermally cracked rocks, raw material, constituents or fill, placement of different rock types or sizes. associations, and environmental context.

Rock alignments are more difficult to place into proper context than intaglios, for they lack the ethnographic data that is available for interpreting intaglios. It may be possible to place rock alignments within their proper environmental and cultural context through additional ethnographic research and the examination of potential archaeoastronomical and mythological aspects of the features. The southern Nevada archaeological community may not ever be able to come to definite conclusions regarding these resources, but the same could have been said several decades ago about teasing religious or sociopolitical data out of the archaeological record. More research and newer ideas can lead us to better comprehension about these phenomena just as it did with other aspects of archaeological research.

TRAILS

Definitions and Past Research

Human beings are in a constant state of communication with one another. There is no culture known, archaeologically or ethnographically, that has not been in contact with cultures around them for as variety of purposes: trade, communication, intermarriage, to establish political and/or social relationships with other groups, and other practical reasons. There are people in every culture that are driven by curiosity and the desire to see what else is out there in the world. To facilitate travel, whether driven by practical need or the urge to explore, lines of communication or trade develop that make the process easier or more rational. As these ties strengthen and the need for contact is seen as being more important, a physical impact is often created that can be recognized in the archaeological and ethnographic record.

In the Mojave Desert, particularly southern Nevada, the physical manifestations of trade and travel are designated or defined as trails. Dansie (1982:285, Table 1[C]) defined a trail as an extensive linear clearing, with no apparent design, with the appearance of continuity between geographic areas. She wrote that such features may have been cleared through use only. Other researchers (Stone 1991: 80; Fowler 2004b, 2009; Cleland 2005), however, have demonstrated that trails could be and were deliberately constructed, with rock and obstacles removed from the intended paths and with cobbles or rocks lining the trails in some portions. Although they probably were a feature on almost all types of natural terrain, they were (and are) most visible on areas of desert pavement and on cleared slopes. They tend to be narrow (30 to 50 cm wide; Stone 1991:80) and were created by the surface of the desert pavement or slope being compressed by continuous human activity.

Trade has been a subject of research interest for archaeologists since the late nineteenth and early twentieth centuries. Hughes and Bennyhoff (1986) wrote a summary of what was known about prehistoric and ethnographic trade patterns in the Great Basin in the early 1980s, mostly from an archaeological perspective. They cite several early sources (e.g., Barber 1876, 1877; Stearns 1877; Yates 1877) as well as sources from the early-to- mid-twentieth century (Brand 1937; Colton 1941; Tower 1945; Rogers 1941; Gifford 1947, 1949) that focused on the acquisition and trade of marine shell by the prehistoric inhabitants of California, the Great Basin, and the U.S. Southwest. These sources emphasized the ability of using shell and shell ornaments to trace trade patterns and cross-date sites throughout the Desert West (see also Bennyhoff and Heizer 1958). Hughes and Bennyhoff (1986: 243, 254) also discussed the use of obsidian trace element analysis to examine prehistoric trade in the Great Basin as the analytical technique was being employed in the late 1970s and early 1980s. Since that time the study of the prehistoric obsidian trade has become more extensive and sophisticated (cf. Haarklu et al. 2005 for a summary and update on this area of study).

On the ethnographic side, J. Davis (1974) and Hughes and Bennyhoff (1986) summarized what was known about the ethnographic trade systems in California and the Great Basin. They examined what was traded, where it was traded, and some of the mechanisms of trade. J. Davis (1974) also discusses how a number of older trails employed by Native Americans evolved into modern roads and highways.

There are at least three subject areas that none of the previous researchers appear to have discussed in any great detail. One is possible alternative uses of trails, such as conduits and paths for spiritual journeys and pilgrimages. Efforts in this area began in the late 1980s and are most active in the Colorado and Mojave Desert areas of California. Recent research along the Colorado River (Johnson 1985, 2001; Ezzo 1994; Ezzo and Altschul 1993c; Altschul and Ezzo 1995) has begun to support the argument that trails used prehistorically and historically among Yuman-speaking peoples had a spiritual purpose, and that some may have been employed as part of a larger culture-wide *keruk* (mourning) ceremony. Examination of the spiritual purposes of trails, as employed by the Las Vegas Band of Southern Paiute and the Chemehuevi in southern Nevada, has also been undertaken by Stoffle et al. (2004), Fowler (2004b, 2009), and Musser-Lopez and Miller (2010) among others.

Related to this is an examination of how trails formed part of the world view of aboriginal populations and how complexes of trails and other features (intaglios and rock alignments) formed a part of the cultural landscape of those populations. Recent research on this topic include the references cited for the previous subject area, plus Cleland (2005, 2008), Apple (2005), and Roberts (2010).

The third area of research involves an investigation and recording of the physical location of these trails and their associated features, including the mechanics of such efforts. James (1996), Apple (2005), and Mehmed and Apple (2009) have led the way in this area. Musser-Lopez and Miller (2010) have attempted to correlate the ethnographically known Salt Song Trail of the Southern Paiute with actual physical manifestations of the trail including trail segments, stacked rock features or cairns, and camps where people resided for short periods along the trail.

Associated with location and recording are issues of how to date such features and thus place them into proper archaeological and cultural context. These include discussions of dating through ceramic artifact associations or "horizontal trail stratigraphy" (Waters 1982d:276, in Stone 1991:84), the dating of geological features associated with trails (James 1996), or more direct dating via techniques such as radiocarbon-dating pedogenic carbonate and rock-varnish laminations of cobbles along the trails (cf. Cerveny et al. 2006).

Cultural and Ethnographic Background

Historically the Mojave and other Yuman speakers were known for their ability to traverse long distances for trade, inter-tribal contact, and perhaps just for the sake of travel. Almost every overview of historic Yuman culture that discusses travel and trade (e.g., Stewart 1983; Stone 1991; Fowler 2004b) cites historic reports and early ethnographies (Forbes 1965; Kroeber 1925; Sample 1950; Spier 1933) of Mojave men being able to travel nearly 100 miles a day at night and being able to reach the Pacific coast in three to four days.

There were a series of major trails that dissected the deserts of California, the Great Basin, and the U.S. Southwest that moved a variety of goods back and forth. It is uncertain as to how far back in time these trails systems were used. Some (James 1996) have made claims that trails within the California Deserts could date back at least 15,000 years. Other claims are more modest, suggesting a 5,000 year age for some of these trails, but Harner (1957, in Fowler 2004) has presented evidence that places use of the trails at least as early as A.D. 900, if not earlier. These trails reached as far east as the Zuni Pueblo, north into the Virgin Anasazi territory of southern Nevada and Southwestern Utah, west to the Pacific coast of California and south to the head of the Gulf of California (J. Davis 1974, Map 1; Forbes 1965). These trails moved valued sumptuary goods such as marine shell, cotton, blankets, salt, pottery, rattles, and other items between California, Great Basin, and the Southwest.

Stone (1991:36) discusses evidence for local trade among groups located on and adjacent to the Colorado River. Upland hunter-gatherers exchanged raw materials such as mineral pigments, animal skins, the meat of various animals (bighorn sheep, rabbit, and antelope), wild foods such as agave, and other resources in exchange for pottery, shell, beads, agricultural products (corn and pumpkins), and other riverine products such as honey and screw bean mesquite (cf. Kroeber 1935; J. Davis 1974, in Stone 1991:36).

Trails were not only used for trade but also for intermarriage, establishing political and military alliances, warfare, and just plain visiting. One purpose that researchers are just beginning to investigate is the use of trails for sacred purposes in the historic (and presumably prehistoric) era. Recent research along the Colorado River (Johnson 1985, 2001; Ezzo 1994; Ezzo and Altschul 1993c; Altschul and Ezzo 1995) has begun to frame the argument that trails used prehistorically and historically among Yuman-speaking peoples also had a spiritual purpose. Altschul and Ezzo (1995) argue that some trails, particularly the one that began in California at Pilot Knob and stretched to the Newberry Mountains near Needles, California, may have been employed as part of a larger culture-wide *keruk* (mourning) ceremony. They explain that the *keruk* or mourning ceremony was an elaborate ritual that combined honoring the recent dead, commemorating the death of the creator, and allowing stories and songs relating to the world's creation to

be retold. Underneath all of this, various other activities took place: arranging marriages, naming children, settling disputes, and exchanging foodstuffs and goods. They also argue that various complexes of intaglios and rock alignments along the route (Senator Wash, Ripley, and Blythe) were used for minor and major *keruks* by pilgrims trying to reach the Newberry Mountains where *Avikwaame*, the place where life was created, is located. They suggest that the concentrations at the center of the Yuman *keruk* ceremonial trail would be most elaborate, and that those farther away would reflect simplified forms that were combined with local ritual (Altschul and Ezzo 1995).

It was asked earlier in this document when discussing intaglios whether the Nevada intaglios were part of this *keruk* trail, with local groups practicing simplified and/or localized versions of the ceremony. The intaglios at Fort Mojave are the most concentrated and complex in Nevada while the Las Vegas and Pahrump intaglios are single examples that are farthest away from the ritual heartland along the Colorado River. This is a possibility that requires more research, but each of these intaglios *is* associated with a trail or trail segment that could be remnants of larger complexes of trails in the area.

Other research has emphasized the sacred and mythological nature of trails to the Yuman-speaking peoples. Cleland (2008a, 2008b) has discussed the existence of the *Xam Kwatcan* ("another going down") trail, the trail the ancestors of the Quechan took from *Avikwaame* to the territories that they occupied in the historic period. Based on his maps (Cleland 2008: Figure 2) and discussions it appears that this trail encompasses the *keruk* trail discussed by Altschul and Ezzo (1995). It runs through California, Arizona, and portions of Nevada. Cleland also emphasizes that these trails are part of a larger cultural landscape that contemporary Quechan and other Yuman groups see as sacred. These groups see an interconnection between all aspects of their culture: dreaming (see intaglio section above), tribal history, cultural/ethnic identity, practical guidance, and cultural landscape features. They further emphasize that both the natural and cultural features of the landscape are meaningful to them and must be understood as an integrated whole (Baksh 1997; Woods 2001,).

The Southern Paiute and Chemehuevi also traded for a wide variety of goods. Citing numerous ethnographic sources, Hughes and Bennyhoff (1986: 241, Table 1) list the type of goods traded and received by the Southern Paiute and other populations in or near the study area. Goods traded by the Southern Paiute included buckskins, mescal fibers, hides, bows, blankets, nets, moccasins, and horses. Goods received included basket making materials, beans, bows and arrows, red and yellow paint, rugs, maize, rabbitskin blankets, buckskins, wild foods, horses and dogs, and knives. The Southern Paiute bands traded among themselves and with the Havasupai, Hualapai, Utes, Navajo, and Hopi, among others.

Examination of the spiritual purposes of trails (sacred trails) employed by the Las Vegas Band of Southern Paiute and the Chemehuevi in southern Nevada has also been undertaken by Stoffle et al. (2004), Fowler (2004b, 2009), and Musser-Lopez and Miller (2010) among others. Much like the Yuman-speaking tribes, Fowler (2004, 2009) notes that Southern Paiute and Chemehuevi peoples had song cycles that were the same or similar to those of the Mojave, with whom they were in contact. The song cycles recounted great journeys and attached peoples to specific geographical areas to establish residency and hunting rights. She cites several songs, including the Mountain Sheep Song, the Deer Song, the Salt Song, and the Talk Song that speak about place names, significant geographic locations, individuals, and other items of cultural significance (cf. Kelly 1932-1933; Laird 1976, in Fowler 2004b).

Fowler suggests that, although the sacred trails may have physical manifestations, the sacred system was perhaps more mental. Fowler (2004b) cites ethnographic information in the form of a sketch map from a Paiute informant, Daisy Smith, given to Kelly (1932-1933) about trails in southern Nevada that linked especially important water sources. Fowler (2004b) says the detail is best for the Las Vegas Valley and immediate environs, although Smith also provided data for Indian Springs, the Pahrump Valley-Ash Meadows region, and connections to the Colorado River.

Musser-Lopez and Miller (2010) conducted a survey in Arizona of a proposed off highway vehicle (OHV) area near Lake Havasu City, and attempted to correlate the Chemehuevi and Southern Paiute concept of the Salt Song Trail with actual features on the ground. The Salt Song Trail was a spiritual trail that was taken by a person who passes away. His friends and relatives moved him along this

path to a specific physical or spiritual place mentioned in the songs by singing salt and bird songs (Stoffle and Arnold 2008, in Musser-Lopez and Miller 2010:1–2). Data collected by Kelly (1932–1933) and Laird (1976) support this concept. Fowler (2009: 88) has recounted a version of the Salt Song that tells of the journey of two birds that begins in the Blythe area of California, continues to the salt caves beyond the great bend of the Colorado River to the north, back south through Las Vegas and the Ash Meadows area, and returning to Blythe. They then turned up the Bill Williams River in Arizona and ended their journey. Musser-Lopez and Miller (2010:3-4) note other variants of the story with different starting points.

As noted above Fowler (2004b, 2009) suggested that sacred trails may have been more spiritual than physical. Informants told Musser-Lopez and Miller (2010) that there may have been an actual physical imprint of the trail in the real world, or as Musser-Lopez and Miller put it "a cultural landscape linked by a network of connected physical trails." They cite additional research by Stoffle and Arnold (2008) that suggested the same thing. Additional research by the "Storyscape Project" mapped the general route of the Salt Song Trail as possibly traversing the proposed OHV area (Klasky 2009). They decided to examine the possibility that there was an actual physical trail that corresponded to the sacred trail. Their survey recorded several resource acquisition sites and trail segments with associated features including stacked-rock features ('trail shrines' or 'prayer stacks') and rock alignments near trails. These included rock-rimmed and rimless circular clearings. They concluded that they could not definitively conclude that the materials in their survey were physical manifestations of the Salt Song Trail, but that they did find a cultural landscape that was connected by a trail networks, and that this corridor of travel may have been used since the end of the Pleistocene.

Although the California and Arizona projects are not specifically related to the current study area, they are cited and discussed as examples of what trails and associated features within the project area may mean. This data, along with data from southern Nevada developed by Fowler (2004b, 2009) and others, when combined with physical examinations of trails in southern Nevada, may give us clues into their meaning and use.

Site Descriptions

There have been a number of trails recorded in the project area, but none as part of trail complexes similar to those recorded in the deserts of California or Arizona. Roberts et al. (2007) compiled a list of all recorded trail sites in Clark County for their work at Corn Creek Dunes. This list was compiled to provide comparative data for a trail segment they recorded that was associated with a previously recorded site (26CK2605) east of the Corn Creek Field Station in an area of desert pavement. The trail (called Locus 7) runs east to west and is roughly parallel to the modern road to Mormon Wells in the Desert Wildlife Refuge. There were rock-pile features and artifacts that were found along the entire trail segment. Moapa Gray ceramics that were identified near a trail rock pile indicate that Native Americans have probably used the trail since the early Ceramic period.

Roberts et al. (2007) cites informants that note the cultural importance of this trail and identify it as the route linking Corn Creek and the Pahranagat Valley. Their discussion of the information they were told is reproduced nearly verbatim here. Table 9.1 (Table 4.1 in Roberts et al. 2007) lists the recorded trail sites in Clark County that were identified during a site-file search at the HRC. As a group, they share several of the attributes noted for the trail in Locus 7. The recorded trail segments, which are scattered widely about Clark County, range in length from 50 m to 1.7 km. This does not include a 30-m segment recorded at 26CK2171, which was later re-interpreted as natural in origin. Doubts are also expressed in the site record concerning 26CK2114, a trail that was clearly used by burros and that may have been established by these animals. Site 26CK3717 is another burro trail, though one that was used in the Historic period by Paiute riders. This case somewhat confounds the distinction between human-made and livestock-made trails. For all of the other trails listed in Table 9.1, the recorders thought they were human in origin. These trails vary in width from 30 to 50+ cm. Several of them were recorded as occurring on desert pavement, and some of the others, which have rather skimpy site records, may be on this kind of surface as well.

Table 9.1. Recorded Trails in Clark County (Table 4.1 from Roberts et al. 2007:58–59)

Site: 26CK	Location	Description	Comments
1285	LV Wash, between LV Valley and Lake Mead	300 m long, 30–40 cm wide; partly on desert pavement	Possible associated faint cleared circle
1531	LV Wash, between LV Valley and Lake Mead	ca. 1.5 km long	Passes by two rock-shelter sites
2114	SE flank of McCullough Range	ca. 750 m long	No associated artifacts or features; "presently used by burros"
2171	W Lake Mead, near Boulder Beach	ca. 30 m long	Trail ID'd within a large clearing in the desert pavement
2605 (Locus 7)	Far NW LV Valley	300 m; on desert pavement	five associated rock piles, two with artifacts
2622	Between Muddy River and Mormon Mtns.	ca. 1.70 km long	Cores and flakes observed along 0.40 km
3246	LV Wash, between LV Valley and Lake Mead	Intermittent over ca. 800 m, 50 cm wide; on "patinated volcanics" and desert pavement	Sites nearby (Rafferty 1984a)
3717	California Wash	–	Historic (1930s) horse trail identified by Paiute observer (Rafferty 1986)
4637	Far NW LV Valley	ca. 250 m long; on desert pavement	No associated artifacts or features; possible continuation of 26CK5132
4802	Far NE LV Valley	82 m long; on desert pavement	15 m to stone cist [rock ring] feature, with flakes
4835	LV Wash, between LV Valley and Lake Mead	2 segments: 150 m and 50 m long, both 50 cm wide	Rock ring next to longer segment; no associated artifacts
4845	Valley of Fire	180 m long x 30 cm wide	No associated artifacts or features
4853	Virgin Valley, near Riverside	120 m long x 45 cm wide	Lithic scatter: biface blank, 3 tested cobbles & cores, 14 flakes; sites within 750–900 m
5132	Far NW LV Valley	300 m long; on desert pavement	No associated artifacts or features; possible continuation of 26CK4637
5433	Far NW LV Valley	1.20 km long x 50+ cm wide x 3–5 cm deep; on desert pavement	No associated artifacts or features
6488	LV Wash, far SE LV Valley	225 m long x 50 cm wide; on desert pavement	Rock ring and 3 lithic cores located nearby
6841	NW Las Vegas Valley	300 m long x 30–40 cm wide; on desert pavement	Rock cluster and biface located within 10–15 m

Some trails are, or appear to be, associated with artifact scatters and features, and at least two of the trails pass by other sites. Three of the trail segments 26CK4637, 5132, and 5433 are located in the northwestern corner of the Las Vegas Valley, as is the trail segment at Corn Creek Dunes.

It is likely that there are other trails or trail segments embedded within other sites, as they often are not recorded as separate features or emphasized in the reports or on the site sheets. Two specific examples can be cited. One of the Fort Mojave intaglios (26CK4382) has at least two trail segments

("sinuous pathways") recorded in association with it. They are short, but may have been part of a larger system of trails, since the *keruk* or *Xam Kwatcan* trails may have run through the area as pilgrimage paths.

The Las Vegas Wash intaglio (26CK4509) has a 30- to 40-m long footpath proceeding northward toward Las Vegas Wash. Interestingly there are at least five trail segment sites that were recorded in Las Vegas Wash north of the intaglio (26CK1285, -1531, -3246, -4835, -and -6488), providing at least 4525 m (4.525 km) of pathways in a fairly compact area. They may have been part of a larger complex of trails that connected the Las Vegas Valley to the *keruk* trail (based on the presence of the intaglio) or may have been part of the physical manifestations of the Salt Song Trail or other Southern Paiute trail complexes. Unfortunately we will never know since the majority of these sites have been destroyed by construction of an artificial lake (Lake Las Vegas) and associated luxury hotels and homes.

Research Directions

Many of the problems associated with trails in southern Nevada are the same ones discussed in relationship to intaglios and rock alignments. One of the most critical issues in dealing with trails is the limited database we have on these features in southern Nevada. Roberts et al. (2007, Table 4.1; Table 1 above) uncovered records for just 17 trails recorded as trails as of 2007, and there are at least two embedded in other sites. Certainly more probably exist and will be recorded in the near future. The majority seem to have been recorded since the publication of the previous *Archaeological Element* (Lyneis 1982a; Dansie 1982). Numerous such features have been recorded elsewhere in the eastern Mojave Desert and western Arizona, either singly, as parts of trail complexes, or as parts of larger complexes of rock alignments, intaglios and trails (cf. Johnson 1985; Ezzo 1994; Ezzo and Altschul 1993a, 1993c; Altschul and Ezzo 1995). It is important that such features be sought out, recorded, and preserved in the near future since they are fragile and non-renewable. Related to this effort is the examination and discussion of the actual mechanics of such efforts. James (1996), Apple (2005), and Mehmed and Apple (2009) have led the way in this area.

Another question is quite basic: what is the age of these features? As noted above the dating of these various features has become mired in great controversy. These features range in age from at least 15,000 years old (James 1996), to more than 5,000 years old (cf. Fowler 2004) to at least pre-A.D. 900 (Harner 1957). Can they be dated through ceramic artifact associations or "horizontal trail stratigraphy" (Waters 1982b:276, in Stone 1991:84), the dating of geological features associated with trails (James 1996), or more direct dating via techniques such as radiocarbon-dating pedogenic carbonate and rock-varnish laminations of cobbles along the trails (cf. Cerveny et al. 2006)? Are there other techniques that may be more effective?

Another problem or set of related problems involves the possible cultural affiliation of trails. Were they used by a single cultural tradition (Southern Paiute, Mojave, etc.) or do they represent palimpsests of reuse of many thousands of years? Under any conditions, how do we determine what prehistoric or ethnographic groups employed the trails? What techniques or theoretical approaches can we use to sort out the overlay of cultures and features on the landscape?

As discussed previously, there are other subject areas that have not been examined in any great detail. One is possible alternative uses of trails, such as being conduits and paths for spiritual journeys and pilgrimages. Efforts in this area are fairly recent, dating to the late 1980s and beyond, and researchers have been most active in examining features in the Colorado and Mojave Desert areas of California. Recent research along the Colorado River (Johnson 1985, 2001; Ezzo 1994; Ezzo and Altschul 1993c; Altschul and Ezzo 1995) has begun to frame the argument that trails used prehistorically and historically among Yuman-speaking peoples had a spiritual purpose, and some may have been employed as part of a larger culture-wide *keruk* (mourning) ceremony. Examination of the spiritual purposes of trails, particularly the Salt Song Trail, employed by the Las Vegas Band of Southern Paiute and the Chemehuevi in southern Nevada has also been undertaken by Stoffle et al. (2004), Fowler (2004b, 2009), and Musser-Lopez and Miller (2010) among others. We need more and better ethnographic data to examine these issues.

Related to this is examining how trails formed part of the world view of aboriginal populations and how complexes of trails and other features (intaglios and rock alignments) formed a part of the cultural landscape of these peoples. Initial efforts have been described above; these are mostly focused on the Yuman-speaking peoples of the Great Basin and U.S. Southwest. As with the spiritual aspects better and more detailed ethnographic data is needed to get at this and similar questions.

Management Needs

There are serious management issues in dealing with the rock alignments of southern Nevada. These include:

1. Protection of known trails and trail complexes in southern Nevada. These measures include detailed recording of all known sites, protective signing, and fencing where appropriate.
2. Nomination of trail complexes or significant trail segments, presently known and those to be recorded, to the National Register of Historic Places (NRHP). This might be appropriate either as individual features, or as features embedded within other cultural resources. Nomination of sites to the National Register could present some serious problems that would need to be navigated and negotiated with Native American groups. Cleland (2008a) notes that the NRHP allows for traditional cultural properties to be eligible for nomination because of their association with practices or beliefs of a living community that are rooted in the community's history and are important in maintaining the continuing cultural identity of the community. If trails or trail complexes meet this definition, Cleland then asks what about the scale of such features?
3. Identification and recording of new trails, focusing not only on segments but on areal and regional associations of such features. These features can be sought for using several different approaches: ground survey integrated into already planned projects; examination of aerial photographs taken by agencies such as the Natural Resources Conservation Service during the course of their regular activity that are stored in federal offices, museums, and other data repositories; examination of older USGS maps for notations such as "ruins"; examination of GLO plats and other federal documents; the use of commercial software such as Google Earth to locate not only individual trails, but complexes of these features.

It appears that, far from just being ways of allowing people to get from here to there across the landscape, trails played a significant role in the lives of the peoples in the study area. We have just begun to scratch the surface. More exciting research lies ahead.

CHAPTER 10
PREHISTORIC RESEARCH THEMES FOR SOUTHERN NEVADA

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The opportunities for continuing research on the prehistory and early history of Native American settlement in southern Nevada can be characterized with reference to a framework of themes that include Chronology, Settlement Patterns and Settlement Systems, Subsistence, Technology, Contacts and Exchange, the Magico-Religious Realm, and Archaeological Cultures and Ethnicity. In discussing each of these themes, we focus first on its relevance to the prehistory and history of southern Nevada taken as a whole, without reference to specific time periods. Many aspects of the research themes cross-cut the four major periods into which we divided our summary and discussion of the archaeological record: the Paleoarchaic and Archaic periods in Chapter 5, the Puebloan period in Chapter 6, and the Post-Puebloan period in Chapter 7. One of the most important of these areas of overlap has to do with the kinds of archaeological evidence that are required to address the various research themes—that is, their "data requirements." In each case, this general treatment of a research theme is followed by a discussion of its application to the four time periods, including a consideration of datasets that are particularly important or, in some cases, unique to a particular period. Both the general and period-specific discussions of each research theme culminate in a series of research questions—some broad and others narrow in focus—that are intended as a jumping-off point for future research. We assume and expect that this research will generate new questions and identify new datasets that will enhance our knowledge and understanding of southern Nevada's archaeological record and the events and peoples that produced it—in other words, that will go beyond the research questions proposed here.

CHRONOLOGY

The accurate time placement of archaeological sites, site components, features, artifacts, and so on is essential for all archaeological research, including that pertaining to the Southern Nevada's prehistoric and early historical periods. As a starting point and for the purposes of organizing our discussion of the region's archaeological record, we have identified four broad time periods: Paleoarchaic, Archaic, Puebloan, and Post-Puebloan. As appropriate, we have also attempted to refer aspects of that record to specific time intervals within those periods. In spite of its usefulness, this temporal framework has limitations when applied to archaeological contexts and remains in the southern Nevada Region. At the most abstract level, these limitations have to do with the desirability of distinguishing between periods defined as time intervals and as stages of cultural development. In Chapters 5 through 7, we defined the major periods as distinct time intervals and, to the extent possible, assigned sites to those periods on the basis of chronological evidence. Some of that evidence consisted of temporal data per se—that is, radiocarbon dates—and some of chronological inferences with greater or lesser degrees of accuracy and temporal resolving power—such as the occurrence of particular kinds of projectile points, the appearance of ceramic technology, and, for subdividing the Puebloan period, the presence of corrugation as a surface treatment on what would otherwise be considered plain ware vessels.

Although valid to a degree, the use of these latter inferences can be seen as a first step in an undesirable chipping away at the independence of our dating evidence. The problem here is that we do not have a firm handle, in chronological terms, on the appearance and rate of adoption of these archaeological traits, and yet we use them as an aid in assigning sites and contexts within sites to periods in the chronology. An example would be the use of architectural evidence to assign sites to sub-periods within the Puebloan period: Are we using particular architectural attributes to date the structures and sites where they are located, or using dated contexts involving the structures and sites to date the inception and spread of the architectural attributes? Ultimately, you cannot have it both ways. In Chapter 6, we mostly avoided using architecture for dating, but not entirely. The use of these dating practices does not mean

that our chronologies are incorrect in some abstract sense, but that they are open to improvement. Similar concerns apply to sites located outside the Puebloan core area of the Moapa and Virgin river valleys. In these areas, however, the definition of named periods is not the primary issue—there is too little evidence to go on and, in any case, the nature and pace of cultural change does not lend itself to this kind of parsing of time. Instead, the goal in these areas should be to date as many sites, well-controlled contexts within sites, and artifacts and other remains as accurately as possible. It then becomes possible to ask what was going on in a particular realm of life in a particular area and during a particular time interval. Steps to achieve these chronological goals are currently underway, and they should continue to be pursued. One of these involves the radiocarbon dating of samples that come from the most well-controlled contexts that can be identified and that, whenever possible, consist of annual plant parts. In the case of sites in open settings, these high-quality datable materials can include charred seeds, maize cobs or kernels, reeds used in roof construction, and so on; in the case of sheltered sites, the range of desirable samples can be expanded to include all manner of perishable materials.

In his 1987 publication *Radiocarbon Dating: An Archaeological Perspective*, R. E. Taylor argued that, for the time period under consideration here, individual radiocarbon dates cannot be expected to distinguish intervals that are less than about 200 years in length (Taylor 1987:104). This estimate took into account both the stated standard error or "±" value that is part of a radiocarbon date, but also the unmeasured error inherent in the technique itself. This 200-year level of temporal resolution would certainly be adequate for addressing many issues in the prehistory of southern Nevada. It should not, however, be taken as a firm limit to the resolving power of radiocarbon dates from this region. The database of southern Nevada radiocarbon dates in Appendix A includes a handful of dates with two-sigma calibrated ranges of 150 years or less. Even considering the unmeasured sources of error referenced by Taylor, these dates are likely to provide better than the 200-year level of dating. This improvement in the quality of individual calibrated radiocarbon dates is certainly of value. Equally if not more important, however, are the opportunities for increasing the resolution of dating inferences provided by basing chronological interpretations on patterning in groups of dates. These groupings can involve dates from a single archaeological context, such as a single roasting pit; from a particular kind of sample, such as maize recovered from what appear to be "early" contexts; or from a controlled sequence of contexts, as in the case of deposits characterized by natural or cultural stratification.

A second step to improving chronologies, which is relevant in particular to sites with assemblages of Puebloan and, at least potentially, Patayan ceramics, involves the definition of sequences or seriations of ceramic attributes (Appendix H). When carefully controlled in this manner, pottery can support robust chronological inferences. There is much room for similar improvement in the dating of other artifact categories, particularly projectile point styles. A third step involves the pursuit of any and all significantly stratified subsurface archaeological contexts. These can provide important chronological evidence on their own, but are even more valuable when combined with radiocarbon dates or with ceramic or other temporally sensitive kinds of artifactual data.

Radiocarbon dating is a particularly valuable tool for dating events and building chronologies in the southern Nevada region, but other dating techniques should also be pursued. Among these techniques are luminescence and hydration dating, which apply respectively to potsherds and obsidian artifacts (Chapter 7). Limitations to the accuracy, temporal resolving power and, in general, reliability of these approaches should not be overlooked. An example involves the temporal resolving power of luminescence dating. The statistical error of luminescence dates (presumably at the one-standard error or 66 percent level) appears to range, at a minimum, from 10 to 15 percent of the age of the dated sample. In the case of a potsherd that dates to the middle of the Puebloan period—ca. A.D. 800 or 1200 years ago—a 10 percent level of error is equivalent to a value of ±120 years. The dating of an artifact to an interval of 200 or more years might be useful in some contexts, but not in others. As is always the case in chronological studies, it is important to find a match between the temporal resolving power of a dating technique and the research questions to which the dates that it produces are to be applied.

Research Questions

PALEOARCHAIC AND ARCHAIC PERIODS

1. When do Paleoindian hunters first enter southern Nevada? Currently all of the available data derive from fluted point finds from surface sites. Stratified, well-dated contexts are needed to clarify the dates of the earliest occupation of the region.
2. What is the temporal extent of the Early Archaic occupation of the project area? A related question concerns the dates of lake desiccation, which substantially impacted Archaic period adaptations.
3. Can Pinto points be divided into two temporal series? Are the larger, broader points older? How do they relate temporally to stemmed points?
4. When (and where) was maize farming first introduced to the southern Nevada region? With respect to our chronological framework, the earliest evidence of this new technology dates to the final centuries of the Late Archaic period in the Las Vegas Valley and, a few centuries later, to the very end of the Late Archaic period and beginning of the Puebloan period in the Moapa and Virgin river valleys. These questions of timing and regional priority need to be resolved in strictly calendrical terms—that is, in (calibrated radiocarbon) years.

PUEBLOAN PERIOD

For Puebloan sites in the Moapa and Virgin river valleys, we have a strong working chronology that is based on the sequence of periods—Basketmaker II and III and Pueblo I, II, and III—that was defined more than 80 years ago in and around the Four Corners region of the U.S. Southwest and that has been undergoing refinement there ever since. The previously discussed issue of maintaining the independence of dating evidence applies in particular to the Puebloan period chronology. This is because trait complexes, including co-occurrences of pottery types or architectural traits, are typically used to assign sites or portions of sites to periods in the Puebloan chronology—Basketmaker II, Basketmaker III, and so on. This complicates the dating of changes in those trait complexes in terms of calendar time. Beyond this general caveat, we can propose several more specific chronology-based questions for future research:

1. When was bow-and-arrow technology introduced to southern Nevada? Current evidence indicates a date between A.D. 400 and 600; can we improve on this estimate?
2. The earliest arrow points from the region appear to fall comfortably within Rose Springs and related types of projectile points. When did Cottonwood Triangular points appear on the scene? When did they decline in use? How rapidly did these points increase and decline in popularity: within what limits is the type useful for dating?
3. The Las Vegas Valley has produced an almost 2,000-year record of maize farming. Can we fill in the gaps in the existing record to demonstrate the degree to which this was a continuous activity over time?
4. Much of the evidence relating to Puebloan period settlement in the Moapa and Virgin river valleys was collected in the 1920s and 1930s, and many of the sites investigated have never been dated, at least not to contemporary standards. Can we improve on the dating of these sites, through the radiocarbon dating of artifacts or specimens (Gilreath 2012) or the analysis of ceramic assemblages that are held in collections today?
5. When did Patayan ceramics first appear in southern Nevada, in particular along the Nevada reach of the lower Colorado River, in the Las Vegas Valley, along the Colorado River upstream from Hoover Dam, in the Moapa and Virgin river valleys, and in the Gold Butte area? Can chronologically significant changes in Patayan pottery be identified with reasonable certainty? Many sites that could provide evidence relating to these questions are lost to the waters of Lake Mohave and Lake Mead. Perhaps evidence from sites in upland areas can provide at least partial answers.

6. Evidence of Puebloan influence, including the presence of potters schooled in the Puebloan pottery-making tradition, has been found in both the Central and Western regions. When did these influences first appear, and how long did they persist?

POST-PUEBLOAN PERIOD

1. Did North Creek Gray pottery continue to be made in the Moapa Valley after formal architecture was abandoned? How late did this pottery tradition continue? Did other Puebloan gray wares, such as Shivwits Plain, continue to be made until later than currently assumed?
2. Patayan buff ware pottery presumably first appeared in southern Nevada during the Puebloan period, but its use continued into Post-Puebloan times. Was this pottery made locally in the region or was it brought in from elsewhere?
3. There are indications that Great Basin Brown Ware was made as early as A.D. 800 in the region. Is this correct, and if so, is this pottery a trade ware from other areas of the Great Basin, for example from the north where hunting territories are better? When does this pottery stop being made?
4. We know that Puebloan pottery and Great Basin Brown Ware were made in the Moapa Valley, on the Shivwits Plateau, at Ash Meadows, and at the Corn Creek Dunes Site. What other areas of manufacture can we identify in southern Nevada? What does this tell us about social organization and exchange systems?

Data Needs

As noted in Chapter 3, many inroads have been made in gaining chronological control of the Late Archaic period in southern Nevada, but much remains to be done for the earlier periods. Efforts should be made to find stratified sites with datable materials associated with diagnostic projectile points to further refine the chronology for the Paleoarchaic and Archaic periods.

Because Post-Puebloan period occupations are often superimposed over Puebloan period ones, many pottery assemblages contain a mix of gray wares, buff wares, and brown wares. Often the quantities of each type are so small that it is difficult to determine which was the locally made pottery. Using new dating methods to sort out these mixed components, and identifying the clay and temper sources is well within our grasp (Glowacki and Neff 2002; Lyneis 2011a; 2011b). Luminescence dating on pottery, when combined with radiocarbon dating and other techniques such as obsidian hydration, will enable us to sort out mixed components. As noted earlier, the error value in luminescence dates on potsherds is a function of the age of the dated object: the older the potsherd, the greater the error. Error values can therefore be substantially smaller in the case of sherds dating to the Post-Puebloan period than to the Puebloan period. Other approaches such as Instrumental Neutron Activation Analysis (INAA) are useful for sorting clay sources and, with that evidence, for determining where the various types were manufactured.

SETTLEMENT PATTERNS AND SETTLEMENT SYSTEMS

One can identify a scale or sequence of archaeological inquiry that includes the three components of activities, settlement patterns, and settlement systems. The goal of "activity analysis" is to determine what "went on" at particular archaeological sites. These activities might include the production or maintenance of hunting tool kits, the processing of plant or animal foods, the cooking and consumption of those foods, the making of ceramic vessels, the erection and occupation of shelters, and so on. The identification of these activities is a critical step in the interpretation of site function. Functional categories are, in turn, useful for studying settlement patterns and settlement systems. In the present context, the term "settlement pattern" applies to the distribution of activity sets or functional site types across a landscape, whereas "settlement system" refers to the interpretation of those patterns at a higher level of abstraction. The analysis of settlement systems includes inferences about the nature of the social groups that produced the investigated sites, the place of the sites and the activities they represent in the seasonal settlement rounds of those social groups, and the relationships between the social groups. These

topics may be difficult to address archaeologically, but they are important to consider when tapping the information potential of a site.

Research Questions

PALEOARCHAIC AND ARCHAIC PERIODS

Much of the data on Archaic period settlement patterns and settlement systems comes from two sources: open air lithic scatters and rockshelters. As the rockshelters often represent special use for ritual purposes, several research questions remain before we can fully reconstruct Archaic period settlement systems.

1. Are deeply buried Paleoindian and Early Archaic sites present in the project area? This can be addressed by trenching within deposits found in the same kinds of geological and environmental settings where these sites have been documented in other surveys.
2. What is the nature of Late Archaic period occupation of the project area? Although we have excellent new information on ritual use of caves, more systematically excavated data are needed from rockshelters used for domestic purposes to clarify the nature and extent of Late Archaic land use. This should be supplemented with excavations of open air sites with stratified deposits.
3. Is the Terminal Archaic occupation of the project area confined to areas where groups could farm? Is there evidence of increasing intensity of occupation at habitation sites? Where are the habitation sites located?

PUEBLOAN PERIOD

Lyneis (1992a:86) places the Virgin Puebloans in the least complex of Lightfoot and Upham's (1989) categories for describing the scale of Southwestern societies. Both architectural and burial data have been used to support this argument for a relatively simple social order.

1. Does this idea of a simple social order represent a consensus view? What evidence can be marshaled in support of more complex social arrangements?
2. Even within the bounds of a simple society, there is evidence of variability in the size, layout, and architectural characteristics of sites and, by implication, in the organization of the communities that inhabited them. To what extent does this variability occur among sites that were occupied at the same or different times? What are the implications of this variability for Western Virgin Puebloan social history?
3. We know that Puebloan pottery was made in the Moapa Valley, at Ash Meadows, and at the Corn Creek Dunes site. What other areas of manufacture can we identify in southern Nevada? What does this tell us about social organization and exchange systems?

POST-PUEBLOAN PERIOD

1. Did the settlement systems of the Post-Puebloan Period in the Central Region change substantially from the earlier Puebloan manifestation there?
2. Did Moapa Valley's Post-Puebloan residents live in habitation features like the ones described by the first Euroamericans who encountered the region's Southern Paiute occupants? How about the Patayan/Mojave groups living along the Colorado River?
3. Why are rockshelters the focus of habitation activities during this period? Do these sites represent one stop on a seasonal round or did they serve as base camps? Was the settlement system organized around base camps located in open settings near springs, like the Southern Paiute system? Or was the settlement system more mobile and consist of several small temporary camps? Many of southern Nevada's mountain ranges contain large campsites with

substantial evidence of Post-Puebloan period use. Are habitation features buried at these sites?

4. When and where in the region was Great Basin Brown Ware pottery made and used? What part did these or other kinds of ceramic vessels play in Post-Puebloan period settlement systems?

Data Needs

To answer these questions even small lithic scatters in alluvial or aeolian contexts might be significant. If mitigation plans for these small assemblage sites are developed, special attention should be paid to those with Desert Side-Notched points, multiple tool types, or fire-cracked rock. . Data recovery efforts should use a combination of backhoe trenches and hand-dug units. In the Central Region some of the largest sites, like Burnt Rock Mound and the Pardee site have, unfortunately, been destroyed or sold by federal land agencies; however, some important site complexes, such as the Corn Creek Dunes, Clark County Wetlands Park, and the Las Vegas Springs Preserve, have management plans and will be preserved for future research.

Evidence of social organization and settlement systems comes from habitation and campsites. Unfortunately, habitation features dating to this period are likely to be difficult to identify in the archaeological record. They will not be flagged on the site's surface by unusually large pottery assemblages or other obvious characteristics. An ephemeral pit structure that HRA excavated at the Corn Creek Dune site was visible only in plan view as subtle change in soil color and an alignment of postholes. If HRA had not excavated a large block area surrounding the structure, it would probably have been missed. Most of the pithouses that have been excavated in the Las Vegas Valley were recognized using methods borrowed from the Hohokam culture area. These methods include backhoe trenching to locate the subtle soil color changes in profile and then removing the overburden mechanically or by hand excavation depending on the thickness of the sterile overburden.

SUBSISTENCE AND DIET

The concepts of subsistence and diet address different, though overlapping, aspects of life. Subsistence is concerned with the economics of the food quest: What foods were consumed, and where, when, and by what methods were these foods obtained? How was this effort allocated among different members of the social group? What was the relative importance of the different categories of food, for example, those obtained from animals, wild plants, or domesticated crop plants or, to be more specific, from the seeds of wild annuals like grasses, the seeds of piñon trees, or the seed pods of mesquite trees? At this higher level of specificity, the concept of subsistence segues into that of diet. This latter topic is concerned not with the economics of the food quest, but with the actual consumption of food. Its frame of reference is not the aggregate behavior of social groups, but the experience of individuals within the group. What did they eat and in what proportions, and how did this vary throughout the year and from one year to the next? We can even ask how their diet varied from day to day or even meal to meal, though more for the purpose of honing our analytical skills than with the expectation of obtaining definitive answers. More important are questions relating to the adequacy of the diet, for example, for sustaining the growth of children and adolescents and for maintaining the health of individuals of all age classes.

Research Questions

PALEOARCHAIC AND ARCHAIC PERIODS

Most of the Paleoarchaic and Archaic sites discussed in this overview lack subsistence remains, and this represents one of the largest data gaps in the archaeology of these periods in southern Nevada. Before we can make assumptions about the role of specific resources (piñon, big game, etc.), we need to obtain more subsistence data from well-defined, well-dated contexts. Some specific research questions follow:

1. Were Paleoindian hunters following Pleistocene megafauna? Megafauna were clearly present in the area (e.g., Tule Springs), but at present there are no data linking Paleoindian hunters to these animals.
2. Were Early Archaic period groups targeting wetland resources, as indicated by site locations? What kinds of resources were being exploited?
3. Was piñon first used during the Middle Archaic period? What impact did the use of this resource have on Middle Archaic period foragers?
4. Were Late Archaic groups targeting specific resources such as piñon, mesquite, agave, and large game? Does diet breadth decrease as people became more efficient at exploiting these resources?
5. Does the Terminal Archaic period represent a transition to farming, or, as discussed in Chapter 5, does it represent the addition of maize to a foraging diet?

PUEBLOAN PERIOD

Three recent studies point the way to future research on Pueblo period subsistence. The first analyzed charred plant, pollen, and (with somewhat less success) faunal specimens recovered from surviving buried midden deposits at the otherwise substantially damaged Main Ridge site in the Moapa Valley. The second studied material from roasting pits and other contexts in the Gold Butte Area. The third examined organic remains from storage pits and ephemeral structures at the Larder and Scorpion Knoll sites in the Las Vegas Valley. As they stand, these studies provide starting points for a comparison of subsistence practices of Puebloan people at core area sites in the Moapa and Virgin river valleys, of Puebloan (and other?) people at upland sites in the Gold Butte Area, and of non-Puebloan (and Puebloan?) people in the Las Vegas Valley. These are, of course, just three nodes in a larger research agenda to study subsistence throughout the southern Nevada Region during the Puebloan period. How did subsistence practices vary among such localities as the ones mentioned, but also among areas that have already received some degree of attention from archaeologists, including Upper California Wash, Corn Creek in the Las Vegas Valley, Ash Meadows, and the Yucca Mountain Area? Also, how did the subsistence systems of particularly groups or communities work? That is, how were the exploitation of upland and lowland resources, including cultivated crops, integrated into subsistence *systems*? As for specific research questions:

1. When was maize farming introduced to the Moapa and Las Vegas valleys. Did this event indeed occur earlier in the Las Vegas valley, as presently available evidence suggests? If so, what was the source of this innovation—the Colorado Plateau or, possibly, southern Arizona?
2. What was the balance in subsistence, for any given area or portion of the Puebloan period, among wild plant, wild animal, and, where relevant, domesticated plant foods? Archaeologists working in many areas have found it difficult to weight the relative contribution of different kinds of resources to prehistoric subsistence, but this is no reason to refrain from asking the question.
3. Do domesticated animals need to be added to this equation—i.e., did Puebloan groups keep domesticated turkeys or dogs at any time?
4. As a small piece of this puzzle, were agave hearts indeed the primary food source processed in roasting pits, or were other plants or animals cooked in them as well?
5. Again in a chronological vein, did the Puebloan inhabitants of the Moapa and Virgin river valleys reduce their use of agave during the final centuries of the Pueblo period?

POST-PUEBLOAN PERIOD

Thirty years ago Claude Warren proposed a "double loop" subsistence strategy for the Las Vegas Valley's Post-Puebloan period residents. Catherine Fowler's (2010) research, which incorporated Isabel Kelly's ethnographic accounts, demonstrates that small-scale farming was also important during the early historic portion of the Post-Puebloan period. The presence of cultigens at the Larder site during earlier

times, ca. A.D. 1300 to 1500, suggests that farming was practiced in the Central Region at this time; however, many questions remain, some of which contain a technological component:

1. Did farming continue during the Post-Puebloan period in all regions of southern Nevada or just the Central Region? How did farming methods differ from those the previous Puebloan period? Who made the irrigation ditches observed by the Mormons when they first settled the Moapa Valley? What was the relative importance of cultigens and wild species in the diet of the area's Post-Puebloan period inhabitants?
2. When were Euroamerican crops such as wheat and watermelons introduced? Were they adopted from the Patayan region, as Fowler (1982) suggested, or did they make their way into the region from the east?
3. Were cactus and tortoise more important during the Post-Puebloan period than the Puebloan period, as the archaeological record currently suggests? If so why is this? Was it due to a cultural preference or a change in the distribution and abundance of these species, or was it related to increased population pressure?
4. What was being cooked in the small cobble-lined roasting pits reported at Corn Creek and elsewhere? Were these features used to cook a variety of plants and animals or were they made specifically to process certain types of foods?
5. Isabel Kelly's Southern Paiute consultants reported farming in Ash Meadows, Pahrump, the Moapa Valley, and also the Gold Butte area. Does the archaeological record support farming in these areas during the Post-Puebloan period?
6. Can we operationalize Robert's and Ahlstrom's (2012) mobile farmer model using Barlow's (2006) Fremont model? If so how?
7. Room 1 at Gypsum Cave and Paiute Cave contained an abundance of maize cobs. Do these cobs date to the Post-Puebloan or Puebloan period? Were they consumed there, cached for later consumption, or left as offerings?
8. What can we infer from the changes in food storage behavior during the Post-Puebloan period? Does the shift from centralized storage during the Puebloan Period, to scattered storage tell us that stored goods could no longer be defended during the Post-Puebloan Period as Metcalfe (2008) suggests?

Data Needs

To address these questions stratified sites containing Paleoindian and Archaic occupations will need to be located and excavated. As noted previously, open sites are preferred over rockshelters. Coprolites from existing collections in museums can also be used to understand subsistence strategies in upland settings where rockshelters are located. When recovered from controlled archaeological contexts, botanical specimens, such as animal bone, seeds from wild plants, and kernels and cobs of maize, can provide important evidence of past subsistence practices

A range of biological data can contribute to the study of subsistence and diet. Among the data categories that are most relevant to the study of subsistence in the southern Nevada region are faunal remains, consisting primarily of animal bone and tortoise shell, but including the remains of hides and horn; plant remains that are visible to the naked eye, both charred and uncharred and including seeds, seed pods, and other tell-tale plant parts; and microfossil plant materials that are visible under magnification, consisting mostly of pollen grains but including starches and phytoliths. Materials of these kinds can be recovered from undifferentiated site deposits, from middens, and from the fill within structures and facilities such as storage pits and thermal features including hearths and roasting pits. Uncharred plant remains and items of hide and horn come almost exclusively from sheltered sites, whereas the other materials, including animal bone, charred plant parts, and plant microfossils can be found in both open and sheltered settings. Both faunal and plant remains can be recovered in the course of excavation or, in the case of small specimens, extracted from soil samples by means of flotation. This

approach is particularly suited to the recovery of charred plant parts, including seeds. Plant microfossils are also extracted from soil samples collected in the course of excavation. This discussion of categories of biological data and the means of their recovery could be expanded. The point is that excavation techniques need to be structured to collect the kinds of evidence that, on the one hand, are believed to be present and that, on the other hand, are relevant to the research agenda. It is important, furthermore, to keep one's mind open to the possible presence of unexpected kinds of biological evidence: it can be the case in archaeological data collection that, if you are not looking for something, you will not find it even if it is there.

Southern Nevada's archaeological record provides few opportunities for dietary analysis. Dietary questions are best addressed with data from substantial habitation sites, where there is the potential to obtain information relating to the eating of many meals by many people. Sites of this kind are also most likely to provide evidence of substantial burial populations. The records and collections from older excavations of habitation sites include little evidence that could contribute to dietary studies. This includes evidence of food remains and observations of human skeletal remains. It would seem that large-scale excavations of habitation sites are, at least for now, a thing of the past. The isotopic analysis of human skeletal remains, which can provide valuable evidence on diet over an interval of years, is also likely to remain out-of-bounds for the foreseeable future—assuming that substantial burial populations are at some point encountered and excavated, which also seems unlikely at this stage.

Not all avenues for dietary research are closed, however. A notable exception involves the analysis of human coprolites, which can provide evidence, including both plant parts and pollen, of recently consumed meals. Once identified, the plant parts in particular can be submitted for radiocarbon dating, which means that the coprolites can be dated independently of archaeological context from which they were recovered. This is a big advantage, since coprolites are found in sheltered sites, whose archaeological deposits are most often mixed than neatly stratified. A noteworthy example of an existing but as yet unanalyzed collection of coprolites is that from Flaherty Rockshelter (Blair and Wedding 2001). Coprolites were also recovered from the Mule Springs Cave and Bighorn Caves (26CK4446) and possibly from other sites as well. These collections should be analyzed and the recovery and analysis of coprolites should be a focus of future data recovery projects that include sheltered sites.

Research on subsistence and diet can be advanced through the radiocarbon dating of botanical samples in museum collections. We also need to obtain new data from contexts, such as habitation or storage features, where pollen or macrobotanical evidence is in good association. Macrobotanical samples should be processed from all thermal features that are encountered and new methods such as those involving lipids and phytoliths should be explored.

TECHNOLOGY

Ezzo (1995:137) defines technology as "the means by which human beings extract materials and harness energy from their environment." The topic includes the production of clothing and footwear from plant fiber and animal skins, as well as the production, maintenance, and use of tools and containers made from flaked stone, ground stone, wood, plant fiber, and clay. It includes the construction, maintenance, and use of facilities, such as hearths, roasting pits, houses, and informal shelters, as well as irrigation canals and ditches. And it includes the methods and practices used in hunting, gathering, and farming, as well as in the processing and storage of foodstuffs.

Research Questions

PALEOARCHAIC AND ARCHAIC PERIODS

1. Are specific tool types associated temporally with specific sub-periods of the Archaic? Lyneis (1982a) suggested that temporally diagnostic tools other than projectile points may be used to seriate surface lithic scatters. This study has suggested that crescents, domed scrapers,

and large bifacial knives may be time-sensitive tool types; this needs to be addressed with further work.

2. Does biface technology change over time?
3. Does raw material use change over time? Is this related to access or changes in mobility patterns?

PUEBLOAN PERIOD

The theme of technology includes a number of categories of Puebloan period material culture, each with its own set of questions for future research.

1. Exactly where in the Moapa and Virgin river valleys—and where outside it—were the vessels that ceramic analysts assign to different wares produced?
2. Where did the clays and tempering materials come from? Recent research has indicated that "Puebloan" pottery was made "locally" in both the northern Las Vegas Valley (specifically Corn Creek) and Ash Meadows areas. What was the scale of this activity?
3. Was Puebloan pottery also manufactured in other localities outside the Moapa and Virgin river valleys? At least some of the buff ware pottery in Southern Nevada—particularly in the region's southern and eastern thirds—dates to the latter portion of the Pueblo period.
4. How much of this pottery was produced locally and, in particular, in settings located away from the Colorado River?
5. Some artifacts found on Pueblo period sites were made from what were certainly nonlocal materials. This includes marine-shell ornaments and flaked obsidian tools. To what extent did these artifacts arrive or move through the region in finished form, as opposed to being produced locally using traded raw materials?
6. Where and how were flaked and ground stone tools produced? What were the sources of the local materials used in making these tools?
7. What are the implications of the temporal and spatial distributions of different kinds of metates—slab, basin, trough, and Utah-style?
8. How was hunting practiced: along with bows-and-arrows (evidenced by the projectile points that are found at many sites), might it have included the use of drives or nets?
9. How were roasting pits used; to what extent were foods other than agave hearts cooked in them; and what are the implications of the demonstrated preference for the use of limestone as the "heating element" in these features? If corn was being cooked in these pits, would the limestone be the equivalent of putting in ash or lye (nixtamalization)?
10. How was farming practiced—in the Moapa vs. Virgin vs. Las Vegas valleys, or along rivers as opposed to adjacent to springs? Did these practices change over time?

Archaeologists have documented an architectural trajectory from "pithouses to pueblos" or from "pit structures to surface structures" throughout the prehistoric Puebloan world.

1. Why did surface structures replace pit structures? How did the unfolding of the process in the Western Virgin Puebloan area compare to that in other Virgin Puebloan areas or, for that matter, in the Kayenta and other distant puebloan areas?
2. Were "oversized" or "community" pit structures present on Western Virgin Puebloan sites, particularly those dating to the Basketmaker III and Pueblo I periods? Possible candidates have been noted on Black Dog Mesa and at House 102, but can these identifications be sustained?
3. How were the parts of structures that are only rarely and imperfectly preserved in the archaeological record built including the superstructures of pithouses and the upper walls and roofs? Where were the materials obtained for constructing these buildings? In what ways and

to what extent did the availability of materials constrain construction practices in particular locations?

POST-PUEBLOAN PERIOD

1. Was pottery manufactured on a small scale by individual families based on need? Or did certain individuals or groups make pottery for trade during the Post-Puebloan period?
2. Lyneis has shown that Great Basin Brown Ware was made at Corn Creek and Ash Meadows during this time; was it also made in the Moapa Valley?
3. Luminescence dating has shown that Great Basin Brown Ware was produced as early as A.D. 800 in the Western Region. Should it be considered a trade ware from more mobile groups living to the north and west? When did Great Basin groups begin making brown ware in other areas of southern Nevada?
4. Was North Creek Gray Ware made later than the accepted date of A.D. 1300 in the Moapa Valley? How about other Puebloan wares?
5. Even in cases in which sites have been 100 percent excavated, we almost never find enough pottery to suggest that whole vessels were discarded there. Numerous puebloan potsherds were found at Site 26CK4440, but the radiocarbon dating of samples from hearths suggests that the site was occupied during the Post-Puebloan period, or between A.D. 1280 and 1650. We suspect that some of the ceramic assemblage from this site and other similar Post-Puebloan period rockshelters was brought in as sherds, rather than as whole vessels. Were these sherds carried to the shelters as raw material for tools or possibly ornaments? What uses can be made of pottery as sherds rather than as containers? Can such secondary uses be demonstrated on the basis of archaeological evidence?
6. When was the Desert Side-Notched style of arrow point introduced to the southern Nevada region?
7. As in the previously mentioned case of Puebloan period roasting pits, were features of this kind that date to the Post-Puebloan period used for cooking foods other than agave hearts and might they have been used for other processing tasks as well?
8. The methods used by Southern Paiute farmers during the Historic period to plant and water fields located adjacent to springs have been documented through ethnographic research. Can similar methods be documented in the archaeological record and for what times?

Data Needs

Carefully dated components, from open sites and rockshelters that have been used for habitation are needed to answer these questions. These sites should be excavated using natural stratigraphy to distinguish components and control provenience. These data are needed for all periods, but particularly for the Archaic and Post-Puebloan periods. More extensive testing methods should be used to identify intact buried deposits in open settings where alluvial or aeolian deposition is indicated.

Technology has not been investigated thoroughly for the Paleoarchaic and Archaic periods and remains one of the more difficult variables to address, in large part because of the way that chipped and ground stone assemblages are reported. Data are available on dart technology, in large part as a result of the excavation of Firebrand and Gypsum Caves, and some data are available on other perishables, but as the bulk of the recovered materials consist of lithics, it is imperative that studies of lithic technology become a major focus of research on the Archaic period in southern Nevada.

The task of distinguishing plain ware pottery is difficult when traditional visual methods are used. Appendix I contains a detailed discussion of the problems with past analyses and the advantages of new methods. Lyneis's mineralogical investigations on temper from pottery at Corn Creek (Lyneis 2011a) and Ash Meadows (Lyneis 2011b) have shown that Great Basin Brown Ware pottery was likely manufactured locally with tempering materials similar to those used by Puebloan potters. She found that at Ash Meadows similar temper was used in locally produced brown, buff, and gray ware vessels. Other

analytical techniques, such as INAA, have yielded important new data on manufacturing processes, seasonal rounds, and social organization (Allison 2000; Glowacki and Neff 2002; Harry 2005; Hildebrand et al. 2002; Watkins 2006).

ROCK ART AND THE MAGICO-RELIGIOUS REALM

Research Questions

Several rock art styles with chronological and cultural implications have been identified in southern Nevada. The validity of the existing schema can be criticized on several grounds, as detailed in Chapter 8. The topic of earth figures, research questions, data and management needs are addressed in Chapter 9. Specific questions for future rock art and other forms of magio-religious research include:

1. To date, convincing evidence of kivas has not been discovered at any Puebloan sites in the Las Vegas Valley. Can this negative conclusion be sustained as new data are collected or old datasets are reexamined? Did some pit structures play a more important role than others in the ceremonial practices of communities?
2. Can new information be gleaned from old burial data (including records and burial goods) from excavations conducted in the 1920s and 1930s? Did Puebloan burial practices, involving location, placement of the body, burial offerings, etc, change over time or remain the same?
3. Fremont and Virgin figurines closely resemble each other. Where in the two regions have figurines been found, and do the spatial and temporal distributions of these datasets within the two regions bear any relationship to one another?
4. What, if anything, can buildings, burial practices, artifacts like figurines, incised stones, and prayer sticks, or rock art tell us about Puebloan religion or ideology as practiced among the Western Virgin Puebloans?

Data Needs

Significant advancement in rock-art studies will require greater clarity both in basic terminology and in the definition of styles and the motifs that they incorporate. Once these issues have been adequately addressed, it will be possible to apply quantitative approaches to the analysis of entire assemblages of rock art and not simply selected subsets of common motifs. Such analyses have the greatest potential for exploring the spatial relationships between styles of rock art and archaeological subregions. Rock art is, of course, just one kind of evidence that might be used to study prehistoric religions or, more to the point, the material remains of past ritualistic and ceremonial practices. Evidence of this kind that has been identified in the southern Nevada region include intaglios (as discussed in detail in Chapter 9), figurines (Chapter 9), the arrangement and contents of burials, figurines (of both the clay and split-twig varieties), prayer sticks, and the contents of buildings. Both rock art and, to the extent possible, the other categories of magico-religious remains should also be examined in the context of prehistoric landscapes.

CONTACT AND TRADE

There is considerable archaeological evidence for the movement of nonlocal objects into and within the southern Nevada region. These objects come in the form of raw material, finished artifacts, or both and include marine shell and shell ornaments, raw turquoise and turquoise ornaments, projectile points and other tools made of obsidian, ceramic vessels, and glass trade beads. Other materials were no doubt transported through the region as well, though archaeological evidence in these cases may be difficult or even impossible to find and, once found, difficult to identify as nonlocal in origin. Examples of these obscure or invisible goods might include baskets, sandals, clothing, and salt. Certain foodstuffs might be identified as nonlocal as well, for example, pine-nut shells found in valley settings tens of miles

from the mountain forests where the nuts must have originally have been obtained. Specific questions relevant to this theme are listed by time period below.

Research Questions

PALEOARCHAIC AND ARCHAIC PERIODS

1. Is the increase in obsidian use documented during the Late Archaic period related to changes in exchange systems? What were the sources of obsidian during this and earlier times? Were other items being exchanged?
2. Is there evidence that obsidian was traded between groups rather than procured directly by its ultimate users? Regardless of who was responsible for the movement of obsidian into and through the region, was it more likely transported as raw material or as finished artifacts?

PUEBLOAN PERIOD

1. What was the role of the Southern Nevada region's Puebloan inhabitants in trade networks involving such goods as salt, shell, turquoise, obsidian, pottery, cultigens, and cotton? Aside from salt and pottery, to what extent were these goods traded in the form of raw materials as opposed to finished artifacts? How and in what ways might this trade have been important to the groups involved?
2. What were the sources of the obsidian found on Puebloan period sites? Did they vary over space or in time?
3. People began bringing marine shell from coastal California and Mexico into southern Nevada by the beginning of the Puebloan period. When did the "shell trade" begin and how did the scale of this endeavor vary over time?

POST-PUEBLOAN PERIOD

Questions pertaining to pottery manufacture and trade have already been addressed, and are outlined by Lyneis in Appendix I. Some other important questions that future studies might address are:

1. Why is obsidian from Utah so common in southern Nevada during this period? Was there a special relationship between southwestern Utah groups living near Milford and groups who occupied the upland areas of the Central Region? Roberts and Ahlstrom (2012) have suggested that control of the shell trade shifted at the beginning of this period from Virgin Puebloan to Patayan control. Did trade routes also move from north of the Colorado River through the Virgin Puebloan region, to south of the Colorado River through Patayan/Mojave/Pai areas? Did salt and turquoise continue to be important trade items during this period or did the Puebloan system reorganization affect demand?
2. Metal points and glass trade beads are common in the region. Where do these items originate? Were the Southern Paiutes taking an active role in the manufacture of points from scrap metal?

Data Needs

The identification of nonlocal objects presents a series of challenges for archaeological interpretation. The objects might have been carried from location to location as trade goods. For some artifact categories, the trade may have involved the raw materials, the finished artifacts, or both. Instead of being a product of trade, some nonlocal objects may have been obtained by individuals who traveled from their homes to obtain them directly. Or travelers may have carried the objects with them from their homes to their destinations and for their own use. In other cases, what appear to be nonlocal artifacts may in fact have been made locally—the movement in this situation involving the makers rather than the objects themselves.

Fortunately, archaeologists have access to a number of analytical tools for identifying the sources of raw materials and finished artifacts. Some, such as the identification of species of marine shell distinguished as originating in the Pacific or Gulf of California have been available for a number of years. Others, though not strictly new, have been developed or at least have come into their own in recent years. Examples include the sourcing of obsidian, the temper constituents of pottery and to some extent the clay body as well, and turquoise. Sourcing of the obsidian used to make datable or "temporally diagnostic" styles of projectile points can help in placing the movement of this material in temporal context, but assemblages of obsidian artifacts that can be dated by other means should be studied as well. The same is true of other kinds of "exotics" recovered from single-component sites and contexts within sites.

Radiocarbon dates should be obtained from perishables in museum collections that came from southern Nevada's salt and turquoise mines. Dating these materials and reevaluating the mines' collections will tell us when they were used, and possibly by whom (Blair and Winslow 2004; Leonard and Drover 1980). Collections of marine shell artifacts from the region should also be reevaluated with an eye toward diachronic change in artifact style and species.

ARCHAEOLOGICAL CULTURES, ETHNICITY, AND ETHNOGENESIS

The study of cultural groups and the boundaries between them reveals the limitations in archaeology's ability to interpret the physical evidence of past human behavior. On the one hand, there is abundant ethnographic evidence arguing against the existence of one-to-one correlations between living sociocultural groups and their material culture, particularly those aspects of material culture that constitute the bulk of the archaeological record. This is true both for "emic" groups that are identified by the members of those groups themselves and for "etic" groups identified by anthropologists and other outsiders. On the other hand, there is the abundant archaeological evidence for spatial and temporal patterning in certain classes of artifacts, which must bear some relationship to the sociocultural groups that occupied the spaces and made the artifacts in question. The reality of this dilemma is acknowledged through the use of the term "archaeological culture" to describe patterns in material culture whose relationship to actual cultures and societies may be difficult to establish.

Research Questions

Given the mobility and small population size of southern Nevada's Paleoarchaic and Archaic period inhabitants, even the concept of "archaeological cultures" probably implies too great a degree of coherence in the spatial distribution of archaeological "traits" to be of use. There is, however, the potential to identify spatially distinct traditions using particular traits. One way to do this is to determine the distribution of trait complexes (groups of traits that seem to be associated with one another).

1. Is there agreement in the spatial parameters of Archaic period rock art styles and other artifact categories, such as split-twig figurines? What might be the significance, in social terms, of the presence or lack of these spatial patterns?
2. With greater understanding of where pottery was manufactured and by whom, can we refine our definition of archaeological cultures as they existed in southern Nevada during the Puebloan and Post-Puebloan periods?
3. Assuming that the movement of artifacts independent of the movement of their makers can be factored out of the equation, can we identify useful boundaries or, perhaps, zones of overlap between archaeological cultures? When did those boundaries or boundary zones come into existence, and how did they change over time?
4. What is the distribution of incised stones in the Mojave Desert and Death Valley area? Can they be linked to Numic groups?
5. What can Patayan intaglios and rock alignments and trails tell us about interactions with groups living along the Colorado River? Can associated pottery be dated to provide a better estimate of when these earth features are made in southern Nevada? What can Native

American oral histories tell us about specific places and features in the landscape, such as Willow Beach and Cottonwood Island?

6. Can these boundaries between groups be reconstructed for the Post-Puebloan period using genetics and linguistics? What is the genetic relationship between the various ethnographic populations in the region? How does this change through time?
7. How might diseases introduced during the Historic period have contributed to variation in the DNA record?
8. What was the nature of the relationship—involving architecture, ceramic decoration, figurine styles, trade, and so on—between the Western Virgin Puebloans and their neighbors to the north, the Fremont people? How important might that relationship have been to each group?

Data Needs

In southern Nevada, as in the adjacent U.S. Southwest, some of the best evidence for identifying archaeological cultures comes in the form of broken pieces of pottery. Though rare outside the Moapa and Virgin river valleys when compared to flaked stone tools, potsherds are far more abundant than other kinds of evidence, such as basketry, textiles, house forms, and specialized feature types like intaglios that can contribute to the definition and identification of archaeological cultures. In southern Nevada, the problem of the defining a relationship between material culture and cultural groups is exacerbated by several factors. The first is the preference for non-decorated brown and buff ware pottery that varies little over a wide region. A second factor is the small number of potsherds typically recovered from sites in this region and, more to the point, the even smaller number of ceramic vessels represented by those sherds. There is much archaeological evidence from the Southwest for the movement of ceramic vessels, through trade, from one social group to another, including from the representatives of one archaeological culture to those of another. When pottery is abundant, there is the possibility of arguing against the "trade interpretation" on the basis of the weight of the evidence. But where one or a few vessels are involved, there is no weight to the evidence on which to base an argument. In fact, the presence of small numbers of vessels might be taken as evidence that one is dealing with a group that made little if any pottery and that might, on that basis, be more likely to obtain the vessels it needed through trade with other, nearby groups that were more involved in pottery production.

The use of ceramic evidence to identify archaeological cultures gives rise to one of Southwestern archaeology's most time-honored cliches. This is the notion that, in defining cultures on the basis of ceramic evidence, archaeologists are in danger of falling back on the simplistic and incorrect notion that "pots equal people." The term "ceramic tradition" is often used in referring to the ceramic component of archaeological cultures. Ceramic traditions reflect spatial and temporal patterning in the manufacture of pottery including the selection and treatment of materials, the building up of vessels, the determination of vessel shapes, and the decoration (or non-decoration) of vessels.

Archaeologists working in southern Nevada recognize three ceramic traditions: Virgin Puebloan, Patayan, and Southern Paiute. The Virgin Puebloan ceramic tradition is, in keeping with its name, a defining characteristic of the Virgin Puebloan archaeological culture. This ceramic tradition and archaeological culture are closely related to the Puebloan ethnographic "culture." The latter is, in general terms, a valid ethnographic construct, though it does combine a number of distinct cultures and linguistic groups.

Similarly, the Patayan ceramic tradition is linked to the Patayan archaeological culture—which is generally considered as a precursor to the Yuman-speaking ethnographic cultures that inhabited the lower Colorado River Valley in historical times and live there to this day. There may not, however, have been a simple one-to-one relationship between the prehistoric Patayan archaeological culture and the historical period Yuman-speaking groups. The Paiute-speaking Chemehuevi, for one, are known to have adopted a number of material-culture traits from their Yuman neighbors.

The Southern Paiute ethnographic culture and ceramic tradition have been recognized archaeologically in southern Nevada, as well as in the surrounding region, during the Post-Puebloan

period. Because of the amount of ethnographic data collected on this group and its material culture, archaeologists often do not distinguish between, on the one hand, a Paiute archaeological culture and ceramic tradition and, on the other hand, a Paiute ethnographic culture. The two are distinguished, however, by the definition of a Brown Ware ceramic tradition, which includes the pottery made by Paiutes, but also that made by members of other groups living in and near the Great Basin. The relationship between the Virgin Puebloan and Southern Paiute archaeological cultures is a subject of debate: the latter may have replaced the former *or* at least in part developed from it.

We recommend that Ortman's (2010) approach for examining Tewa ethnogenesis be applied to the Southern Paiute region. Also, extracted genetic material from nonburial contexts including quids, coprolites, or even human blood residue on projectile points can be used to address questions on genetic relationships between populations. Excavation projects should be attentive to this emerging field of study in their future research designs.

CHAPTER 11
RECOMMENDATIONS

Heidi Roberts and Richard V.N. Ahlstrom

Since Margaret Lyneis prepared her prehistoric context for southern Nevada more than 30 years ago, archaeologists have intensively surveyed 23 percent of the project area; they have documented over 9,000 archaeological sites; they have excavated nearly 100 of these sites; and they have processed almost 400 radiocarbon dates. While most of the projects of the last three decades were conducted to mitigate impacts related to urban expansion, several important studies were undertaken for research and training purposes. Spurred by funding from SNPLMA, archaeologists have also returned to archives and museum collections to examine and reevaluate numerous archaeological sites that were excavated before 1980. The collections from Main Ridge, the Corn Creek Dune site, Black Dog Cave, Flaherty Shelter, Las Vegas Wash (Clark County Wetlands Park), and Gypsum Cave—to name a few—have all been studied in the last 20 years. This research has dramatically expanded the number of radiocarbon dates that can now be associated with large and varied artifact assemblages. Other datasets, obtained from macrobotanical samples, obsidian sourcing studies, faunal remains, pottery, and ornaments, flesh out what we now know about the past. Although these studies have answered many old questions, they have also raised new ones (Ahlstrom 2003b; Gilreath 2009, 2012; Harry 2007; Lyneis 1992a; Roberts and Ahlstrom 2000; Roberts et. al 2003b; Winslow and Blair 2003).

Unfortunately, the galloping pace of urban growth and expansion has not allowed us, before now, to pause and reflect on what we have learned. Thanks to SLPLMA funding, which supported the present project, one of the goals of the current document is to examine these data and evaluate what we know about the past. Toward this end, this final chapter addresses three key questions: What have we learned about southern Nevada's prehistory, what don't we know, and how can we fill the gaps in our knowledge?

WHAT DO WE KNOW ABOUT SOUTHERN NEVADA'S PREHISTORY?

Paleoindian and Archaic Periods

In Chapter 5, Roth examines the NVCRIS data and inventory of excavated sites to document that occupation of southern Nevada began during the Paleoindian period (11,150–10,850 B.C.) and continued, without breaks, through the Archaic period. Projectile point distributions, from the NVCRIS dataset, clearly demonstrate that use of the region increased gradually over time. Most of our data on the Paleoindian and Early Archaic periods comes from surface finds and unexcavated contexts. Only one radiocarbon date is associated with the earliest Paleoindian period, and this date was obtained during the Tule Springs investigations in the 1960s. Unfortunately, no fluted points, which are diagnostic of Paleoindians, or Pleistocene fauna were associated with this early date. In the NVCRIS dataset, fluted points are rare and are known primarily from surface contexts. Their prevalence in and around Forty Mile Canyon led Roth to suggest that this area may have served as a game corridor that attracted Paleoindian hunters.

The Early Archaic period (9050–5550 B.C.) is characterized by stemmed points, and they are more common in southern Nevada than fluted ones. Many Early Archaic sites are concentrated near springs and lacustrine settings, which suggests to Roth (Chapter 5) a focus on wetlands resources. As with the Paleoindian period, the Early Archaic period has not been well dated in the region and, in fact, only a single date falls into this interval. This calibrated date of 7480–7140 B.C. was obtained from a piece of basketry recovered from Gypsum Cave during Harrington's investigations there in the 1930s (Gilreath 2009).

The large number of Pinto points recorded throughout southern Nevada suggests that, despite drier conditions, use of the region continued to increase during the Middle Archaic period (5550–2050 B.C.). These sites are frequently associated with ground stone tools and thermal features (Simms 1989), which Roth believes indicates generalized foraging activities. Middle Archaic sites are clustered around springs and in upland settings, and Roth suggests that piñon use is indicated by the presence of ground stone associated with upland sites.

The number of radiocarbon dates increases dramatically from Late Archaic period (2050 B.C.–A.D. 400) sites, but as Roth points out in Chapter 5, many of the dates were obtained from caves such as Gypsum, Firebrand, and Pintwater, and use of these sites is likely related to ritual behaviors, rather than domestic ones. The increase in ritual behavior can also be seen in rock art and in portable artifact forms such as split-twig figurines, prayer sticks, and incised stones. The NVCRIS data indicate increasing population size and settlement complexity. Site locations continue to favor well watered areas, but Roth notices a shift from the uplands to the resource-rich areas in the valleys. She infers use of mesquite resources from the presence of mortars and pestles in the lowlands. Furthermore, she concludes that a range of hunting and gathering activities is indicated by the artifacts and site distributions, rather than a specialized focus on hunting.

Maize farming is introduced at the end of this period between 200 B.C. and A.D. 400. The earliest evidence of maize was recovered from storage pits at the Larder site along Las Vegas Wash. Other Terminal Archaic radiocarbon dates have been obtained from Black Dog Cave in the Moapa Valley and the Barnett site in Ash Meadows. In the Eastern Region excavated sites, such as Black Dog Cave, contain pithouse architecture and basketry that suggests links to the Puebloan regions that lie to the east, south, and southeast.

Puebloan Period (A.D. 200–1300)

Regional differences and the beginnings of distinct cultural traditions first become recognizable during this period. The Moapa Valley groups are strongly influenced by the Puebloan populations of the Four Corners region. Winslow and Blair (2003) believe that basketry specimens from Black Dog Cave's Basketmaker II component represent a Puebloan migration into southern Nevada from the core areas in the San Juan-Kayenta regions of northeastern Arizona. In the Eastern Region, settlements are concentrated along the Muddy and Virgin rivers. In the Central Region, where populations were less influenced by Puebloan traditions, farming was practiced around springs and spring-fed drainages. Because many of the material-culture and architectural characteristics of Puebloans living in southern Nevada, southwestern Utah, and the Arizona Strip are distinct from Puebloan groups to the east and south, this version of the Puebloan tradition has been labeled the Western Virgin Puebloan archaeological culture.

Ahlstrom (Chapter 7) and Lyneis (1995; Appendix D) use the Pecos classification to organize this Puebloan period. In southern Nevada Basketmaker II (A.D. 1–500) sites are characterized by pithouse architecture (pithouses are usually deep), artistic mastery of basketry technology, dart points during the early part of the period, and arrow points after A.D. 200–500. Caches for storage of food and other items are commonly located in caves or in pits near habitations. Substantial evidence of maize cultivation has been documented for Basketmaker populations elsewhere (Coltrain et al. 2007). In southern Nevada, farming also appears to have been important, with the evidence for maize dependence continuing to accumulate. Upland resources, such as agave and piñon, and other wild plants—particularly mesquite—continue in importance.

During the Basketmaker III period (A.D. 500–800) gray ware pottery is manufactured for the first time, pithouses remain deep and their hearths and walls may be slab-lined. In the Eastern Region storage facilities begin to shift from pits, to oval-shaped slab-lined or adobe rooms aligned end to end. Pottery is tempered with sand and few of the vessels are decorated. In the Central Region pit storage continues for maize and wild plants at the Larder site and Scorpion Knoll. Houses in the Central Region are often built in shallow pits and lack the formal architectural features of those that have been excavated in the Eastern

Region. Basketmaker pottery has been recovered from sites in the Eastern and Southern Regions, but no architectural features have been reported.

The Pueblo I period begins around A.D. 800 and lasts for two hundred years. In the Eastern Region, adobe and slab-lined storage rooms begin to form an arc or curve and these alignments, along with arrangements of the pithouses begin to define courtyards. Pueblo I pithouses have benches, ventilators, and other formalized architectural features; however, the few pithouses known in the Central Region lack these features—though evidence of a side entry has been found in a structure at the Three Kids site. A habitation structure reported at the Corn Creek site in the Central Region that dates to this period resembles an ephemeral brush structure. No pit structures associated with this period have been reported in the other two regions of southern Nevada.

Lyneis (Appendix D) and Ahlstrom (Chapter 6) divide the Pueblo II period (A.D. 1000–1200) into the Early (A.D. 1000–1050), Middle (A.D. 1050–1150) and Late (A.D. 1150–1200) sub-periods. Based on her work at the Yamashita sites in the Moapa Valley, Lyneis (Appendix D) has extended the Puebloan period from A.D. 1200 to 1300, and we have identified this hundred years as the Puebloan III period. During the early part of the Pueblo II period red wares from the Kayenta region were imported and corrugated pottery begins to be locally manufactured during the Middle Phase. Trade wares from the Kayenta region are fairly common, and the prevalence of corrugated pottery increases to at least 50 percent during the Pueblo III period. Linked storage rooms are built in an arc and, later, a circle that encloses a courtyard. Often pithouses are shallow and attached to the storage rooms. At the Steve Perkins site habitation features consisted of oval alignments of post holes surrounding a central hearth.

Over the last 30 years we have learned that farming was likely the subsistence focus of the Virgin Puebloans in the Eastern Region. To a lesser extent, farming was also practiced in the Central Region. Lyneis's research on pottery has made significant contributions to our understanding of temper sources, locales of manufacture, and seriation of design styles. She has identified the Mount Trumbull region of northwestern Arizona as the likely source area for olivine-tempered Moapa Gray Ware, and she has recently determined that corrugated and plain gray wares were made in the Las Vegas Valley and as far west as Ash Meadows. Buff ware pottery makes an appearance in southern Nevada by A.D. 1050 and perhaps a couple centuries earlier, and it is more common in the Southern Region and the southern portions of the Central and Eastern regions than elsewhere. Rafferty's research on the distribution of earth figures and new data on the rock art styles suggest that Patayan influences begin in portions of southern Nevada sometime after A.D. 1000.

Strides have been made toward understanding regional changes after A.D. 1300; however, the cause of the Virgin Puebloan abandonment is far from resolved. The date for the event has been pushed forward to the end of the thirteenth century and possibly later. Lyneis learned at the Yamashita sites that hearths associated with Great Basin Brown Ware were built in abandoned Puebloan rooms sometime during the thirteenth century. During the Post-Puebloan period formal architecture is replaced with open camps and rockshelters. There are hints that these changes were related to region-wide ones including the arrival of new groups—the Patayan and Numic—into the region. The presence of Patayan groups in southern Nevada was explored by Shutler (1961), and although Lyneis has convincingly questioned his ceramic evidence for a strong Patayan presence at Main Ridge, the issue refuses to go away. Patayan rock art styles, earth figures, and buff ware pottery have been reported along the Colorado River and its major tributaries. The arrival of these new art forms and items of material culture suggests that sometime after A.D. 1000 Patayan groups pushed up the Colorado River, moving as far north as the Nevada/Utah border. This date also corresponds to settlement-pattern shifts in the Central Region where farmer/foragers in which the Las Vegas Valley moved from open sites around springs in the valley bottoms to small rockshelters in protected locales in the foothills. In the Moapa Valley, the evidence for a similar settlement shift is not as clear.

We have suggested here, and elsewhere (Roberts and Ahlstrom 2012), that the Puebloan abandonment of the region after A.D. 1300 was probably related to region-wide events that included declining rainfall (Larson and Michaelson 1990) and the appearance of Patayan, Numic, and possibly

Athabaskan groups. Perhaps the collapse of the Puebloan system in the Four Corners region caused a rippling effect in regional trade networks or resource redistribution links.

Post-Puebloan Period (A.D. 1300–1776)

The timing of the arrival of Numic groups is far from resolved, as luminescence dates on Great Basin Brown Ware from the Yamashita sites in the Eastern Region and other sites in the Central Region indicate that Great Basin Brown Ware pottery had appeared by A.D. 800 and became dominant in the Moapa Valley by the end of the thirteenth century. Luminescence dates on gray ware that fall into the Post-Puebloan period cloud the picture further. Recently, we have learned that farming continued in the Las Vegas Valley after A.D. 1300, and new dates on maize suggest a similar picture is possible in the Moapa Valley. Lyneis has discovered that brown ware pottery recovered from Corn Creek and Ash Meadows was made with the same tempering material as the locally made gray ware pottery. In Chapter 7, Roberts argues that most Numic Spread models do not explain the Post-Puebloan archaeological record in southern Nevada because the models ignore the complex dynamics of the Colorado River groups, the early dates on Great Basin Brown Ware, and the presence of farmer/foragers of the Central Region who stored maize and mesquite in pits at the Larder site between 300 B.C. and A.D. 1500.

Since 1980 new research has focused on the impacts of European colonialism on Native people. Archaeologists generally agree that a continent-wide demographic collapse accompanied the arrival of European diseases. Mathematical models of the spread of infectious diseases show that sedentary farming populations are, and possibly were, impacted to a greater extent than mobile hunter-gatherer groups by these diseases. Exactly when introduced diseases became an important cultural factor in southern Nevada is not known.

WHAT WE DON'T KNOW ABOUT PREHISTORY

While we have made good progress answering many of the questions that Lyneis posed 30 years ago, our work is far from done. The culture history of the Eastern and Central regions is better known than in the Western and Southern regions, and the more recent periods have been more thoroughly studied than the Paleoindian and Archaic. Where we have conducted archaeological research is more a function of development and urban growth, than a desire to conduct pure research to fill gaps in our knowledge of the past. Far fewer sites have been excavated and recorded in the Southern and Western regions because the area is rugged, remote, and undeveloped. Researchers have focused on the Puebloan ruins of the Moapa Valley, in part because they are more visible and accessible for study and teaching. We believe that the sample of excavated sites is biased in favor of the more recent past for two reasons: these sites are less likely to be deeply buried and Puebloan period sites contain more substantial artifact deposits and architecture and are therefore, more visible.

Refinements have been made in our understanding of projectile point typologies; however, many of these studies were conducted outside the project area. We know that some point types are temporally sensitive, for example, Desert Side-Notched, but we have also learned that they are not diagnostic of prehistoric cultures or ethnic groups as some previously believed. Fluted, stemmed, Pinto, and Gypsum, Eastgate, Rose Springs, and Cottonwood Triangular points are all temporally sensitive, but Elko Corner Notched and Humboldt are less so. Obsidian hydration dating has been used successfully to refine chronologies and it has now been extended to nondiagnostic tools and small lithic scatters.

The question of changes in lithic technology through time is less clear. Lithic technologist Jeffrey Flenniken (2001, 2003, 2006) studied lithic assemblages from several Puebloan and Post-Puebloan period sites in the Central and Eastern regions and found no changes in the technology through time. Flenniken (personal communication, 2003) would argue that biface technology has dominated lithic assemblages in the Great Basin and Southwest since the Archaic period, and that there have been no major technological innovations. In Chapter 10, Roth notes that little research has been directed toward understanding technological change and flaked stone assemblages cannot be compared because studies lack consistency.

The question of whether flaked-stone materials have changed through time is still a valid and important topic.

As Mayer et al. demonstrate in Chapter 2, we have made excellent progress in understanding broad changes in climate through time, but we have made less headway in understanding how these changes impacted human populations. For example, projectile point distributions suggest that during the drier Middle Archaic period populations may have shifted to springs and uplands. Additional research and data from excavated sites are needed to support this observation. The effect of drier periods on Puebloan and Post-Puebloan populations is also far from clear, and many questions remain unanswered regarding the impact of region-wide droughts on the spring-fed Muddy River.

Progress has also been made toward understanding long-term directional trends in Puebloan and Post-Puebloan period settlement patterns, community size, population density and distribution, assemblage composition, technological change, and intercommunity exchange. This is not true for the Paleoindian and Archaic periods. As Roth argues in Chapter 5, we have made good inroads in gaining chronological control of the Late Archaic period, but the earlier periods are not well understood. Stratified sites, preferably in open settings, are needed to refine the chronology for these periods. Open sites would be preferable because rockshelters were used during the Late Archaic period for ritual purposes, and therefore, they may not yield useful data on Archaic settlement and subsistence strategies. As Claude Warren reminded us in 2006, to find old sites, we must look in old sediments. Roth suggests that Early Archaic sites may lay deeply buried under around the edges of desiccated lakes. Paleoindian occupations may be buried there as well.

How Archaic collector/forager settlement systems changed through time continues to elude us, although some progress had been made. This question will remain incompletely understood until we can link small nondiagnostic lithic scatters and camps by time period in each region. Site location and settlement-subsistence models have been developed elsewhere in the Great Basin, but these models have not been validated using dated artifact assemblages from excavated sites in varied ecosystems and settings. We argue in Chapter 1 that the archaeological record can never be fully understood unless sites representing the complete Archaic settlement system form the basis for these models.

Many of Lyneis's questions regarding the Virgin Puebloan period are still valid. We narrowed down the timing of the collapse, but we have learned less about the cause of these changes. Ahlstrom argues that both domesticated and wild foods were important to the Virgin Puebloans; however, subsistence studies are lacking in southern Nevada, and Lyneis's questions regarding the relative proportions of domesticated versus wild foods cannot be answered. Despite recent attempts to learn if cotton was grown in the Moapa Valley, we have no evidence for this. Some other questions that are still relevant are: How did the Virgin Puebloans adapt to the unique conditions of the hot desert? How did they maintain their cultural identity on the fringes of the Puebloan world? Were they linked more closely with the Upland Virgin or St. George Virgin groups, and did these relationships change over time?

We have made some progress toward understanding the relationship between the Virgin Puebloans in the Eastern Region and the other regions of southern Nevada, but many questions remain. Ahlstrom and Roberts (2008) have suggested that Puebloan period populations in the Western and Central regions were influenced by the Virgin Puebloans to the east, for example, they adopted farming and made gray ware pottery, yet they ignored Virgin Puebloan architecture and decorated pottery. These findings are inferred from a handful of sites and additional excavations and research are needed.

Trade relationships between Virgin and other Puebloan groups are still not well understood. Recent studies by the Harry Reid Center on prehistoric turquoise mines in the Mojave Desert have given us new insights into the role of southern Nevada's populations in turquoise procurement, yet we still do not know who did the mining or where the turquoise ended up (Roberts and Ahlstrom 2012). A recent sourcing study on turquoise recovered from Chaco Canyon found that Chaco turquoise came from as far away as central Nevada (Hull et al. 2007). Were the Virgin Puebloans the middle-men in the turquoise and shell trade as Rafferty (1990c), Lyneis (1982d, 1995), and Warren (2006) have suggested? Research currently underway by the University of Manitoba will hopefully begin to address questions regarding

turquoise procurement and trade routes, but the importance of the shell trade has undergone little study (Roberts and Ahlstrom 2012).

One topic we have made significant progress on is the relationship between Patayan groups and the lowland Virgin Puebloans. Studies by Rafferty (2008), Seymour (1997), and McGuire et al. (2010) demonstrate that the Patayan (and probably Mojave) influence was felt along the Colorado River and its tributaries as far north as Utah. Buff ware pottery dominates artifact assemblages associated with the Post-Puebloan period in the Central Region, particularly along Las Vegas Wash. The distribution of Patayan buff ware pottery, rock art, and earth figures supports the blending of Southern Paiute/Mojave characteristics observed among Chemehuevi groups during the Historic period. The timing of the Patayan push northward, the reason for this movement, and the nature of the interactions between the Virgin Puebloan populations and the Patayan groups are still far from clear.

Finally, the timing and nature of the arrival of Numic groups into southern Nevada has not been resolved, and Roberts argues in Chapter 8 that current models fail to explain what we see in southern Nevada's archaeological record. Lyneis's idea of mutualism, or trade relationships between Great Basin foragers and southern Nevada's farmers, holds great potential and should be explored.

HOW CAN WE FILL THESE DATA GAPS?

In her prehistoric context for southern Nevada Lyneis (1982a) recommended that archaeologists inspect backhoe trenches excavated in the region for evidence of irrigation ditches, field patterns, or other evidence of farming techniques. Using the correct tool for the job is a critical part of locating and evaluating sites for the presence of buried cultural features. At the Larder site in Clark County Wetlands Park none of the storage pits would have been visible if excavators had tested the site using small 1- x 1-m excavation units or even smaller shovel tests. Although portions of these features were destroyed in the process of locating them with the backhoe, we argue that understanding that site was used for 1,700 years to store food in pits was well worth the loss of portions of some of these features. The excavation of small test units to evaluate large sites for the presence of buried cultural deposits, and to locate these deposits, is inadequate and ineffective (Seddon 2011).

One of the ways we can locate deeply buried Paleoindian and Archaic sites is for intensive surveys to take into account the geomorphological characteristics of the study area (area of potential effect) *before* fieldwork begins. In other words, the project's survey methods should be tailored to take into consideration the potential for completely buried sites (Eckerle et al. 2011b). For example, is the project area located in a floodplain where cultural deposits are likely to be buried under modern flood deposits? Is the project area in a setting where forest fires have caused burning and subsequent episodes of erosion (Harmon 2011)? Is the setting so active that no sites could ever be preserved? If sites are likely to be buried under new deposits, should subsurface excavation methods, such as shovel test or backhoe trench, be used to locate cultural deposits during the survey? Will the proposed undertaking destroy such deeply buried sites or can they be avoided?

Modern geomorphological techniques can tell us where sites may be buried, and they can also help us understand a site's integrity (Eckerle et al. 2011a). For example, Harmon (2011) recently demonstrated that burned sites can completely erode away if the soils are not stabilized soon after a forest fire. What are the implications of this if the project area is on a gradual slope that has likely burned multiple times during prehistory? Is that vast lithic-covered landscape actually just a heavily eroded lithic scatter that is completely void of integrity? Or, is the archaeological site a lithic procurement area that has also been heavily eroded? Are there level places where sites may still retain integrity and have the potential to contain intact buried deposits? Perhaps more time should be spent evaluating the quality and integrity of the resource, before plotting the exact locations of surface artifacts.

To locate older sites with intact buried deposits we recommend that more extensive test excavations be conducted when the geomorphological setting suggests that soils are conducive to burial processes that could preserve intact features (Wintch 2011). In some cases surface artifacts may represent only the latest episode of use, or they may signal the presence of buried artifacts that have been disturbed,

which have been moved to the surface by rodents or other animals. In many contexts, such as sand dunes, the visible sites are heavily eroded, yet the adjacent sand dune may contain buried features that are in good condition (Talbot 2011). Evaluative testing has been eliminated by many states; however, removing this step makes it impossible to understand a prehistoric site's integrity and its potential to contain information important to prehistory (Seddon et al. 2011; Wintch 2011). In some cases mechanical equipment is the best way to locate buried cultural deposits in active geomorphological settings (Roberts and Herr 2011; Talbot 2011); however, other methods have also been shown to be effective (Eckerle et al. 2011b; Rogers 2011).

Future data recovery projects in Clark County should use a combination of hand-dug units and backhoe trenches. In desert pavement settings we recommend stripping off the soils to a depth of 10 to 30 cm to expose broad areas including small hearth and thermal features that may have "healed over" through time. In our experience, most sites that contain multiple categories of artifacts (e.g., flaked stone tools, ground stone, debitage, or pottery) plus fire-affected rocks are likely to also contain intact hearths, habitations, or storage features. Predicting the presence or absence of intact cultural features should occur in steps. First hand-dug units should be excavated and all soils screened to evaluate the presence and depth of buried artifacts. If artifacts are buried and soils contain evidence of charcoal staining, then trenches should be excavated across the site, either by hand or mechanically, to the depths indicated by the artifact concentrations. Trench profiles should be cleaned with a trowel or shovel, examined for cultural features and deposits, and profiled (Roberts and Herr 2011).

New techniques have become available that can be used to refine our understanding of the past, and many of these methods can be used on curated artifacts that are obtained from sites with mixed stratigraphy or unknown contexts. Perishables, for example baskets and sandals, can be radiocarbon dated. Coprolites, both human and animal, contain a wealth of information on diet, health, and even genetics. They can also be radiocarbon dated. Human DNA has been extracted from agave quids and coprolites recovered from rockshelters. This DNA data can be used to reconstruct diet and environment, understand the arrival and spread of diseases, evaluate population continuity and replacement, and understand the domestication of plants (i.e. maize) and animals (i.e. turkeys).

Curated collections from several rockshelters in southern Nevada such as Conaway and O'Malley (Fowler et al. 1973), Mule Springs (Turner 1978), 26CK4446 (Bighorn Cave near Goodsprings), Catclaw Cave (Wright 1954), and Flaherty Rockshelter (Winslow and Wedding 2001) should be inventoried for these materials so they can be maintained in good condition for future research. Neither quids nor coprolites fall under the jurisdiction of NAGPRA, so their study will not be as restrictive.

Methods for sourcing turquoise beads hold promise (Hull et al. 2007). Beck and Jones (2010) have demonstrated that similar sourcing research on obsidian can provide data used to reconstruct population migrations and trade (Hughes and Bennyhoff 1986). Mineralogical methods and INAA source determination can be used to identify pottery manufacture locations and trade routes. As we have stated previously, plainware pottery from this area should be evaluated chemically rather than visually to determine location of manufacture. We are just learning that Logandale Gray pottery was likely made in the Las Vegas Valley as well as the Moapa Valley, and these studies have also shown that corrugated pottery was made during the Puebloan period at the Corn Creek Dune site and at a separate site in the Ash Meadows National Wildlife Refuge (Lyneis Appendix I). A critical question for future research in these areas involves expanding our knowledge as to where the pottery was made. Were these pots made in the mountains, where the temper comes from, or was the temper carried down to the valleys and the pottery made there? As we have stated throughout this document, visual typing of plain ware cannot tell us who made the pottery or even where it was made (see Lyneis in Appendix I).

Making excavation data accessible to the archaeological community would help us devise new research questions, and better understand what we already have learned. Therefore, we would like to recommend that data files be maintained for excavation data. These should be available to the professional community and be updated regularly by that same community. Spreadsheets like the ones developed for this study on obsidian sources, radiocarbon dates, shell artifacts, perishables, and so on should be maintained in a central repository, like NVCRIS. The simple spreadsheets would be updated

electronically when excavators curate their collections. Other files might also be maintained for example, ones that list macrofloral data, fauna, INAA, and genetics. In this way, standardized data categories in spreadsheet format could be linked to the NVCRIS database and accessed by future researchers. A final item we would like to recommend is that electronic copies of survey notes, photographs, shape files, and other data should be curated each year with the Nevada State Museum or other curation facility. Other states, such as Arizona, curate all survey records each year; however there is not a requirement in Nevada to do so.

In summary, new scientific methods will make it possible to answer some key questions that have remained elusive. Prehistoric components can be sorted out with thermoluminescence, obsidian hydration, and radiocarbon methods. Ancient DNA, extracted from radiocarbon-dated coprolites and agave quids can provide information on health, diet, and population continuities/discontinuities. Turquoise, shell, and obsidian sourcing information, once organized in an accessible format, can be used to track trade networks and changes in trade routes through time. In his autobiography, Jesse Jennings (1994) expressed concerns about the discipline's new focus on theory rather than on the search for new scientific methods to analyze artifacts and illuminate the past. Over the last decade exciting new techniques have been developed that have the potential to answer many questions that have eluded us. Even more important is the fact that these methods can be used on existing artifact collections, and additional excavation is not required.

REFERENCES CITED

Adams, Karen R., Cathryn M. Meegan, Scott G. Ortman, R. Emerson, Lindsay C. Werth, Deborah A. Muenchrath, Michael K. O'Neill, and Candice A. C. Gardner

2006 MAIS (Maize of American Indigenous Societies) Southwest: Ear Descriptions and Traits that Distinguish 27 Morphologically Distinct Groups of 123 Historic USDA Maize (*Zea mays* L. spp. *mays*) Accessions and Data Relevant to Archaeological Subsistence Models. Copyrighted manuscript on file with Karen R. Adams: kadams@crowcanyon.org. Viewable at http://farmingtonsc.nmsu.edu/documents/maissouthwestcopyrightedmanuscript1.pdf.

Adams, Kenneth D.

2003 Age and Paleoclimatic Significance of Late Holocene Lakes in the Carson Sink, NV, USA. *Quaternary Research* 60:294–306.

Adovasio, James M.

1986 Prehistoric Basketry. *Handbook of the North American Indians. Vol. 11: Great Basin.* Edited by Warren L. D'Azevedo. pp. 194–205, Smithsonian Institution, Washington D.C

Adovasio, James, M., and David R. Pedler

1994 A Tisket, Tasket: Looking at the Numic Speakers through the 'Lens' of a Basket. In *Across the West: Human Population Movement and the Expansion of the Numa*, edited by David B. Madsen and David Rhode, pp. 114-123. University of Utah Press, Salt Lake City.

Ahlbrandt, Thomas S., James B. Swinehart, and David G. Maroney

1983 Dynamic Holocene Dune Fields of the Great Plains and Rocky Mountain Basins, U.S.A. In *Aeolian Sediments and Processes*, edited by M. E. Brookfield and T. S. Ahlbrandt, pp. 374–406. Elsevier Scientific Publishing B. V., Amsterdam.

Ahlstrom, Richard V.N.

2003a *Archaeological Investigations in Clark County Wetlands Park: The 170-A Pipeline Project*. HRA, Inc. Archaeological Report No. 01-27. Submitted to the Southern Nevada Water Authority, Las Vegas and Bureau of Reclamation, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

2003b *The Las Vegas Wash Collections Project: Analysis of Artifacts and Biological Specimens from Past Archaeological Excavations in Clark County Wetlands Park, Southern Nevada.* HRA, Inc. Archaeological Report No. 01-01. Draft Report, submitted to the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City. HRA, Inc. Conservation Archaeology, Las Vegas.

2008a Re-Imagining the History of Maize Farming in the Las Vegas Valley. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 1–20. Nevada Archaeological Association, Las Vegas.

Ahlstrom, Richard V.N. (editor)

2005 *Desert Oasis. The Prehistory of Clark County Wetlands Park, Henderson, Nevada*. HRA Papers in Archaeology No. 4. Prepared for the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

2008b *Persistent Place: Archaeological Investigations at the Larder and Scorpion Knoll Sites, Clark County Wetlands Park, Southern Nevada*. HRA Papers in Archaeology No. 7. HRA Inc., Conservation Archaeology, Las Vegas.

Ahlstrom, Richard V.N., and Jerry D. Lyon
2004 Las Vegas Valley Site Distribution Analysis. In *An Archaeological Survey for the Las Vegas Valley Disposal Boundary Environmental Impact Statement, Clark County, Nevada*, pp. 261–281. BLM Report No. 5-2467. Archaeological Report No. 03-15. HRA, Inc., Conservation Archaeology, Las Vegas.

Ahlstrom, Richard V.N., and Heidi Roberts
1999 *Archaeology at the Apex: A Site Location Model in the Las Vegas Valley, Clark County, Nevada*. Prepared for NECI, Henderson, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.
2001a *Archaeological Test Excavations at Sites 26CK1282 and 26CK1474, Clark County Wetlands Park, Southern Nevada*. HRA, Inc. Archaeological Report No. 00-07. Submitted to the Southern Nevada Water Authority, Las Vegas. HRA, Inc., Conservation Archaeology, Las Vegas.
2001b Desert Pavement and Buried Archaeological Features in the Arid West: A Case Study from Southern Arizona. *Journal of California and Great Basin Anthropology* 23(1):1-26.
2004 Native American Exploitation of Wetland Habitats in the Las Vegas Valley, Southern Nevada. Paper presented at the 39th annual meeting of the Society for American Archaeology, Montreal.
2008 Who Lived on the Southern Edge of the Great Basin? In *The Great Basin: People and Place in Ancient Times*, edited by Catherine S. Fowler and Don D. Fowler, pp. 129–136. School for Advanced Research Press, Santa Fe.

Ahlstrom, Richard V.N., and Heidi Roberts (editors)
2001c *Archaeology at the Apex: Excavations in the Apex Project Area, Southern Nevada*. HRA Papers in Archaeology No. 2. HRA, Inc., Conservation Archaeology, Las Vegas.

Ahlstrom, Richard V.N., Suzanne Eskenazi, and Heidi Roberts (editors)
2004 *An Archaeological Survey for the Las Vegas Valley Disposal Boundary Environmental Impact Statement, Clark County, Nevada*. BLM Report No. 5-2467. HRA, Inc. Archaeological Report No. 03-15. HRA, Inc., Conservation Archaeology, Las Vegas.

Ahlstrom, Richard V.N., Claudia Woodman, and Heidi Roberts
2001 *Archaeological Survey along the Channel of the Muddy River near Overton, Clark County, Nevada*. HRA, Inc. Archaeological Report No. 01-06. HRA, Inc., Conservation Archaeology, Las Vegas.

Aikens, C. Melvin
1965 *Excavations in Southwest Utah*. University of Utah Anthropological Papers No. 76. Glen Canyon Series No. 27. University of Utah Press, Salt Lake City.
1994 Adaptive Strategies and Environmental Change in the Great Basin and Its Peripheries as Determinants in the Migrations of Numic-Speaking Peoples. In *Across the West: Human Population Movement and the Expansion of the Numa*. Edited by David B. Madsen and David Rhode, pp. 35–43, University of Utah Press, Salt Lake City.

Aikens, C. Melvin and Younger T. Witherspoon
1986 Great Basin Numic Prehistory: Linguistics, Archaeology, and Environment. In *Anthropology of the Desert West: Essays in Honor of Jesse D. Jennings*, Edited by Carol Condie and Don D. Fowler, pp. 7–20. University of Utah Anthropological Papers No. 110, University of Utah Press, Salt Lake City.

Alley, R. B., J. Marotzke, W. D. Nordhaus, J. T. Overpeck, D. M. Peteet, D. M. Pielke, R. T. Pierrehumbert, P. B. Rhines, T. F. Stocker, L. D. Talley, and J. M. Wallace
2003 Abrupt Climate Change. *Science* 299:2005–2010.

Allison, James R.
1996 Comments on the Impacts of Climatic Variability and Population Growth on Virgin Anasazi Cultural Development. *American Antiquity* 61(2):414–418.
2000 Craft Specialization and Exchange in Small-scale Societies: A Virgin Anasazi Case Study. Unpublished Ph.D. dissertation, Department of Anthropology, Arizona State University, Tempe.

Allison, James R., Cathryn M. Meegan, and Shawn Sabrina Murray
2008 Archaeology and Archaeobotany of Southern Paiute Horticulture in the Saint George Basin, Southwestern Utah. *Kiva* 73(4): 417–448.

Altschul, Jeffrey H., and Joseph A. Ezzo
1995 Ceremony and Warfare Along the Lower Colorado River During the Protohistoric Period. *Proceedings of the Society of California Archaeology* 8:133–145.

Altschul, Jeffrey H., and Helen C. Fairley
1989 *Man, Models and Management: An Overview of the Archaeology of the Arizona Strip and the Management of its Cultural Resources.* Prepared for USDA, U.S. Forest Service and USDI, Bureau of Land Management. Statistical Research, Plateau Archaeology, and Dames & Moore.

Ambler, J. Richard, and Mark Q. Sutton
1989 The Anasazi Abandonment of the San Juan Drainage and the Numic Expansion. *North American Archaeologist* 10(1):39-54.

Amsden, Charles A.
1937 The Lake Mojave Artifacts. In *The Archaeology of Pleistocene Lake Mojave*, by Elizabeth W. Campbell, William H. Campbell, Ernst Antevs, Charles A. Amsden, Joseph A. Barbieri, and Francis D. Bode, pp. 51–95. Southwest Museum Papers 11, Los Angeles.

Anderson, Kirk C., and Stephen G. Wells
2003 Latest Quaternary Paleohydrology of Silurian Lake and Salt Spring Basin, Silurian Valley, California. *Geological Society of America, Special Paper* 368:129–141.

Antevs, Ernst
1948 Climatic Changes and Pre-White Man. In *The Great Basin, with Emphasis on Glacial and Post-Glacial Times.* University of Utah Bulletin 38(20):168–191.
1955 Geologic-Climatic Dating in the West. *American Antiquity* 20:317–355.

Apple, Rebecca McCorkle
2005 Pathways to the Past. *Proceedings of the Society for California Archaeology* 18:105–111.

Aveni, Anthony
1993 *Ancient Astronomy.* Smithsonian Books, Washington, D.C.
2008 *People and the Sky: Our Ancestors and the Cosmos.* Thames & Hudson, New York.

Bachand, Holly, Rosemary A. Joyce and Julia A. Hendon
2003 Bodies Moving in Space: Ancient Mesoamerican Sculpture and Embodiment. *Cambridge Archaeological Journal* 13:238-247.

Bailey, G. N.,
1983 Concepts of time in quaternary prehistory. *Annual Review of Anthropology* 12:165-192.

Bagnold, R. A.
1941 *The Physics of Blown Sand and Desert Dunes*. Methuen, London.

Baksh, Michael
1994 Ethnographic and Ethnohistoric Insights Into the Quien Sabe Intaglios. In *Recent Research Along the Lower Colorado River*, edited by Joseph A. Ezzo, pp. 15–48 . Statistical Research Technical Series 51:15–48. Statistical Research, Tucson.
1997 *Native American Consultation for the Chemgold Imperial Project*. Tierra Environmental Services, San Diego. Document on file, USDI, Bureau of Land Management, El Centro, California.

Baldwin, Gordon C.
1943 Archaeological Survey of the Davis Dam Reservoir Area. Manuscript. U.S. Department of the Interior, National Park Service, Boulder Dam National Recreation Area.
1948 Archaeological Surveys and Excavations in the Davis Dam Reservoir Area. Manuscript on file, National Park Service, Region 3, Lake Mead Recreation Area, Boulder City, Nevada.

Barber, Edwin A.
1876 Bead Ornaments Employed by the Ancient Tribes of Utah and California. *Bulletin of the U.S. Geological and Geographical Survey of the Territories* 2(1):67–69.
1877 Stone Implements and Ornaments from the Ruins of Colorado, Utah, and Arizona. *American Naturalist* 11(5): 264–275.

Barker, Pat
2008 Woven Sandals as Boundary Markers Between the Great Basin and Southwest Culture Areas. In *Past, Present, and Future Issues in Great Basin Archaeology: Papers in Honor of Don D. Fowler,* edited by Bryan Hockett, pp. 125–145, Cultural Resource Series No. 20. USDI, Bureau of Land Management, Nevada, Reno.

Barlow, K. Renee
2006 A Formal Model for Predicting Agriculture among the Fremont. In *Behavioral Ecology and the Transition to Agriculture*, edited by Douglas J. Kennett and Bruce Winterhalder, pp. 87–102. University of California Press, Berkeley.

Barrett, John C.
1992 *Fragments from Antiquity*: *An archaeology of social life in Britain, 2900-1200 BC*. Blackwell, Oxford.

Basgall, Mark E.
2000 The Structure of Archaeological Landscapes in the North-Central Mojave Desert. In *Archaeological Passages, a Volume in Honor of Claude Nelson Warren,* edited by Joan S. Schneider, Robert M. Yohe II, and Jill K. Gardner, pp. 123–138. Western Center for Archaeology & Paleontology Publication in Archaeology Number 1, Hemet, California.

Basgall, Mark E. and M.C. Hall
1992 Fort Irwin Archaeology: Emerging Perspectives on Mojave Desert Prehistory. *Society for California Archaeology Newsletter* 26(5):1–7.

Bean, George W.
1972 The Journal of George W. Bean. *Nevada Historical Society Quarterly* 15(3):3–29.

Bean, Lowell
1976 Power and its Applications in Native California. In *Native Californians: A Theoretical Retrospective*. Edited by L. J. Bean and T. C. Blackburn, Pp407-420. Romona, California; Ballena Press.

Beck, Charlotte, and George T. Jones
1997 The Terminal Pleistocene/Early Holocene Archaeology of the Great Basin. *Journal of World Prehistory* 11:161–236.
2009 *The Archaeology of the Eastern Nevada Paleoarchaic, Part 1: The Sunshine Locality*. University of Utah Anthropological Papers No. 126, University of Utah Press, Salt Lake City.
2010 Clovis and Western Stemmed: Population Migration and the Meeting of Two Technologies in the Intermountain West. *American Antiquity* 75(1):81–116.

Bednarik, Robert G.
2001 Rock Art Science: The scientific study of palaeoart. International Federation of Rock Art Organizations, vol. 1. Brepols, Turnhout, Belgium.

Bee, Robert L.
1983 Quechuan. In *Southwest*, edited by Alfonso Ortiz, pp. 86-98. Handbook of North American Indians Vol. 10. Smithsonian Institution, Washington, D.C.

Bedwell, Stephen F.
1973 *Fort Rock Prehistory and Environment*. University of Oregon Books, Eugene.

Begole, Robert S.
1973 An Archaeological Survey of the Anza-Borrego Desert State Park: 1972 Preliminary Report. *Pacific Coast Archaeological Survey Quarterly* 9:2.
1974 Archaeological Phenomena in the California Desert. *Pacific Coast Archaeological Survey Quarterly* 10:2.

Benedict, James B., and Byron L. Olson
1978 *The Mount Albion Complex: A Study of Prehistoric Man and the Altithermal*. Research Report No. 1. Center for Mountain Archeology, Ward, Colorado.

Bennyhoff, James A., and Robert F. Heizer
1958 Cross-Dating Great Basin Sites by California Shell Beads. In *Current Views on Great Basin Archaeology*. University of California Archaeological Survey Reports 42:60–92. Berkeley.

Bennyhoff, James A., and Richard E. Hughes
1987 *Shell Bead and Ornament Exchange Networks between California and the Western Great Basin*. Anthropological Papers of the American Museum of Natural History Vol. 64, No. 2. American Museum of Natural History, New York.

Benson, Larry V.
2004 Western Lakes. In *The Quaternary Period of the United States, Developments in Quaternary Science 1*, edited by Jim Rose, pp. 185–204. Elsevier, New York.

Benson, Larry V., and Robert S. Thompson
1987 The Physical Record of Lakes in the Great Basin. In *North America and Adjacent Oceans during the Last Deglaciation*, edited by W. F. Ruddiman and H. E. Wright, Jr., pp. 241–260. The Geology of North America Vol. K-3. The Geological Society of America, Boulder, Colorado.

Benson, Larry V., D. R. Currey, R. I. Dorn, K. R. Lajoie, C. G. Oviatt, S. W. Robinson, G. I. Smith, and S. Stine
1990 Chronology of Expansion and Contraction of Four Great Basin Lake Systems during the Past 35,000 Years. *Palaeogeography, Palaeoclimatology, Palaeoecology* 78:241–286.

Benson, Larry V., Michaele Kashgarian, and Meyer Rubin
1995 Carbonate Deposition, Pyramid Lake Subbasin, Nevada: 2. Lake Levels and Polar Jet Stream Positions Reconstructed from Radiocarbon Ages and Elevations of Carbonate Deposits (tufas). *Palaeogeography, Palaeoclimatology, Palaeoecology* 117:1–30.

Benson, Larry V., M. Kashgarian, R. Rye, S. Lund, F. Paillet, J. Smoot, C. Kester, S. Mensing, D. Meko, and S. Lindstrom
2002 Holocene Multidecadal and Multicentennial Droughts Affecting Northern California and Nevada. *Quaternary Science Reviews* 21:659–682.

Benson, Larry V., S. P. Lund, J. P. Smoot, D. E. Rhode, R. J. Spencer, K. L. Verosub, L. A. Louderback, C. A. Johnson, R. O. Rye, and R. M. Negrini
2011 The Rise and Fall of Lake Bonneville between 45 and 10.5 ka. *Quaternary International* 235:57–69.

Bergin, K. A., C. S. Crownover, C. Stevens, R. Stockton, S. Vaughan, D. Jenkins, R. Brooks, D. D. Ferraro, A. Turner, L. Kirkberg, P. Olsen, R. Maus, G. Stough, R. Scheuch, and G. Tullis
1979 *Final Report on the 1978 Archaeological Investigations of the Nellis Bombing and Gunnery Ranges, Nye, Lincoln, and Clark Counties, Nevada.* Archaeological Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Bettinger, Robert L.
1994 How, When, and Why Numic Spread. In *Across the West: Human Population Movement and the Expansion of the Numa,* edited by David B. Madsen and David Rhode, pp. 44–55, University of Utah Press, Salt Lake City.

Bettinger, Robert L., and Martin A. Baumhoff
1982 The Numic Spread: Great Basin Cultures in Competition. *American Antiquity* 47:485–503.

Binford, Lewis R.
1980 Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45:4–20.

Birnie, R. I.
1995a Alluvial and Aeolian Stratigraphy. In *Holocene Archaeology near Squaw Butte, Canyonlands National Park, Utah*, edited by Betsy L. Tipps, pp. 19–25. Submitted to National Park Service, Rocky Mountain Regional Office, Denver. Contract CX 1200-4-A063. Cultural Resources Report 411-04-9102.
1995b Paleoenvironmental Summary. In *Holocene Archaeology near Squaw Butte, Canyonlands National Park, Utah*, edited by Betsy L. Tipps, pp. 31–33. Submitted to National Park Service, Rocky Mountain Regional Office, Denver. Contract CX 1200-4-A063. Cultural Resources Report 411-04-9102.

Blair, Lynda M.
1986 A New Interpretation of Archaeological Features in the California Wash Region of Southern Nevada. Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.
1993 *Kern River Natural Gas Transmission Company Proposed Meter Station near Lone Mountain Road, Clark County, Nevada*. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas Report 5-150-8.

Blair, Lynda M., and Gregory R. Seymour
1998 *Mended Basket Rockshelter and Quarry. An Archaeological Excavation in the Southwestern Las Vegas Valley*. Report 5-164-6. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Blair, Lynda M. and Jeffrey R. Wedding
2001 *Archaeological Excavations for the Apex Land Exchange, Clark County, Nevada*, Vol. 1, *Rockshelters 26CK415, 26CK3780, and 26CK4415.* USDI, Bureau of Land Management Report No. 5-2377(P), Las Vegas. Report No. 5-164-13. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Blair, Lynda M., and Diane L. Winslow
2004 *Kern River 2003 Expansion Project, California,* Vol. 1. *Prehistoric Turquoise Mining in the Mojave Desert. Data from the Dr. Albert Mohr Collection*. Report 5-150-14(27). Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.
2006 *Firebrand Cave: An Archaic Ceremonial Site in Southern Nevada*. HRC Anthropological Series, Vol. 1, No. 1. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Blair, Lynda M., Diane L. Winslow, and Jeffrey R. Wedding.
2000 *Northern Beltway Data Recovery Program Archaeological Sites 26CK3799 and 26CK4908, Clark County, Nevada,* Vol. 1. BLM Report #5-2373.

Blair, Lynda M., Jeffrey R. Wedding, William G. White, Diane L. Winslow, Susan Murphy, David Smee, Wendy Andrejack, Amy Brock, and Jacob Ambos
2001 *Cultural Resource Class I and Class III Investigations for the Proposed 2003 Kern River Expansion Project, Nevada*. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas Report 5-150-14(1) prepared for Williams Gas Pipeline Company. USDI, Bureau of Land Management, Las Vegas, Report 5-2411.

Boas, Franz
1955 [1927] *Primitive Art*. Dover Publications, New York

Bolton, Herbert E. (editor)
1930 *Anza's California Expeditions.* 5 vols. University of California Press, Berkeley.

Bond, Gerard, William Showers, Maziet Cheseby, Rusty Lotti, Peter Almasi, Peter deMenocal, Paul Priore, Heidi Cullen, Irka Hajdas, and Georges Bonani
1997 A Pervasive Millennial-Scale Cycle in North Atlantic Holocene and Glacial Climates. *Science* 278:1257–1266.

Bourke, John G.
1889 Notes on the Cosmogony and Theogony of the Mojave Indians of the Rio Colorado, Arizona. *The Journal of American Folklore* 2(6):169–189.

Bowen, Nina
1992 *Utah Rock Art*, Volume X. Utah Rock Art Research Association, Salt Lake City.

Bradley, Richard
1990 *The Passage of Arms*. Cambridge University Press, Cambridge.
2000 *An Archaeology of Natural Places*. Routledge, London.

Bradley, W. Glen, and James E. Deacon
1967 The Biotic Communities of Southern Nevada. In *Pleistocene Studies in Southern Nevada*, edited by H. M. Wormington and Dorothy Ellis, pp. 201–298. Nevada State Museum Anthropological Papers 13. Carson City, Nevada.

Brand, Donald D.
1937 Aboriginal Trade Routes for Sea Shells in the Southwest. *Yearbook of the Association of Pacific Coast Geographers* 4. Los Angeles.

Brooks, Richard H., Daniel O. Larson, Kathryn Olson, Joseph King, Gregory King, Robert Leavitt, and Patricia Anderson
1975 *Prehistoric and Historic Research along the Navajo-McCullough Transmission Line Right-of-way*. Report No. 4-2-1. Nevada Archaeological Survey, University of Nevada, Las Vegas.

Brott, Clark W., Daniel F. McCarthy, Kathlyn Obendorfer-McGraw, and Mary L. Obendorfer
1984 *Archaeology in Panamint Dunes, 1983.* Great Basin Foundation, San Diego.

Broughton, Jack M., David B. Madsen, and Jay Quade
2000 Fish Remains from Homestead Cave and Lake Levels of the Past 13,000 Years in the Bonneville Basin. *Quaternary Research* 53:392–401.

Bryan, Alan L.
1980 The Stemmed Point Tradition: An Early Technological Tradition in Western North America. In *Anthropological Papers in Memory of Early H. Swanson, Jr.*, edited by L. B. Harten, C. N. Warren, and D. R. Tuohy, pp. 77–107. Special Publication of the Idaho Museum of Natural History, Pocatello.

Bryce, Sandra A., Alan J. Woods, James D Morefield, James M. Omernik, Thomas R. McKay, Gary K. Brackley, Robert K. Hall, Damian K. Higgins, David C. McMorran, Karen E. Vargas, Eric B. Petersen, Desiderio C. Zamudio, and Jeffery A. Comstock
2003 *Ecoregions of Nevada*. U.S. Geological Survey (scale 1:1,350,000). Reston, Virginia.

Bryson, Reid A.
1994 On Integrating Climatic Change and Culture Studies. *Human Ecology* 22(1):115–128.

Buck, Paul E.
1997 *Results of Archaeological Survey and Site Investigations for Year 2, Pintwater Cave Area Archaeological Research Program.* Desert Research Institute, Las Vegas. Submitted to Nellis Air Force Base, Contract No. F44650-94-D-0004/S401. Copies available from Nellis Air Force Base.

Buck, Paul E., and Anne DuBarton
1994 Archaeological Investigations at Pintwater Cave, Nevada, During the 1963–64 Field Season. *Journal of California and Great Basin Anthropology* 16(2):221–242.

Buck, Paul E., D.S. Amick, and W.T. Hartwell
1994 The Midway Valley Site (26NY4759): Prehistoric Lithic Quarry near Yucca Mountain, Nye County, Nevada. Topics in Yucca Mountain Archaeology No. 1. National Technical Information Service, Virginia.

Buck, Paul E., William T. Hartwell, Gregory Haynes, and David Rhode
1998 *Archaeological Investigations at Two Early Holocene Sites near Yucca Mountain, Nye County, Nevada*. Quaternary Sciences Center, Desert Research Center, Las Vegas.

Buckingham, S. E., J. W. Whitney, P. A. Glancy, and A. Ehrenberg
2004 *Accelerated Modern Erosion In Las Vegas Wash, Clark County, Nevada.* U.S. Geological Survey.

Bull, William B.
1991 *Geomorphic Responses to Climate Change*. Oxford University Press, Oxford.

Burke, R. M., and P. W. Birkeland
1983 Holocene Glaciation in the Mountain Ranges of the Western United States. In *The Holocene*, edited by H. E. Wright, Jr., pp. 2–11. Late-Quaternary Environments of the United States, Vol. 2. University of Minnesota Press, Minneapolis.

Burkholder, Grace
1990a Site Sheet for Site 26CK4553.On File at the State Historic Preservation Office Records Repository, Harry Reid Center for Environmental Research, University of Nevada, Las Vegas.
1990b Site Sheet for Site 26CK4631. On File at the State Historic Preservation Office Records Repository, Harry Reid Center for Environmental Research, University of Nevada, Las Vegas.
1995 *Perceptions of the Past: Solar Phenomena in Southern Nevada.* Graphics West, Las Vegas, Nevada.
2000 Something to Think About. *Nevada Archaeologist* 18:9–15.

Busacca, Alan J., James E. Beget, Helaine W. Markewich, Daniel R. Muhs, Nicholas Lancaster, and Mark R. Sweeney
2004 Eolian Sediments. In *The Quaternary Period of the United States, Developments in Quaternary Science* 1, edited by Jim Rose, pp. 275–309. Elsevier, New York.

Bush, B. Jane, and Sarah Bush
1993 *Utah Rock Art*, Vol. XI. Utah Rock Art Research Association, Salt Lake City.

Butzer, Karl W.
1982 *Archaeology as Human Ecology: Method and Theory for a Contextual Approach.* Cambridge University Press, London.

Byrd, Brian, D. Craig Young, and Kelly R. McGuire
2009 Pavement Quarries, Gypsum Period Residential Stability, and Trans-Holocene Settlement Systems in the Mojave Desert: A Case Study at Fort Irwin. *Journal of California and Great Basin Anthropology* 29:121–144.

Cachora, Lorey
1994 The Spirit Life of Yuman-Speaking Peoples: Lower Colorado River Between Arizona and California. In *Recent Research along the Lower Colorado River*, edited by Joseph A. Ezzo, pp. 13–14. Statistical Research Technical Series Vol. 51. Statistical Research, Tucson, Arizona.

Campbell, Elizabeth W., William H. Campbell, Ernst Antevs, Charles A. Amsden, Joseph A. Barbieri, and Francis D. Bode,
1937 *The Archaeology of Pleistocene Lake Mojave.* Southwest Museum Papers 11, Los Angeles.

Cannon, William J. and Mary Ricks
2007 Contexts in the Analysis of Rock Art: Rock Art and Settlement in the Warner Valley Area, Oregon. In *Great Basin Rock Art: Archaeological Perspectives*, edited by Angus R. Quinlan, pp. 107-125. University of Nevada Press, Reno and Las Vegas.

Caple, C.
2001 Overview-Degradation, Investigation, and Preservation of Archaeological Evidence. In *Handbook of Archaeological Sciences*, edited by D. R. Brothwell, and A. M. Pollard, pp. 587–593. John Wiley and Sons, West Sussex.

Castetter, Edward F., and Willis H. Bell
1951 *Yuman Indian Agriculture*. University of New Mexico Press, Albuquerque.

Castor, Stephen B., James E. Faulds, Stephen M. Rowland, and Craig M. dePolo
2000 *Geologic Map of the Frenchman Mountain Quadrangle, Clark County, Nevada*. Nevada Bureau of Mines and Geology Number 127. Nevada Bureau of Mines and Geology, Reno.

Cerveny, Niccole Villa, Russell Kaldenberg, Judyth Reed, David S. Whitley, Joseph Simon, and Ronald I. Down
2006 A New Strategy for Analyzing the Chronometry of Constructed Rock Features in Deserts. *Geoarchaeology: An International Journal* 21(3):281–303.

Christensen, Don D., and Jerry Dickey
2001 The Grapevine Style of the Eastern Mojave Desert of California and Nevada. In American Indian Rock Art, Vol. 27, edited by Steven L. Freers and Alanah Woody, pp. 185–200. American Rock Art Research Association, Tucson.
2008 The Grapevine Style Revisited: Patayan Rock Art in the Eastern Mojave Desert. In *Proceedings of the 2007 Three Corners Conference,* edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 59–78. Nevada Archaeological Association, Las Vegas.

Clark, Jeanne Wilson
1984 *Prehistoric Settlement in the Moapa Valley*. Anthropological Papers No. 19. Nevada State Museum, Carson City.

Clarke, Michèle L., and Helen M. Rendell
1998 Climatic Change Impacts on Sand Supply and the Formation of Desert Sand Dunes in the Southwest USA. *Journal of Arid Environments* 39:517–532.

Cleland, James H.
2005 The Sacred and the Mundane-Cultural landscape Concepts and Archaeological Interpretation in the Colorado Desert. *Proceedings of the Society for California Archaeology* 18: 131-136.
2008a Ethnographic Trail Systems as Large-Scale Cultural Landscapes: Preservation and Management Issues. In *Exploring the Boundaries of Historic Landscape Preservation*. *Proceedings of the Twenty-ninth Annual Meeting of the Alliance for Historic Landscape Preservation 2007*, edited by Cari Goetcheus and Eric McDonald, pp. 41–55. Clemson University Digital Press, Clemson, South Carolina.
2008b Large Scale Ethnographic Landscapes in the Three-Corners. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 79–86. Nevada Archaeological Association, Las Vegas.

Cleland, James H., et al. (unlisted)
1986 *Kern River Pipeline Cultural Resource Overview*. Dames & Moore, BLM Report No. 5-1737.

Clements, Lydia
1956 Inferences Regarding the Ancient Habitation of Panamint Valley, California. *Masterkey* 30(6):184–190.

Clements, Lydia, and Thomas Clements
1953 Evidence of Pleistocene Man in Death Valley. *Geologic Society of America Bulletin* 64: 1189–1204.

Clewlow, C. W., Jr. and H. F. Wells
1980 Test Excavations at Bird Springs, Clark County, Nevada (26CK1). Report on file at the Archaeological Research Center, Harry Reid Center, University of Nevada, Las Vegas.

COHMAP Members
1988 Climatic Changes of the Last 18,000 Years: Observations and Model Simulations. *Science* 241:1043–1052.

Coles, John
1987 Preservation of the Past: The Case for Wet Archaeology. In *European Wetlands and Prehistory,* edited by John M. Coles and Andrew J. Lawson. Clarendon Press, Oxford.

Colton, Harold S.
1941 Prehistoric Trade in the Southwest. *The Scientific Monthly* 52: 208–219.
1945 The Patayan Problem in the Colorado River Valley. *Southwestern Journal of Anthropology* 1(1):114–121.

Coltrain, Joan Brenner, Joel C. Janetski, and Shawn W. Carlyle
2007 The Stable-and Radio-Isotope Chemistry of Western Basketmaker Burials: Implications for Early Puebloan Diets and Origins. *American Antiquity* 72:301-321.

Conkey, Margaret W.
1990 Experimenting with Style in Archaeology: Some Historical and Theoretical Issues. In *The Uses of Style in Archaeology*, edited by Margaret W. Conkey and Christine Hastorf, pp. 5–17. Cambridge University Press.

Cordell, Linda
1997 *Prehistory of the Southwest,* second edition. Academic Press, Orlando, Florida.

Coulam, Nancy J. and Alan R. Schroedl
2004 Late Archaic Totemism in the Greater American Southwest. *American Antiquity* 69:41–62.

Crafford, A. Elizabeth Jones
2007 *Geologic Map of Nevada*. U.S. Geological Survey Data Series 249, 1 CD-ROM, 46 p., 1 plate.

Cronyn, J. M.
2001 The Deterioration of Organic Materials. In *Handbook of Archaeological Sciences*, edited by D. R. Brothwell, and A. M. Pollard, pp. 628–636. John Wiley and Sons, West Sussex.

Crownover, C. S.
1981 *An Archaeological Survey of Targets and Support Facilities of the Nellis Air Force Bombing and Gunnery Ranges in Nye, Lincoln and Clark Counties, Nevada.* Archaeological Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Crownover, Scott, Robert Leavitt, and Richard H. Brooks
1978 *Archaeological Test Excavations at Site 26CK1333, Grapevine Springs, Las Vegas, Nevada.* Prepared for the Bureau of Reclamation, Boulder City Nevada. Purchase Order No. 8-07-30-X0048, ARS Report 1-3-8. Division of Environmental Assessment, Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Cunningham, Arme L.
1978 *Analysis of the Interrelationships of Archaeological Survey Assemblages: An Approach to Petroglyphs*. M.A. Thesis, Department of Anthropology, University of Nevada, Las Vegas.

Currey, Donald R.
1991 *Hemiarid Lake Basins: Hydrographic and Geomorphic Patterns*. Department of Geography, University of Utah, Salt Lake City.

Dansie, Amy
1982 Earth Surface Features. In *An Archaeological Element for the Nevada State Historic Preservation Plan,* coordinated by Margaret M. Lyneis, pp. 277–304. Nevada State Historic Preservation Office, Carson City.

Daron, Steven
1995 IMACS Site Form for 26CK5221. On file at the Southern Nevada SHPO Data Repository, Harry Reid Center, Barrick Museum of Natural History, University of Nevada Las Vegas, Las Vegas.

Daubenmire, R.
1952 Forest Vegetation of Northern Idaho and Adjacent Washington, and its Bearing on Concepts of Vegetation Classification. *Ecological Monographs* 22:301–330.

Davide, Robert, Jerry D. Lyon, Suzanne Eskenazi, and Christopher Harper
2010 *Archaeological Testing at the Fairbanks Spring Site (26NY1729), Ash Meadows National Wildlife Refuge, Nye County, Nevada*. Draft Report. Prepared for U.S. Fish and Wildlife Service, Ash Meadows National Wildlife Refuge. HRA, Inc. Archaeological Report No. 08-19. HRA, Inc., Conservation Archaeology, Las Vegas.

Davis, C. Alan, and Gerald A. Smith
1981 *Newberry Cave*. San Bernardino County Museum Association, Redlands, California.

Davis, Emma Lou
1981 Shamanism and Ikonography of Paleoindians. *Archaeological Survey Association of Southern California Journal* 5(1): 35–42.
1983 Shamanic Dreams and Dying Lakes. In *Civilization and Catastrophe*, edited by Elizabeth Baity. University of Texas Press, Austin.

Davis, Emma Lou, and Sylvia Winslow
1965 Giant Ground Figures of the Prehistoric Deserts. *Proceedings of the American Philosophical Society* 109(1): 8–21.

Davis, Emma Lou, Kathryn M. Brown, and Jacqueline Nichols
1980 Evaluation of Early Human Activities and Remains in the California Desert. In *Cultural Resources Publication Anthropology-History.* USDI, Bureau of Land Management, California Desert District, Riverside.

Davis, James T.
1974 *Trade Routes and Economic Exchange among the Indians of California*. Publications in Archaeology, Ethnology, and History No. 3. Ballena Press, Ramona, California. Originally published 1961, as University of California Archaeological Survey Reports 54, Berkeley.

Davis, Jonathan O., and Robert Elston
1972 New Stratigraphic Evidence of Late Quaternary Climatic Change in Northwestern Nevada. In *Great Basin Cultural Ecology: A Symposium*, edited by Don D. Fowler, pp. 43–55. Desert Publications in the Social Sciences No. 8. Desert Research Institute, Reno.

Davis, Owen K., and William D. Sellers
1994 Orbital History and Seasonality of Regional Precipitation. *Human Ecology* 22(1):97–113.

Davis, Thompson P.
1988 Holocene Glacier Fluctuations in the American Cordillera. *Quaternary Science Reviews* 7(2):129–157.

Deal, Michael
1985 Household Pottery Disposal in the Maya Highlands: An Ethnoarchaeological Interpretation. *Journal of Anthropological Archaeology* 4:243–291.

Dean, Jeffery S., Robert C. Euler, George J. Gumerman, Fred Plog, Richard H. Hevly, and Thor N. V. Karlstrom
1985 Human Behavior, Demography, and Paleoenvironment on the Colorado Plateaus. *American Antiquity* 50(3):537–554.

Dickerson, Robert P.
2006 *Old Lakes and Young Playas*: *The Nellis Air Force Base Geologic Study and Quaternary History of Four Playas on the Nevada Test and Training Range*. Morgan Printing, Austin, Texas.

Diehl, Michael W.
2005 When Corn Was Not Yet King. In *Subsistence and Resource Use Strategies of Early Agricultural Communities in Southern Arizona*, edited by Michael W. Diehl, pp. 1–18. Anthropological Papers No. 34. Center for Desert Archaeology, Tucson.

Dobyns, Henry F., Paul H. Ezell, Alden W. Jones, and Greta Ezell
1957 Thematic Changes in Yuman Warfare. In *Cultural Stability and Cultural Change,* edited by Verne F. Ray, pp. 46–71. American Ethnological Society, Seattle.

Dohrenwend, J. C.
1987 Basin and Range. In *Geomorphic Systems of North America,* edited by William L. Graf, pp. 303–342. Geological Society of America Centennial Special, Vol. 2. Boulder, Colorado.

Dohrenwend, J. C., W. B. Bull, L. D. McFadden, G. I. Smith, R. U. Smith, and S. G. Wells
1991 Quaternary Geology of the Basin and Range Province in California. In *Quaternary Nonglacial Geology: Conterminous U.S.*, edited by R. B. Morrison, pp. 321–352. The Geology of North America, Vol. K-2. Geological Society of America, Boulder, Colorado.

Doolittle, Christopher J., and Joseph A. Ezzo
1995 *A Noncollection Cultural Resources Survey and Inventory of 2,250 Acres South of Ehrenberg, Yuma County, Arizona*. Statistical Research Report No. 95-9. Statistical Research, Inc., Tucson, Arizona.

Down, R.I., P.B. Clarkson, M.F. Nobbs, L.L. Loendorf, and D.S. Whitley
1992 New Approach to the Radiocarbon Dating of Rock Varnish with Examples from Drylands. *Annals of the Association of American Geographers* 82:136–151.

DuBarton, Anne
2003 *Archaeological Investigations of Nine Sections in the Summerlin West Development Project, Las Vegas, Nevada.* Report prepared by SWCA Environmental Consultants, Tucson.

Duke, Daron G., and Mark C. Slaughter
2000a *Research Design for a 2,000-Acre sample Survey on the South Range, Nellis Air Force Base, Nevada.* Submitted to U.S. Army Corps of Engineers, Fort Worth District and Nellis Air Force Base, Las Vegas, Contract No. DACA 63-95-D-0051. Copies available from Harry Reid Center for Environmental Excellence, Las Vegas.
2000b *A Field Test of the Traveler-Processor Model on the South Range, Nellis Air Force Base, Nevada*. Headquarters Air Combat Command, Nellis Air Force Base, Las Vegas.

Duke, Daron, Amy Gilreath, and Jerome King
2004 *Cultural Resources Survey (Random and Non-random) of the Sloan, NCA, Clark County, Nevada*. Report No. 5-2480-P. Prepared by Far Western Anthropological Group, Davis, California for Booz Allen Hamilton, Las Vegas. Submitted to the USDI, Bureau of Land Management, Las Vegas Field Office.

Dutton, Clarence E.
1886 Mount Taylor and the Zuni Plateau. In *Report of the Secretary of the Interior; being part of the Message and Documents Communicated to the Two Houses of Congress at the Beginning of the First Session of the Forty Ninth Congress in Five Volumes*, Vol. III, pp. 105–198. U.S. Government Printing Office, Washington, D.C.

Dyksterhuis, E. J.
1949 Condition and Management of Rangeland Based on Quantitative Ecology. *Journal of Range Management* 2:104–115.
1958 Ecological Principles in Range Evaluation. *The Botanical Review* 24:252–272.

Ebeling, W.
1986 *Handbook of Indian Foods and Fibers of Arid America.* University of California Press, Berkeley.

Eckerle, William
2002 *Geoarchaeological Evaluation of the Corn Creek Springs and Corn Creek Dunes Areas, Desert National Wildlife Refuge, Clark County, Nevada*. Western GeoArch Research, LLC. Submitted to HRA, Inc. Conservation Archaeology. Copies available from Western GeoArch Research, LLC, Salt Lake City.

Eckerle, William, and Sasha Taddie
2002 Modeled Paleoenvironmental and Archaeo-Resource Frames of Reference for the Southwestern Green River Basin. In *Data Recovery Excavations at Site 48UT375, Uinta County, Wyoming,* edited by Thomas P. Reust et al., pp. 171–196. Submitted to Pioneer Pipe Line Company by TRC Mariah Associates. Copies available from TRC Mariah Associates, Laramie, Wyoming.

Eckerle, William, Judson Finley, and Rebecca R. Hanna
2011a Data Collection Strategies for Assessing Artifact Zone Spatial and Associational Integrity on Sand Occupational Substrates. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V. N. Ahlstrom, pp. 167–182. SAA Press, Washington, D.C.

Eckerle, William, Eric Ingbar, Sasha Taddie, Judson Finley, Michael Drews, and Mary Hopkins
2011b Forecasting Landscape Settings Conducive to Site Burial. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V. N. Ahlstrom, pp. 99–113. SAA Press, Washington, D. C.

Eckerle, William, Marissa Taddie, and Eric Ingbar
2000 Potential Food Resource Distribution in the Seedskadee Land Exchange Area. *Brigham Young University Museum of Peoples and Cultures Technical Series* 99(3):437–450.

Eerkens, Jelmer W., Jector Neff, and Michael D. Glascock
2002a Ceramic Production among Small-Scale and Mobile Hunter and Gatherers: A Case Study from the Southwestern Great Basin. *Journal of Anthropological Archaeology* 21:200–229.
2002b Typologies and Classification of Great Basin Pottery. In *Ceramic Production and Circulation in the Greater Southwest,* edited by Donna M. Glowacki and Hector Neff, pp. 140–151. Monograph 44. The Cotsen Institute of Archaeology, University of California, Los Angeles.

Ellis, Robert, Mike Moen, and Richard Brooks
1978 *Archaeological Test Excavations in the Vicinity of Hacienda Avenue, Las Vegas, Nevada.* Prepared for the Bureau of Reclamation, Boulder City Nevada Purchase Order No. 8-07-30-X0048, ARS Report 1-3-8. Division of Environmental Assessment, Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Ellis, Robert R., Richard H. Brooks, Eileen Green, and Teri Swearingen
1982 *A Cultural Resources Survey and Limited Test Excavations in the Vicinities of Quail Point, Bunkerville Ridge, and Hackberry Spring, Virgin and Mormon Mountains, Southern Nevada*. BLM Report No. 5-1107 (HRC 2-5-8). Submitted to USDI, Bureau of Land Management, Las Vegas Field Office.

Ely, Lisa L., Yehouda Enzel, Victor R. Baker, and Daniel R. Cayan
1993 A 5000-Year Record of Extreme Floods and Climate Change in the Southwestern United States. *Science* 262:410–412.

Enfield, David B., Alberto M. Mestas-Nunez, and Paul J. Trimble
2001 The Atlantic Multidecadal Oscillation and its Relation to Rainfall and River Flows in the Continental U.S. *Geophysical Research Letters* 28:2077–2080.

Enzel, Yehouda, Lisa L. Ely, Juan Martinez-Goytre, and Vivian R. Gwinn
1994 Paleofloods and a Dam-Failure Flood on the Virgin River, Utah and Arizona. *Journal of Hydrology* 153(1–4):291–315.

Enzel, Yehouda, and Stephen G. Wells
1997 Extracting Holocene Paleohydrology and Paleoclimatology Information from Modern Extreme Flood Events: An Example from Southern California. *Geomorphology* 19:203–226.

Erlandson, Jon M., Torben C. Rick, Todd J. Braje, Molly Casperson, Brendan Culleton, Brian Fulfrost, Tracy Garcia, Daniel A. Guthrie, Nicholas Jew, Douglas J. Kennett, Madonna L. Moss, Leslie, Reeder, Craig Skinner, Jack Watts, and Lauren Willis
2011 Paleoindian Seafaring, Maritime Technologies, and Coastal Foraging on California's Channel Islands. *Science* 331:1181–1185.

Eskenazi, Suzanne
2010 Archaeological Survey of Arrow Canyon, Clark County, Nevada. Prepared by HRA Conservation Archaeology, Report No. 09-18. Report prepared for the Bureau of Land Management, Las Vegas Field Office. BLM Report No. 5-2649

Eskenazi, Suzanne, and Heidi Roberts
2011 Archaeological Testing at the Fairbanks Spring Site (26NY1729), Ash Meadows National Wildlife Refuge, Nye County, Nevada. HRA Inc. Report No 08-19.

Ezzo, Joseph A.
1994 *Recent Research along the Lower Colorado River*. Technical Series No. 51. Statistical Research, Inc., Tucson.
1995 *A Class I Cultural Resources Survey for the Southern Nevada Water Authority Treatment and Transmission Facility, Clark County, Nevada*. Technical Series No. 55. Statistical Research, Inc., Tucson.
1996 *A Class I Cultural Resources Survey of the Moapa and Virgin Valleys, Clark County, Nevada.* Technical Series No. 58. Statistical Research, Inc., Tucson.

Ezzo, Joseph A., and Jeffrey H. Altschul
1993a An Archaeological Survey of Pilot Knob, Imperial County, California: A Class III Cultural Resource Survey and Evaluation. In *Glyphs and Quarries of the Lower Colorado River Valley* by Joseph A. Ezzo and Jeffrey H. Altschul. Technical Series No. 44. Statistical Research, Inc., Tucson.
1993b An Archaeological Survey of Senator Wash, Imperial County, California. In *Glyphs and Quarries of the Lower Colorado River Valley,* by Joseph A. Ezzo and Jeffrey H. Altschul. Technical Series No. 44. Statistical Research, Inc., Tucson.
1993c *Glyphs and Quarries of the Lower Colorado River Valley*. Technical Series No. 44. Statistical Research, Inc., Tucson.

Ezzo, Joseph A., and Teresita Majewski
1995 Prehistory, Protohistory, and Ethnography. In *A Class I Cultural Resources Survey for the Southern Nevada Water Authority Treatment and Transmission Facility, Clark County, Nevada*, by Joseph A. Ezzo, pp. 35–74. Technical Series No. 55. Statistical Research, Inc., Tucson.

Fagan, Brian M.
2009 *In the Beginning,* twelfth edition. Prentice Hall, Upper Saddle River, New Jersey.

Fairley, Helen C.
2003 Changing River: Time, culture and the transformation of Landscape in the Grand Canyon: a regional research design for the study of Cultural Resources along the Colorado River in lower Glen Canyon and Grand Canyon National Park, Arizona. Tucson, Arizona: Statistical Research, Inc

Feng, Xiahong, and Samuel Epstein
1994 Climate Implications of an 8000-Year Hydrogen Isotope Time Series from Bristlecone Pine Trees. *Science* 265:1079–1081.

Fenneman, Nevin M.
1931 *Physiography of Western United States*. McGraw-Hill, New York.

Ferring, C. Reid
1986 Rates of Fluvial Sedimentation: Implications for Archaeological Variability. *Geoarchaeology* 1:259–274.

Fiero, Bill
2009 *Geology of the Great Basin.* University of Nevada Press, Reno.

Finley, Judson, William Eckerle, Aaron Geery, and Sasha Taddie
2009 *Geoarchaeological Analysis of 26CK7870, A Structure Associated with the Historic Bishop Ranch and Glendale Farm, Clark County Wetlands Park, Nevada*. Submitted to HRA, Inc., Conservation Archaeology, Las Vegas, Nevada. Copies available from Western GeoArch Research, Salt Lake City.

Flenniken, J. Jeffrey
2001 Flaked Stone from Survey and Testing. In *Archaeology at the Apex: Excavations in the Apex Project Area, Southern Nevada*, edited by Richard V.N. Ahlstrom and Heidi Roberts, pp. 79–90. Papers in Archaeology No. 2. HRA, Inc., Conservation Archaeology, Las Vegas.

Flenniken, J. Jeffrey (continued)
2003 Flaked Stone. In *The Las Vegas Wash Collections Project: Analysis of Artifacts and Biological Specimens from Past Archaeological Excavations in Clark County Wetlands Park, Southern Nevada*, edited by Richard V.N. Ahlstrom, pp. 97–119. HRA, Inc. Conservation Archaeology Report No. 01-01. Submitted to the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada.
2006 Technological Analysis of Flaked Stone Artifacts. In *A Room with a View: Data Recovery of an Early Historical Rockshelter Site Located in the Upper Moapa Valley, Clark County, Nevada*, edited by Christopher Harper, pp. 53–74. Papers in Archaeology No. 5. HRA, Inc., Conservation Archaeology, Las Vegas.

Forbes, Jack D.
1965 *Warriors of the Colorado.* University of Oklahoma Press, Norman.

Ford, Richard I.
1983 Inter-Indian Exchange in the Southwest. In *Southwest*, edited by Alfonso Ortiz, pp. 711–722. Handbook of North American Indians, Vol. 10, William C. Sturtevant, general editor, Smithsonian Institution, Washington D.C.

Forde, C. Daryll
1931 *Ethnography of the Yuma Indians*. University of California Publications in American Archaeology and Ethnology 28(4):83–278.

Forester, R. M., J. P. Bradbury, C. Carter, A. B. Elvidge-Tuma, M. L. Hemphi, S. C. Lundstrom, S. A. Mahan, B. D. Marshall, L. A. Neymark, J. B. Paces, S. E. Sharpe, J. E Whelan, and P. E. Wigand
1999 *The Climatic and Hydrologic History of Southern Nevada during the Late Quaternary*. Open-File Report No. 98-835. U.S. Geological Survey, Washington, D. C.

Fowler, Catherine S.
1982 Settlement Patterns and Subsistence Systems in the Great Basin: The Ethnographic Record. In *Man and Environment in the Great Basin*, edited by David B. Madsen and James F. O'Connell, pp. 121–138. SAA Papers No. 2. Society for American Archaeology, Washington D.C.
1983 Some Lexical Clues to Uto-Aztecan Prehistory. *International Journal of American Linguistics* 49:224–257.
1994a Material Culture and the Proposed Numic Expansion. In *Across the West: Human Population Movement and the Expansion of the Numa*, edited by D. B. Madsen and D. Rhode, pp. 103–113. University of Utah Press, Salt Lake City.
1994b *Native Americans and Yucca Mountain: 1994*. Contract report, submitted to Nevada Nuclear Waste Projects Office, Carson City.
1995 Some Notes on Ethnographic Subsistence Systems in Mojavean Environments in the Great Basin. *Journal of Ethnobiology* 15(1): 99–117.
1998 *Ethnohistory: Isabel Kelly's Data Relevant to the Site at Big Springs. Contribution to The Las Vegas Springs Heritage Site, Studies of a Cultural Landscape, Part 1*, by Gregory R. Seymour, pp. 1.84–1.94. Report No. 2-1-31.. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.
1999a Ethnohistory. In *Cultural Resource Management Plan for the Las Vegas Springs Preserve, Clark County, Nevada*, edited by Gregory R. Seymour. HRC Report 4-9-3. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Fowler, Catherine S. (continued)

1999b Current Issues in Ethnography, Ethnology and Linguistics. In *Models for the Millennium: Great Basin Anthropology Today*, edited by Charlotte Beck, pp. 53–61. University of Utah Press, Salt Lake City.

1999c In the Field in Death Valley: Julian Steward's Panamint Shoshone Fieldwork. In *Re-reading Julian Steward: Essays on Steward's Impact on Great Basin Anthropology*, edited by Richard Clemmer and Daniel Myers, pp. 134–152. University of Utah Press, Salt Lake City.

2004a Material Culture and Southern Paiute Ethnic Identity. In *Ethnic Identity in the Greater Southwest*, edited by Barbara Mills, pp. 135–148. University of Colorado Press, Boulder.

2004b Southern Paiute–Chemehuevi Trails Across the Mojave Desert: The Isabel Kelly Data, 1932-33. In *Faint Traces across the Land: The Archaeology of Trails*, edited by Andrew J. Darling and James E. Snead, vol. in preparation.

2004c What's In a Name? Southern Paiute Names for Springs as Keys to Their Environmental Perceptions. In *Spring-fed Wetlands: Important Scientific and Cultural Resources of the Intermountain West*, edited by D. W. Sada and S. E. Sharp. Desert Hydrology Series Publication 41210. Electronic publication, www.wetlands.dri.edu.

2006a A Numic Migration? Ethnographic Evidence Revisited. In *Migration and Anthropology: New Perspectives for a New Millennium*, edited by Graciela Carbana and Jeff Clark (interdisciplinary conference proceedings, AAA and Arizona State University, being edited for publication).

2006b Southern Paiute–Chemehuevi Trails across the Mojave Desert: Isabel Kelly's Data, 1932-33. For *Landscapes of Movement: Trails, Paths, and Roads in Anthropological Perspective*, edited by James Snead, Clark Erikson, and Andrew Darling (to be published by University Museum, University of Pennsylvania, based on special seminar held in May, 2006).

2009 Reconstructing Southern Paiute-Chemehuevi Trails in the Mojave Desert of Southern Nevada and California: Ethnographic Perspectives from the 1930s. In *Landscapes of Movement: Trails, Paths, and Roads in Anthropological Perspective,* edited by James E. Snead, Clark L. Erikson, and J. Andrew Darling, pp. 84–105. University of Pennsylvania Museum of Anthropology and Archaeology, Philadelphia.

2010 *Facing Snow Mountain: Las Vegas-Pahrump-Desert Southern Paiute Culture in the Late 19th Century.* Archaeological Report No. 07-28, HRA Inc., Conservation Archaeology, Las Vegas.

Fowler, Catherine S., and Don D. Fowler

1971 Notes on the History of the Southern Paiutes and Western Shoshonis. *Utah Historical Quarterly* 39(2):95–113.

1981 The Southern Paiute, A.D. 1400–1776. In *The Protohistoric Period in the North American Southwest, A.D. 1450-1700*, edited by D. Wilcox and B. Masse, pp. 129–162. Anthropological Paper No. 24. Arizona State University, Tempe.

Fowler, Catherine S, and Lawrence E. Dawson

1986 Ethnographic Basketry. In *Handbook of North American Indians: Great Basin*, edited by Warren L. d'Azevedo, Vol. 11, pp. 705–737. Smithsonian Institution, Washington D.C.

Fowler, Don D.

1986 History of Research. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 15–30. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor, Smithsonian Institution, Washington D.C.

2010 *A Laboratory for Anthropology: Science and Romanticism in the American Southwest, 1846–1930.* University of Utah Press, Salt Lake City.

Fowler, Don D., and Catherine S. Fowler (editors)
1971 *Anthropology of the Numa, John Wesley Powell's Manuscripts on the Numic Peoples of Western North America, 1868–1880*. Smithsonian Institution Press, Washington, D.C.

Fowler, Don D., and David B. Madsen
1986 Prehistory of the Southeastern Area. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 173–182. Handbook of North American Indians, Vol. 11, Williams C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Fowler, Don D., David B. Madsen, and Eugene M. Hattori
1973 *Prehistory of Southeastern Nevada*. Publication in the Social Sciences No. 6. Desert Research Institute, Reno, Nevada.

Fowler, Don D., and John F. Matley
1979 *Material Culture of the Numa: The John Wesley Powell Collection 1867–1880.* Contributions to Anthropology No. 26. Smithsonian Institution Press, Washington D.C.

Frison, George C., Eric E. Ingbar, and William P. Eckerle
1988 *Geoarchaeological Research and Archaeological Research in the Jackson Lake Reservoir Pool Area*, *1987*. Department of Anthropology, University of Wyoming. Submitted to the U.S. National Park Service, Midwest Archeological Center. Copies available from the University of Wyoming, Laramie.

Gabet, Emmanuel J., O. J. Reichman, and Eric W. Seabloom
2003 The Effects of Bioturbation on Soil Processes and Sediment Transport. *Annual Review of Earth and Planetary Sciences* 31:249–273.

Geib, Phil R., and Donald R. Keller
2002a Summary and Conclusion. In *Bighorn Cave. Test Excavations of a Stratified Dry Shelter, Mohave County, Arizona*, edited by Phil R. Geib and Donald R. Keller, pp. 191–200. Bilby Research Center Occasional Paper No. 1. Northern Arizona University, Flagstaff.

Geib, Phil R., and Donald R. Keller (editors)
2002b *Bighorn Cave. Test Excavations of a Stratified Dry Shelter, Mohave County, Arizona*. Bilby Research Center Occasional Paper No. 1. Northern Arizona University, Flagstaff.

Geib, Phil R., and Kimberly Spurr
2000 The Basketmaker II–III Transition on the Rainbow Plateau. In *Foundations of Anasazi Culture: the Basketmaker–Pueblo Transition*, edited by Paul F. Reed, pp. 175–200. University of Utah Press, Salt Lake City.

Giambastiani, Mark A., and Dayna R. Tinsley
2002 *Archaeology beyond the Virgin Valley: Class III Survey, Testing and Data Recovery for the Lincoln County Land Act, Mesquite, Nevada,* Vol. I. Albion Environmental, Inc., Santa Cruz, California and SWCA, Inc., Environmental Consultants, Reno.

Gifford, Diane P.
1978 Ethnoarchaeological Observations of Natural Processes Affecting Cultural Materials. In *Explorations in Ethnoarchaeology,* edited by R. A. Gould, pp. 77–101. University of New Mexico Press, Albuquerque.

Gifford, Diane P., and A. Kay Behrensmeyer
1976 Observed Depositional Events at a Modern Human Occupation Site in Kenya. *Quaternary Research* 8:245–266.

Gifford, Edward W.
1947 California Shell Artifacts. *University of California Anthropological Records* 9(1):1–114.
1949 Early Central Californian and Anasazi Shell Artifact Types. *American Antiquity* 15(2):156–157.

Gifford-Gonzalez, Diane P., David B. Damrosch, Debra R. Damrosch, John Pryor, and Robert L. Thunen
1985 The Third Dimension in Site Structure: An Experiment in Trampling and Vertical Dispersal. *American Antiquity* 5(4):803–818.

Gilreath, Amy J.
1999 The Archaeology and Petroglyphs of the Coso Rock Art Landmark. In *American Indian Rock Art,* Vol. 25, edited by Steven M. Freers, pp. 33–44. American Rock Art Research Association, Tucson.
2009 *Gypsum Cave Revisited*, Vol. I and II. Nevada Cultural Resources Report # CR5-2462-4(P). Far Western Anthropological Research Group, Davis, California.
2012 *Improving the Prehistoric Chronology for Southern Nevada*. Far Western Anthropological Research Group, Henderson, Nevada

Gilreath, Amy J. (editor)
2010 *Final Research Results for the Gold Butte Study Area, Clark County, Nevada,* Vol. I and II. USDI, Bureau of Land Management Report No. 5-2617. Far Western Anthropological Research Group, Davis, California.

Gilreath, A. J., G. Bengston, and B. Patterson,
2012 Ethnographic and Archaeological Inventory and Evaluation of Black Canyon, Lincoln County, Nevada. Vol. I. Report prepared for Far Western, Henderson, Nevada. Submitted to U.S. Fish and Wildlife Service, Portland, Oregon.

Gilreath, Amy J., and Daron G. Duke
2006 Archaeology of the Sloan Canyon National Conservation Area, Clark County, Nevada. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 169–186. Three Corners Conference, Las Vegas.

Gilreath, Amy J., Teresa Wriston, and Daron Duke
2007 *Mitigation of Eleven Prehistoric Sites in the HAMD 500 kV Corridor, Clark County, Nevada.* CR5-2462-3(P). Far Western Anthropological Research Group, Davis, California.

Glowacki, Donna M., and Hector Neff (editors)
2002 *Ceramic Production and Circulation in the Greater Southwest: Source Determination by INAA and Complementary Mineralogical Investigations*. Cotsen Institute of Archaeology, Monograph 44. Los Angeles.

Graf, Kelly E. and D. N. Schmitt (editors)
2007 *Paleoindian or Paleoarchaic? Great Basin Human Ecology at the Pleistocene-Holocene Transition.* University of Utah Press, Salt Lake City.

Grant, Campbell
1967 *Rock Art of the American Indian*. Promontory Press, New York.

Graumlich, Lisa J.
1993 A 1000-Year Record of Temperature and Precipitation in the Sierra Nevada. *Quaternary Research* 39:249–255.

Grayson, Donald K.
1982 Toward a History of Great Basin Mammals during the Past 15,000 Years. In *Man and Environment in the Great Basin*, edited by David B. Madsen and James F. O'Connell, pp. 82–101. SAA Papers No. 2. Society for American Archaeology, Washington, D.C.
1991 Late Pleistocene Mammalian Extinctions in North America: Taxonomy, Chronology, and Explanations. *Journal of World Prehistory* 5(3):193–231.
2000 Mammalian Responses to Middle Holocene Climatic Change in the Great Basin of the Western United States. *Journal of Biogeography* 27:181–192.

Green, Eileen M.
1987 A Cultural Ecological Approach to the Rock Art of Southern Nevada. Unpublished Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Green, Eileen M. and Elaine Holmes.
2001 Kohta Circus: A Mesoamerican connection. In *American Indian Rock Art, Volume 27*, edited by Steven M. Freers and Alanah Woody, pp. 293-299. American Rock Art Research Association, Tucson, Arizona.

Gregory, David A. and David R. Wilcox
2007 *Zuni Origins: Toward a Synthesis of Southwestern Archaeology.* University of Arizona Press, Tucson.

Greubel, Rand A.
2005a Formative Culture Boundaries and Definitions. In *Prehistoric Synthesis—Examination of Data by Archaeological Unit*, edited by Alan D. Reed, Matthew T. Seddon, and Heather K. Stettler, pp. 259–280. Kern River 2003 Expansion Project, Utah, Vol. 4.Alpine Archaeological Consultants, Montrose, Colorado, and SWCA Environmental Consultants, Salt Lake City.
2005b Subsistence during the Formative Period. In *Synthesis of Regional Archaeological Data*, Vol. 6, edited by Alan D. Reed, Matthew T. Seddon, and Heather K. Stettler, pp. 147-153. Kern River 2003 Expansion Project, Utah, Vol. 6. Alpine Archaeological Consultants Inc., Montrose, Colorado, and SWCA Environmental Consultants, Salt Lake City.

Gunnerson, James H.
1962 Plateau Shoshonean Prehistory: A Suggested Reconstruction. American Antiquity 28(1):41–45.

Haarklau, Lynn, Lynn Johnson, and David L. Wagner
2005 *Fingerprints in the Great Basin: The Nellis Air Force Base Regional Obsidian Sourcing Study*. Prepared for the U.S. Air Force, Air Combat Command, Contract No. DACA63-00-D-0006. Prewitt and Associates, Austin.

Hack, John T.
1941 Dunes of the Western Navajo Country. *Geographical Review* 31:240–263.

Haenszel, Arda M.
1978 The Topock Maze: Commercial or Aboriginal. *San Bernardino County Museum Quarterly* 26(1).
1981 Notes on the Historic Research at Topock Maze. *Footprints* (March):17–21.
1982 Giants Near Fort Mojave. *Journal of the Archaeological Survey Association of Southern California* 6(1):21–37.

Hall, Stephen A.
1990 Holocene Landscapes of the San Juan Basin, New Mexico: Geomorphic, Climatic, and Cultural Dynamics. In *Archaeological Geology of North America*, edited by N. P. Lasca and J. Donahue, pp. 323–334. Centennial Special, Vol. 4. Geological Society of America, Boulder, Colorado.

Harmon, Craig
2011 The Effect of Range Fires on Surface Artifact Scatters in Western Utah. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V. N. Ahlstrom, pp. 85–98. SAA Press, Washington, D. C.

Harner, Michael J.
1953 *Gravel Pictographs of the Lower Colorado River Region.* Reports of the University of California Archaeological Survey 20. Paper on California Archaeology No. 21. University of California, Berkeley.
1957 Potsherds and the Tentative Dating of the San Gorgonio-Big Maria Trail. *University of California Archaeological Survey Reports* 37:35–37.

Harper, Christopher
2001 Site Sheet for Site 26CK4553. On file at the State Historic Preservation Office Records Repository, Harry Reid Center for Environmental Research, University of Nevada, Las Vegas.
2006 *A Room with a View: Data Recovery of an Early Historical Rockshelter Site Located in the Upper Moapa Valley, Clark County, Nevada*. Papers in Archaeology No. 5. HRA, Inc., Conservation Archaeology, Las Vegas.
2012 Recordation and Evaluation of 20 Archaeological Sites within the Desert National Wildlife Refuge Complex, Clark County, Nevada. Submitted to the USFWS Desert National Wildlife Refuge. HRA Report 11-07. HRA, Inc., Conservation Archaeology, Las Vegas.

Harper, Christopher, Richard V.N. Ahlstrom, Suzanne Eskenazi, and Heidi Roberts
2002 *Archaeological Inventory of Bureau of Reclamation Lands In the Vicinity Of Davis Dam, Clark County, Nevada and Mojave County, Arizona*. BOR Cultural Resources Report No. Lc-Az-02-05; HRA, Inc. Archaeological Report No. 02-12. Prepared for the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

Harper, Christopher, Suzan Rose, and Christopher Young
2001 *Archaeological Investigation of the Bighorn Power Generation Facility, Primm to Arden Transmission Line and Ancillary Facilities Associated with the Bighorn Generation Project, Clark County, Nevada*. BLM Report No. 5-2408. URS Corporation, Las Vegas

Harper, Christopher, Suzan Rose, Dana Harper, and Tracy Henderson
2002 Archaeological Inventory of the Proposed Meadow Valley Generation Facility, including Electrical Transmission and Distribution Lines, Fresh and Wastewater Pipelines, Selected Land Exchange Parcels, and Ancillary Facilities, Associated with the Meadow Valley Generation Project, Clark and Lincoln Counties, Nevada. URS Project #66-00000070.01, BLM Cultural Resources Report Number 5-2422 (P). For the PG&E National Energy Group, Bethesda Maryland.

Harrington, John P.
1908 A Yuma Account of Origins. *Journal of American Folklore* 21(82):324.

Harrington, Marie
1985 *On the Trail of Forgotten People: A Personal Account of the Life and Career of Mark Raymond Harrington*. Great Basin Press, Reno.

Harrington, Mark R.
1925 Pueblo Site near St. Thomas, Nevada. *Indian Notes* 2(1):74–76. Museum of the American Indian, Heye Foundation, Washington, D.C.
1927 A Primitive Pueblo City in Nevada. *American Anthropologist* 29:262–277.
1929 An Archaeological Survey of the Lower Moapa Valley, Nevada. MS No. 214-34, Mark Raymond Harrington Collection, Southwest Museum, Los Angeles.
1930a Introduction. In *Archaeological Explorations in Southern Nevada*, pp. 1–25. Edited by M. R. Harrington, Irwin Hayden, and Louis Schellbach 3rd. Southwest Museum Papers No. 4. Los Angeles.
1930b Paiute Cave. In *Archaeological Explorations in Southern Nevada*, pp. 106–126. Southwest Museum Papers No. 4. Los Angeles.
1933 *Gypsum Cave, Nevada.* Southwest Museum Papers No. 8. Los Angeles.
1937a Ancient Nevada Pueblo Cotton. *The Masterkey* 11:5–7.
1937b Excavation of Pueblo Grande de Nevada. *Bulletin of the Texas Archaeological and Paleontological Society* 9:130–145.
1937c Some Early Pit-dwellings in Nevada. *The Masterkey* 11:122–124.
1942 Black Dog Cave. *The Masterkey* 16:173–174.

Harrington, Mark R., and Ruth D. Simpson
1961 *Tule Springs, Nevada with Other Evidences of Pleistocene Man in North America*. Southwest Museum Papers No. 18. Los Angeles.

Harry, Karen G.
2005 Ceramic Specialization and Agricultural Marginality: Do Ethnographic Models Explain the Development of Specialized Pottery Production in the Prehistoric American Southwest? *American Antiquity* 70(2):295–320.
2007 *Lost City Archival Project Finder's Guide*. Submitted to the Lake Mead National Recreation Area, National Park Service by the Department of Anthropology & Ethnic Studies and the Public Lands Institute, University of Nevada, Las Vegas. Great Basin Cooperative Ecosystems Studies Unit Cooperative Agreement No. H8R0706001.
2008a *Main Ridge 2006 Research Project: Condition Assessments, Test Excavations, and Data Analyses for the UNLV Fall 2006 Field School.* Prepared for the Lake Mead National Recreation Area. Department of Anthropology & Ethnic Studies and the Public Lands Institute, University of Nevada Las Vegas, Las Vegas.

Harry, Karen G. (continued)
2008b Seven Foot Giants and Silk-Clad Skeletons: A Voyeur's Look Back at the Discovery and Early Fieldwork of Nevada's "Lost City." In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 111–136. Nevada Archaeological Association, Las Vegas.

Harry, Karen G., and James T. Watson
2010 The Archaeology of Pueblo Grande de Nevada: Past and Current Research within Nevada's "Lost City." *Kiva* 78(4):403–424.

Harry, Karen G., Cheryl Gregory, and Leilani Espinda
2008 Lost City Archival Project Finder's Guide, Version 1.0. Document submitted to the Lake Mead National Recreation Area, National Park Service, by the Department of Anthropology & Ethnic Studies and the Public Lands Institute of the University of Nevada Las Vegas. Great Basin Cooperative Ecosystems Studies Unit, Cooperative Agreement No. H8R0801001 and Task Agreement No. J8R07050006. Document on file, Lake Mead National Recreation Area, Boulder City, Nev.

Harvey, Adrian M., and Stephen G. Wells
2003 Late Quaternary Variations in Alluvial Fan Sedimentologic and Geomorphic Processes, Soda Lake Basin, Eastern Mojave Desert, California. In *Paleoenvironments and Paleohydrology of the Mojave and Southern Great Basin Deserts*, edited by Y. Enzel, S. G. Wells and N. Lancaster, pp. 207–230. Special Paper No. 368. Geological Society of America, Boulder, Colorado.

Hatzenbuehler, Lynn
1992 Sunrise Mountains Rockshelters: Evidence of Aboriginal Use. Paper Presented at Nevada Archaeological Association Annual Meeting, Ely, Nevada.
1995 Defining Mojave Traditional Territory. *California Anthropologist* 22(1):13–22.

Hauck, F. R., D. G. Weder, L. Drollinger and A. McDonald
1979 *A Cultural Resource Evaluation in Clark County, Nevada: Part I: Cultural Resource Overview.* Paper No. 17. Archaeological Environmental Research Corporation, Salt Lake City.

Hayden, Irwin
1930 Mesa House. In *Archaeological Explorations in Southern Nevada*, pp. 26–92. Paper No. 4. Southwest Museum, Los Angeles.

Hayden, Julian D.
1965 Fragile-Pattern Areas. *American Antiquity* 31:272–276.
1982 Appendix I. Ground Figures of the Sierra Pinacate, Sonora, Mexico. In *Hohokam and Pathan: Prehistory of Southwestern Arizona*, edited by Randall H. McGuire and Michael B. Schiffer, pp. 581–588. Academic Press, New York.

Haynes, C. Vance
1967 Quaternary Geology of the Tule Springs Area, Clark County, Nevada. In *Pleistocene Studies in Southern Nevada*, edited by H. Marie Wormington and Dorothy Ellis, pp. 15–104. Anthropological Papers No. 13. Nevada State Museum, Carson City.
1991 Geoarchaeological and Paleohydrological Evidence for a Clovis-Age Drought in North America and its Bearing on Extinction. *Quaternary Research* 35:438–450.

Haynes, C. Vance (continued)
2007 Quaternary Geology of the Murray Springs Clovis Site. In *Murray Springs: a Clovis Site with Multiple Activity Areas in the San Pedro Valley, Arizona*, edited by C. V. Haynes, Jr. and Bruce B. Huckell, pp.16–56. Anthropological Papers No. 71. University of Arizona Press, Tucson, Arizona.
2008 Younger Dryas "Black Mats" and the Rancholabrean Termination in North America. *Proceedings of the National Academy of Sciences* 105:6520–6525.

Haynes, Gregory M.
1996 Evaluating Flake Assemblages and Stone Tool Distributions at a Large Western Stemmed Tradition Site near Yucca Mountain, Nye County, Nevada. *Journal of California and Great Basin Anthropology* 18(1):104–130.

Heald, W. F.
1967 *The Chiricahua Mountains*. University of Arizona Press, Tucson.

Hedges, Ken
1982 Great Basin Rock Art Styles: A Revisionist View. In *American Indian Rock Art,* Vols. 7 and 8, edited by Frank G. Bock, pp. 205–211. American Rock Art Research Association, El Toro, California.
1985 Rock Art Portrayals of Shamanic Transformation and Magical Flight. In *Rock Art Papers,* Vol. 2, edited by Ken Hedges, pp. 83–94. Museum Papers No. 18. Museum of Man, San Diego.
2001 Traversing the Great Gray Middle Ground: An Examination of Shamanistic Interpretation of Rock Art. In *American Indian Rock Art, Volume 27*, edited by Steven M. Freers and Alanah Woody, pp. 123-136. American Rock Art Research Association, Tucson.
2002 Rock Art Styles in Southern California. In *American Indian Rock Art, Volume* 28:25-40, edited by Steven M. Freers. American Rock Art Research Association, Tucson.

Heizer, Robert F. and Martin A. Baumhoff
1962 *Prehistoric Rock Art of Nevada and Eastern California*. University of California Press, Berkeley.

Heizer, Robert R., and Rainer Berger
1970 Radiocarbon Age of the Gypsum Dave Culture. *University of California Archaeological Research Facility Contributions* 7:13–18. Berkeley.

Heizer, Robert F. and Thomas R. Hester
1974 Two petroglyph sites in Lincoln County, Nevada. *Contributions of the University of California Archaeological Research Facility* 20 (1):1-52. Berkeley.

Hicks, Patricia A. Lonnie C. Pippin, and G. H. Henton
1991 *Inter and Intrasite Analyses of Cultural Materials from U20aw, Nye county, Nevada*. Technical Report No. 66. Desert Research Institute, Quaternary Sciences Center, Reno and Las Vegas.

Hildebrand, John A., G. Timothy Gross, Jerry Schaefer, and Hector Neff
2002 Patayan Ceramic Variability. In *Ceramic Production and Circulation in the Greater Southwest,* edited by Donna M. Glowacki and Hector Neff, pp. 121–139. Monograph No. 44. Cotsen Institute of Archaeology, University of California, Los Angeles.

Hildebrandt, William R. and Kelly R. McGuire
2002 The Ascendance of Hunting during the California Middle Archaic: An Evolutionary Perspective. *American Antiquity* 67:231–256.

Hill, Jane H.
2001 Proto-Uto-Aztecan: A Community of Cultivators in Central Mexico? *American Anthropologist* 103(4):913–934.
2002 Toward a Linguistic Prehistory of the Southwest: Azteco-Tanoan" and the Arrival of Maize Cultivation. *Journal of Anthropological Research* 58:457–475.

Hill, Joseph
1930 Spanish Exploration and Trade Northwest from New Mexico into the Great Basin. *Utah Historical Quarterly.*

Hockett, Brian Scott
2000 Paleobiogeographic Changes at the Pleistocene-Holocene Boundary near Pintwater Cave, Southern Nevada. *Quaternary Research* 53:263–269.

Hohmann, John W., Don W. Ryden, and Margaret "Peg" Davis
2000 *Preservation Plan for the Cultural Resources of the Old Las Vegas Mormon Fort*. Cultural Resource Publication No. 14. Berger/Ryden, Phoenix.

Hoisch, Thomas D.
2011 Description and Interpretation of Temper from Pottery in the Ash Meadows Area, Nevada. In *Shared Place: Cultural Landscapes in the Ash Meadows National Wildlife Refuge, Nye County, Nevada,* prepared by Jerry Lyon, Heidi Roberts, Richard V.N. Ahlstrom, Christopher Harper, Suzanne Eskenazi, Robert Davide, Catherine Fowler, and Elizabeth von Till Warren, pp. 115–130. Draft outreach report prepared for U.S. Fish and Wildlife Service. HRA Inc., Conservation Archaeology, Las Vegas.

Holliday, Vance T.
2000 Folsom Drought and Episodic Drying on the Southern High Plains from 10,900-10,200 C14 yr B.P. *Quaternary Research* 53:1–12.
2004 *Soils and Archaeological Research*. Oxford University Press, Oxford.

Holmgren, Camille A., Julio L. Betancourt, and Kate A. Rylander
2006 A 36,000-yr Vegetation History from the Peloncillo Mountains, Southeastern Arizona, USA. *Palaeogeography, Palaeoclimatology, Palaeoecology* 240:405–422.

Holmgren, Camille A., M. Cristina Penalba, Kate Aasen Rylander, and Julio L. Betancourt
2003 A 16,000 14C yr B.P. Packrat Midden Series from the USA-Mexico Borderlands. *Quaternary Research* 60:319–329.

Holmlund, James
1993 The Ripley Geoglyph Complex: Results of An Intensive Survey. In *Glyphs and Quarries of the Lower Colorado River Valley*. Technical Series No. 44. Statistical Research, Inc, Tucson, Arizona.

House, Kyle P., Heather Green, Abbey Grimmer, and Nevada Digital Dirt Mapping Team
2010 Preliminary Surficial Geologic Map of Clark County, Nevada. Nevada Bureau of Mines and Geology, Reno.

Huckleberry, Gary, Charlotte Beck, George T. Jones, Amy Holmes, Michael Cannon, Stephanie Livingston, and Jack M. Broughton
2001 Terminal Pleistocene/Early Holocene Environmental Change at the Sunshine Locality, North-Central Nevada, U.S.A. *Quaternary Research* 55:303–312.

Hughes, Richard E., and James A. Bennyhoff
1986 Early Trade. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 238–255. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor, Smithsonian Institution, Washington D.C.

Hughes, P. J., and R. J. Lampert
1977 Occupational Disturbance and Types of Archaeological Deposit. *Journal of Archaeological Science* 4:135–140.

Hulkrantz, Ake
1986 Mythology and Religious Concepts. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 630–640. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor, Smithsonian Institution, Washington D.C.

Hull, Sharon, Mostafa Fayek, Frances Joan Mathien, Phillip Shelley, and Kathy Roler Durand
2007 A New Approach to Determining the Geological Provenance of Turquoise Artifacts Using Hydrogen and Copper Stable Isotopes. *Journal of Archaeological Science* 35:1355–1369.

Hunt, Alice
1960 *Archaeology of the Death Valley Salt Pan, California.* Archaeological Papers No. 47. University of Utah Press, Salt Lake City.

Hunt, Alice P., and Charles B. Hunt
1964 Archeology of the Ash Meadows Quadrangle, California and Nevada. Manuscript on file, Death Valley National Monument, Death Valley, California.

Hunt, Charles
1975 *Death Valley: Geology, Ecology, Archaeology.* University of California Press, Berkeley.

Imbrie, J., and J. Z. Imbrie
1980 Modeling the Climatic Response to Orbital Variations. *Science* 207:943–953.

Inter-Tribal Council of Nevada
1976 *Nuwuvi: A Southern Paiute History*. Inter-Tribal Council of Nevada. University of Utah Press, Salt Lake City.

Jacobs, D., and R. Dunn
2008 Contextualizing Intaglios. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 143–150. Nevada Archaeological Association, Las Vegas.

Jahren, A. Hope, Ronald Amundson, Carol Kendall, and Peter Wigand
2001 Paleoclimatic Reconstruction Using the Correlation in Delta $\delta^{18}O$ of Hackberry Carbonate and Environmental Water, North America. *Quaternary Research* 56:252–263.

James, E. Henry
1996 15,000 Years of Human Trails in the Lake Manix Basin. *Proceedings of the Society for California Archaeology* 9:127–152.

Jenkins, Dennis L.
1981 Cliff's Edge: A Pueblo I Site on the Lower Virgin River. Unpublished Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.
1987 Dating the Pinto Occupation at Rogers Ridge: A Fossil Spring Site in the Mojave Desert, California. *Journal of California and Great Basin Anthropology* 9:214–231.

Jennings, Jesse D.
1957 *Danger Cave*. Anthropological Papers No. 27. University of Utah Press, Salt Lake City.
1986 Prehistory: Introduction. In, *Great Basin,* edited by Warren L. d'Azevedo, pp. 113–119. Handbook of the North American Indians, Vol. 11*,* William C. Sturtevant, general editor. Smithsonian Institution, Washington D.C.
1994 *Accidental Archaeologist: Memoirs of Jesse D. Jennings.* University of Utah Press, Salt Lake City.

Jennings, Jesse D. and Edward Norbeck
1955 Great Basin Prehistory: A Review. *American Antiquity* 21:1–11.

Jenny, Hans
1941 *Factors of Soil Formation.* McGraw-Hill, New York.

Jensen, Eva A., Gregory R. Seymour, and Laureen M. Perry
2006 "…From a Lump of Clay..." Replicating Prehistoric Pottery in the Moapa Valley. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 275–300. Three Corners Conference, Las Vegas.

Johnson, Boma
1984 *Cultural Resource Investigations in the Bullhead City Area for the BLM Land Disposal Program*. BLM Document No. 107-261/278-84-15. USDI, Bureau of Land Management, Yuma District Office, Yuma.
1985 Earth Figures of the Lower Colorado and Gila River Deserts: A Functional Analysis. *The Arizona Archaeologist* 20.
1991 Field Notes on file with USDI, Bureau of Land Management, Las Vegas District.
2001 Appendix D. A Cultural Resources Overview of the North Baja Pipeline Project. In *Cultural Resources Evaluation for the North Baja Gas Pipeline.* Archaeology Plus, Ivins, Utah.
2003 Geoglyphs Associated with the Xam Kwatcan Trail in the Palo Verde Point Area, South of Blythe, California. In *A View Across the Cultural Landscape of the Lower Colorado Desert: Cultural Resource Investigations for the North Baja Pipeline Project,* by James H. Cleland and Rebecca McCorkle, pp. 159–177. Prepared by EDAW Inc., San Diego.

Johnson, Donald L.
1989 Subsurface Stone Lines, Stone Zones, Artifact Manuport Layers, and Biomantles Produced by Bioturbation via Pocket Gophers (*Thomomys Bottae*). *American Antiquity* 54:292–326.

Johnson, Matthew
2004 *Archaeological Theory*. Blackwell, Cornwall.

Jones, Robert C., and Susan R. Edwards
1994 A Clovis Point on the Nevada Test Site. *Nevada Archaeologist* 16:18–23.

Justice, Noel
2002a *Stone Age Spear and Arrow Points of California and the Great Basin*. Indiana University Press, Bloomington.
2002b *Stone Age Spear and Arrow Points of the Southwestern United States*. Indiana University Press, Bloomington.

Kaestle, Frederika A. and David Glenn Smith
2001 Ancient Mitochondrial DNA Evidence for Prehistoric Population Movement: The Numic Expansion. *American Journal of Physical Anthropology* 115:1–12.

Karlstrom, Thor N. V.
1988 Alluvial Chronology and Hydrologic Change of Black Mesa and Nearby Regions. In *The Anasazi in a Changing Environment*, edited by G.J. Gumerman, pp. 45–91. Cambridge University Press, New York.

Kelly, Isabel T.
1932–1933 Southern Paiute Field Notes. Copies in possession of Catherine S. Fowler, University of Nevada, Reno.
1934 Southern Paiute Bands. *American Anthropologist* 36(4):548-560.
1964 *Southern Paiute Ethnography*. Anthropological Papers No. 69, Glen Canyon Series No. 21. University of Utah Press, Salt Lake City.

Kelly, Isabel T., and Catherine S. Fowler
1986 Southern Paiute. In *Great Basin*, edited by Warren d'Azevedo, pp. 368-397. Handbook of North American Indians, Vol. 11, Williams C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Kessler, M. A., and B. T. Werner
2003 Self-Organization of Sorted Patterned Ground. *Science* 17(299):380–383.

Khera, Sigrid, and Patricia S. Mariella
1983 Yavapai. In *Southwest*, edited by Alfonso Ortiz, pp. 38–54. Handbook of North American Indians, Vol. 10, William C. Sturtevant, general editor. Smithsonian Institution, Washington D.C.

King, Jerome, Allika Ruby, and Amy Gilreath
2006 *Mitigation of Sites 26CK6907 and 26CK6913, Northern Las Vegas Valley, Clark County, Nevada.* BLM Report No. 5-2524. Far Western Anthropological Research Group, Davis, California.

Kirkberg, Lysenda
1980 *Pueblo Grande De Nevada: A Record Reconciliation*. Prepared for the Division of Historic Preservation and Archaeology, Carson City.

Klasky, Philip M.
2009 *Salt Song Trail Map: The Sacred Landscape of the Nuwuvi People.* The Storyscape Project of the Cultural Conservancy, Department of American Indian Studies, San Francisco State University, San Francisco.

Klimowicz, Janis R.
1988 A Structural Analysis of Prehistoric Incised Stones from Southern Nevada. Unpublished Master's thesis, Department of Anthropology, University of Nevada, Reno.

Knack, Martha
1981 Ethnology. In *A Cultural Resources Overview of the Colorado Desert Planning Units*, by Elizabeth von Till Warren, Robert H. Crabtree, Claude Warren, Martha Knack, and Richard McCarty, pp. 55–82. Cultural Resources Publications: Anthropology-History. USDI, Bureau of Land Management, California Desert District, Riverside.

Knight and Leavitt Associates
2003 *Mitigation of Sites 26CK1169 and 26CK6573 in the Nevada State College Development Site, Henderson, Clark County, Nevada*. BLM Report No. 5-2460. Knight and Leavitt Associates, Las Vegas.

Kocurek, Gary
1981 Significance of Interdune Deposits and Bounding Surfaces in Aeolian Dune Sands. *Sedimentology* 28:753–780.

Kolb, Doug, William Eckerle, Judson Finley, Aaron Geery, and Sasha Taddie
2010 *Geoarchaeological Analysis of 26CK6139, Clark County Wetlands Park, Nevada*. Western GeoArch Research. Submitted to HRA, Inc., Conservation Archaeology, Las Vegas, Nevada. Copies available from Western GeoArch Research, Salt Lake City.

Kroeber, Alfred L.
1925 *Handbook of the Indians of California*. Reprinted in 1976, Dover, New York.
1951 A Mohave Historical Epic. *University of California Anthropological Records* 11(2):71–176.
1974 *Mojave Indians: Report on Aboriginal Territory and Occupancy of the Mojave Tribe.* Garland, New York.

Kroeber, Alfred L. (editor)
1935 *Walapai Ethnography.* Memoir No. 42. American Anthropological Association, Washington, D.C.

Kutzbach, J. E., R. Gallimore, S. P. Harrison, P. Behling, R. Selin, and F. Laarif
1998 Climate and Biome Simulations for the Past 21,000 Years. *Quaternary Science Reviews* 17(6–7):473–506.

Laird, Carobeth
1976 *The Chemehuevis.* Malki Museum Press, Banning, California.
1980 Chemehuevi Shamanism, Sorcery, and Charms. *Journal of California and Great Basin Anthropology* 2(1):80–87.

LaMarche, Valmore C., Jr.
1973 Holocene Climatic Variations Inferred from Treeline Fluctuations in the White Mountains, California. *Quaternary Research* 3:632–660.

Lamb, Sydney
1958 Linguistic Prehistory of the Great Basin. *International Journal of American Linguistics* 24:95–100.

Lancaster, N., and V. P. Tchakerian
2003 Late Quaternary Eolian Dynamics, Mojave Desert, California. In *Paleoenvironments and Paleohydrology of the Mojave and Southern Great Basin Deserts*, edited by Y. Enzel, S. G. Wells and N. Lancaster, pp. 231–249. Special Paper No. 368. Geological Society of America, Boulder, Colorado.

Larson, Daniel O.
1978 A Study of Settlement Patterns of Southern Nevada As Reflected by the Archaeological Record. Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Larson, Daniel O., and Joel Michaelsen
1990 Impacts of Climatic Variability and Population Growth on Virgin Branch Anasazi Cultural Developments. *American Antiquity* 55:227–249.

Larson, Andrew Karl
1950 Irrigation and Agriculture in Washington County. In *Under Dixie Sun: A History of Washington County, Utah*, compiled by Washington County Chapter Daughters Utah Pioneers, pp. 35–59. Garfield County News, Panguitch, Utah.

Lawrence, Denise L., and Setha M. Low
1990 The Built Environment and Spatial Form. *Annual Review of Anthropology* 19:453–506. Annual Reviews, Palo Alto.

Layton, Robert
1977 Naturalism and Cultural Relativity in Art. *In* Peter J. Ucko (ed) *Form in Indigenous Art: Schematisation in the Art of Aboriginal Australia and Prehistoric Europe*, pp. 33-43 Australian Institute of Aboriginal Studies, Canberra.
1991 *The Anthropology of Art*. Second ed. Cambridge University Press, Cambridge.
2000 Shamanism, Totemism and Rock Art: Les Chamanes de la Préhistoire in the Context of Rock Art Research. *Cambridge Archaeological Journal* 10(1):169–186.

Leavitt, Robert Merrill
1982 The Theoretical Basis and Methodology of Archaeoastronomy and Its Application to Historic and Prehistoric Great Basin Archaeological Sites. Unpublished master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Leavitt, Robert Merrill, and Kevin A. Rafferty
2006 *A Cultural Resources Survey of 22,370 Acres in the Coyote Springs Valley During 2006.* Report No. 06-0366. Knight & Leavitt Associates, Las Vegas.
2009 *A Cultural Resource Survey of 1605 Acres in Coyote Springs Valley during 2009.* Knight & Leavitt Associates, Las Vegas.

Leavitt, Stephen W.
1994 Major Wet Interval in White Mountains Medieval Warm Period Evidenced in δ13C of Bristlecone Pine Tree Rings. *Climatic Change* 26:299–307.

Leonard, N. Nelson, III, and Christopher E. Drover
1980 Prehistoric Turquoise Mining in the Halloran Springs District, San Bernardino County, California. *Journal of California and Great Basin Anthropology* 2(2):245-256.

Ortman 2009

Lewis-Williams, J. David
1982 The economic and social context of southern San rock art. *Current Anthropology* 23(4): 429-449.
1997 Harnessing the brain: vision and shamanism in Upper Palaeolithic Western Europe. In Beyond Art: Pleistocene image and symbol, edited by Margaret W. Conkey, Olga Soffer, Deborah Stratmann, and Nina G. Jablonski, pp. 321-342. Memoirs of the California Academy of Sciences no. 23. San Francisco.

Lewis-Williams, J. David and Thomas A. Dowson
1988 The Signs of All Times: Entoptic Phenomena in Upper Palaeolithic art. *Current Anthropology* 29(2):201-245.

Lightfoot, Kent G., and Steadman Upham
1989 The Sociopolitical Structure of Prehistoric Southwestern Societies: Concluding Thoughts. In *The Sociopolitical Structure of Prehistoric Southwestern Societies*, edited by Steadman Upham, Kent G. Lightfoot, and Roberta A. Jewett, pp. 583-593. Westview Press, Boulder.

Lindstrom, Susan
1990 Submerged Tree Stumps as Indicators of Mid-Holocene Aridity in the Lake Tahoe Basin. *Journal of California and Great Basin Anthropology* 12:146–157.

Livingston, Stephanie D. and Fred L. Nials
1990 *Archaeological and Paleoenvironmental Investigations in the Ash Meadows National Wildlife Refuge, Nye, County, Nevada*. Quaternary Sciences Center Technical Report No. 70, Desert Research Institute, Las Vegas.

Livingston, Stephanie, Angus R. Quinlan and Ginny Bengston
2005 *The Sloan Canyon National Conservation Area Cultural Resources Management Plan*. Sloan Canyon Draft RMP/EIS: Appendix D-Cultural Resources Management Plan. Prepared by Summit Envirosolutions, Carson City. Report submitted to the USDI, Bureau of Land Management, Las Vegas Field Office.

Longwell, C. R., E. H. Pampeyan, B. Bowyer, and R. J. Roberts
1965 Geology and Mineral Deposits of Clark County, Nevada. *Nevada Bureau of Mines and Geology Bulletin* 62, p. 218, plate 62.

Ludington, Steve, E. H. McKee, Dennis P. Cox, Barry C. Moring, and Kenneth R. Leonard
1996 Pre-Tertiary Geology of Nevada. In *An Analysis of Nevada's Metal-bearing Mineral Resources*, edited by D. A. Singer. Open File Report No. 96-2. Nevada Bureau of Mines and Geology, Carson City.

Lyneis, Margaret M.
1982a *An Archaeological Element for the Nevada Historic Preservation Plan*. Prepared for the Nevada Division of Historic Preservation and Archaeology, Carson City. Project No. 230-580, University of Nevada, Las Vegas.
1982b Prehistoric Southern Nevada Study Units. In *An Archaeological Element for the Nevada Historic Preservation Plan*, compiled by Margaret Lyneis, pp. 161–206. Prepared for the Nevada Division of Historic Preservation and Archaeology, Carson City. Project No. 230-580, University of Nevada, Las Vegas.

Lyneis, Margaret M. (continued)

1982c Prehistory in the Southern Great Basin. In *Man and Environment in the Great Basin*, edited by David B. Madsen and James F. O'Connell, pp. 172–185. SAA Papers No. 2. Society for American Archaeology, Washington, D.C.

1986a Residual Archaeology of the Main Ridge Locality, Pueblo Grande de Nevada. *Western Anasazi Reports* 3:183–259. Cedar City, Utah.

1986b A Spatial Analysis of Anasazi Architecture A.D. 950–1150, Moapa Valley, Nevada. *Kiva* 52:53–74.

1988 Tizon Brown Ware and the Problems Raised by Paddle-and-Anvil Pottery in the Mojave Desert. *Journal of California and Great Basin Anthropology* 10(2):146–155.

1990 Buff and Brown Wares at Lost City: A Fresh Look at Intrusives. *Nevada Archaeologist* 8:25–34.

1992a *The Main Ridge Community at Lost City: Virgin Anasazi Architecture, Ceramics, and Burials.* Anthropological Papers No. 117. University of Utah Press, Salt Lake City.

1992b Social Complexity Among the Virgin Anasazi. *Kiva* 57(3):197–212.

1994 East and onto the Plateaus?: An Archaeological Examination of the Numic Expansion in Southern Nevada, Northern Arizona and Southern Utah. In *Across the West: Human Population Movement and the Expansion of the Numa*, edited by David Madsen and David Rhode, pp. 141–149. University of Utah Press, Salt Lake City.

1995 The Virgin Anasazi, Far Western Puebloans. *Journal of World Prehistory* 9(2):199–241.

1996 Pueblo II/III Change in Southwestern Utah, the Arizona Strip and Southern Utah. In *The Prehistoric Pueblo World, A.D. 1150–1350,* edited by M. Adler, pp. 11–28. University of Arizona Press, Tucson.

1999 Basketmaker Maize from Southern Nevada. Presented at the 64th Annual Meeting of the Society for American Archaeology, Chicago.

2000 Life at the Edge: Pueblo Settlements in Southern Nevada. In *The Archaeology of Regional Interaction*, edited by Michelle Hegmon, pp. 257–274. University Press of Colorado, Boulder.

2004 Radiocarbon Dates from the Yamashita Sites near Logandale, Moapa Valley, Southern Nevada. Paper presented at the Nevada Archaeological Association Meeting, Winnemucca. Copy on file, Special Collections, Lied Library, University of Nevada, Las Vegas.

2005 Pots on the Move: Western Colorado Plateaus Vessels in Southern Nevada. Paper presented at the 70th Society of American Archaeology meeting, Salt Lake City.

2006 Comments. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 321–324. Three Corners Conference, Las Vegas.

2008a New and Revised Prehistoric Pueblo Pottery Wares and Types from North and West of the Colorado River: Part1, Gray Wares from the Western Area. *Pottery Southwest* 27(1):3–20. (http://www.unm.edu/~psw/)

2008b The Socioeconomic Context of Changing Middle Pueblo II Pottery Frequencies at the Yamashita Sites, Moapa Valley, Southern Nevada. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 163–184. Nevada Archaeological Association, Las Vegas.

2008c Ceramic Analysis. In *Shared Place: An Archaeological Survey of the Ash Meadows National Wildlife Refuge, Nye County, Nevada.* Archaeological Report No. 07-24, HRA Inc., Conservation Archaeology, Las Vegas.

2011a Ceramic Analysis. In *Archaeological Excavations at the Corn Creek National Register Site, Desert National Wildlife Refuge, Clark County, Nevada,* prepared by Heidi Roberts and Jerry Lyon, pp. 149–173. Archaeological Report No. 08-22. Draft report submitted to U.S. Fish and Wildlife Service. HRA Inc., Conservation Archaeology, Las Vegas.

Lyneis, Margaret M. (continued)
2011b Ceramic Analysis. In *Shared Place: Cultural Landscapes in the Ash Meadows National Wildlife Refuge, Nye County, Nevada,* prepared by Jerry Lyon, Heidi Roberts, Richard V.N. Ahlstrom, Christopher Harper, Suzanne Eskenazi, Robert Davide, Catherine Fowler, and Elizabeth von Till Warren, pp. 101–130. Draft outreach report prepared for U.S. Fish and Wildlife Service. HRA Inc., Conservation Archaeology, Las Vegas.

Lyneis, Margaret, and Kelley Hays-Gilpin
2008 Prehistoric Pueblo Pottery North and West of the Colorado River: Museum of Northern Arizona Ceramic Conference. *Pottery Southwest* 26 (4): 12–20. (http://www.unm.edu/~psw/)

Lyneis, Margaret M., Mary K. Rusco, and Keith Myhrer
1989 *Investigations at Adam 2 (26CK2059): A Mesa House Phase Site in the Moapa Valley*. Anthropological Papers No. 22. Nevada State Museum, Carson City.

Lyon, Jerry D., and Richard V.N. Ahlstrom
2006 Archaeological Landscapes in the Las Vegas Valley. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 139–168. Three Corners Conference, Las Vegas.

Lyon, Jerry D. Heidi Roberts, Rick Ahlstrom, Christopher Harper, Suzanne Eskenazi, Robert Davide, Catherine Fowler, and Elizabeth von Till Warren
2008 *Shared Place: An Archaeological Survey of the Ash Meadows National Wildlife Refuge, Nye County, Nevada.* Archaeological Report No. 07-24, HRA Inc., Conservation Archaeology, Las Vegas.

Lyon, Jerry D., Richard V.N. Ahlstrom, Mark L. Chenault, Suzanne Eskenazi, Christopher Harper, and Heidi Roberts
2004 Survey Results. In *An Archaeological Survey for the Las Vegas Valley Disposal Boundary Environmental Impact Statement, Clark County, Nevada*, edited by Richard V.N. Ahlstrom, Suzanne Eskenazi, and Heidi Roberts, pp. 84–260. BLM Report No. 5-2467. Archaeological Report No. 03-15. HRA, Inc., Conservation Archaeology, Las Vegas.

Madsen, David B.
1975 Dating Paiute-Shoshoni Expansion in the Great Basin. *American Antiquity* 40:82–86.
1985 A Culture History Manifesto: Towards an Ethnology of the Past. Unpublished manuscript on file at the Utah State Historical Society, Salt Lake City.

Madsen, David B., and David Rhode
1990 Early Holocene Pinyon in the Northeastern Great Basin. *Quaternary Research* 33:94–101.

Madsen, David B., and David Rhode (editors)
1994 *Across the West: Human Population Movement and the Expansion of the Numa*. University of Utah Press, Salt Lake City.

Madsen, David B., and Steven R. Simms
1998 The Fremont Complex: A Behavioral Perspective. *Journal of World Prehistory* 12(3):255–336.

Madsen, Rex E. (compiler)
1977 *Prehistoric ceramics of the Fremont*. Ceramic Series No. 6, Museum of Northern Arizona, Flagstaff.

Mahan, Shannon A., David M. Miller, Christopher M. Menges, and James C. Yount
2007 Late Quaternary Stratigraphy and Luminescence Geochronology of the Northeastern Mojave Desert. *Quaternary International* 166:61–78.

Mallery, Garrick
1886 Pictographs of the North American Indians: A Preliminary Paper. In *4th Annual Report of the Bureau of American Ethnology for the Years 1882–1883*, pp. 3–256, Washington, D.C.
1893 Picture-Writing of the American Indians. In *10th Annual Report of the Bureau of American Ethnology for the Years 1888–1889*, pp. 3–822, Washington, D.C.

Mantua, Nathan J., Steven R. Hare, Yuan Zhang, John M. Wallace, and Robert C. Francis
1997 A Pacific Interdecadal Climate Oscillation with Impacts on Salmon Production. *Bulletin of the American Meteorological Society* 78:1069–1079.

Marwitt, John P.
1986 Fremont Cultures. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 161–172. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Matheny, Ray T., Thomas S. Smith and Deanne G. Matheny
1997 Animal Ethology Reflected in the Rock Art of Nine Mile Canyon, Utah. *Journal of California and Great Basin Anthropology* 19:70-103.

Matson, R. G.
1991 *The Origins of Southwestern Agriculture*. University of Arizona Press, Tucson.

Mawby, John E.
1967 Fossil Vertebrates of the Tule Springs Site, Nevada. In *Pleistocene Studies in Southern Nevada*, edited by H. Marie Wormington and Dorothy Ellis, pp. 105–129. Anthropological Papers No. 13. Nevada State Museum, Carson City.

Mayer, Dorothy
1975 Star Patterns in Great Basin Petroglyphs. In *Archaeoastronomy in Pre-Columbian America*, edited by Anthony F. Aveni. University of Texas Press, Austin.

Mayer, L. and W. B. Bull
1981 Impact of Pleistocene-Holocene Climatic Change on Particle Size Distribution of Fan Deposits in Southwestern Arizona. *Geological Society of America Abstracts with Programs* 13:95.

Mayer, J. H., Richard G. Reider, and Marcel Kornfeld
2010 The geoarchaeological and paleoenvironmental context of Paleoindian sites in the western Middle Park, Colorado, USA. Geoarchaeology: An International Journal 25(2):151-194.

Mayewski, Paul A., Eelco E. Rohling, J. Curt Stager, Wibjorn Karlen, Kirk A. Maasch, L. David Meeker, Eric A. Meyerson, Francoise Gasse, Shirley van Kreveld, Karin Holmgrend, Julia Lee-Thorp, Gunhild Rosqvist, Frank Rack, Michael Staubwasser, Ralph R. Schneider, and Eric J. Steig
2004 Holocene Climatic Variability. *Quaternary Research* 62:243–255.

McCabe, Gregory J., Michael A. Palecki, and Julio L. Betancourt
2004 Pacific and Atlantic Ocean Influences on Multidecadal Drought Frequency in the United States. *Proceedings of the National Academy of Sciences of the United States of America* 101(12):4136–4141.

McCarthy, Daniel F.
1986 Preliminary Report on the Rock Alignments of Panamint Valley, California. *American Indian Rock Art* 11:33–37.

McClellan, Carole, David A. Phillips, and Mike Belshaw
1980 *The Archaeology of Lake Mead National Recreation Area: An Assessment*. Publications in Anthropology No. 9. Western Archeological Center, National Park Service, Tucson.

McDonald, Eric V., Leslie D. McFadden, and Stephen G. Wells
2003 Regional Response of Alluvial Fans to the Pleistocene-Holocene Climatic Transitions, Mojave Desert, California. In *Paleoenvironments and Paleohydrology of the Mojave and Southern Great Basin Deserts*, edited by Y. Enzel, S. G. Wells, and N. Lancaster, pp. 189–205. Special Paper No. 368. Geological Society of America, Boulder.

McGuire, Kelly R., and William R. Hildebrandt
2005 Re-Thinking Great Basin Foragers: Prestige Hunting and Costly Signaling during the Middle Archaic Period. *American Antiquity* 70:695–712.

McGuire, Kelly, William Hildebrandt, Amy Gilreath, Jerome King, and John Berg
2010 *Final Research Results for the Gold Butte Study Area, Clark County, Nevada*, Vol. I, *Prehistoric Resources*. BLM Report No. 5-2617. Far Western Anthropological Research Group, Davis, California.

McGuire, Randall H., and Michael B. Schiffer (editors)
1982 *Hohokam and Patayan: Prehistory of Southwestern Arizona.* Academic Press, New York.

McGuire, Thomas R.
1983 Walapai. In *Southwest*, edited by Alfonso Ortiz, pp. 25–37. Handbook of North American Indians, Vol. 10, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Mehmed, Anamay, and Rebecca Apple
2009 Trails Through the Landscape of the Colorado Desert. *Proceedings of the Society for California Archaeology* 21:226–230.

Mehringer, Peter J., Jr.
1985 Late-Quaternary Pollen Records from the Interior Pacific Northwest and Northern Great Basin of the United States. In *Pollen Records of Late-Quaternary Sediments*, edited by Vaughn M. Bryant and Richard G. Holloway, pp.167–189. American Association of Stratigraphic Palynologists Foundation, Dallas.
1996 *Columbia River Basin Ecosystems: Late Quaternary Environments.* Interior Columbia Basin Ecosystem Management Project. Departments of Anthropology and Geology, Washington State University, Pullman.

Mehringer, Peter J., Jr., and C. N. Warren
1976 Marsh, Dune, and Archaeological Chronology, Ash Meadows, Amargosa Desert, Nevada. In *Holocene Environmental Change in the Great Basin*, edited by R. G. Elston and P. Headrick, pp. 120–150. Research Papers, No. 6. Nevada Archaeological Society, Reno.

Mensing, S. A., L. V. Benson, et al.
2004 A Holocene Pollen Record of Persistent Droughts from Pyramid Lake, Nevada, USA. *Quaternary Research* 62:29-38.

Metcalfe, Duncan
2008 Range Creek Canyon. In *The Great Basin: People and Place in Ancient Times*, edited by Catherine S. Fowler and Don D. Fowler, pp. 117–123. School for Advanced Research Press, Santa Fe.

Meltzer, David J.
2004 Peopling of North America. In *The Quaternary Period of the United States, Developments in Quaternary Science 1*, pp. 539–563. Elsevier, New York.

Meltzer, David J., and Vance T. Holliday
2010 Would North American Paleoindians have Younger Dryas Age Climate Changes? *Journal of World Prehistory* 23:1–41.

Mensing, Scott A., Larry V. Benson, Michaele Kashgarian, and Steve Lund
2004 A Holocene Pollen Record of Persistent Droughts from Pyramid Lake, Nevada, USA. *Quaternary Research* 62:29–38.

Miller, Jay
1983 Basin Religion and Theology: A Comparative Study of Power (Puha). *Journal of California and Great Basin Anthropology* 5(1,2):66–86.

Morrison, R. B.
1965 Quaternary Geology of the Great Basin. In *The Quaternary of the United States,* edited by H. E. Wright and D. G. Frey, pp. 265–286. Princeton University Press, Princeton, New Jersey.
1991 Quaternary Stratigraphic, Hydrologic, and Climatic History of the Great Basin with Emphasis on Lakes Lahontan, Bonneville, and Tecopa. In *Quaternary Nonglacial Geology: Conterminous U.S.*, edited by R. B. Morrison, pp. 283–320. The Geology of North America, Vol. K-2. Geological Society of America, Boulder.

Moy, Christopher M., Geoffrey O. Seltzer, Donald T. Rodbell, and David M. Anderson
2002 Variability of El Niño / Southern Oscillation Activity at Millennial Timescales during the Holocene Epoch. *Nature* 420:162–166.

Muhs, Daniel R., and Marcelo Zárate
2001 Eolian Records of the Americas and their Paleoclimatic Significance. In *Interhemispheric Climate Linkages*, edited by V. Markgraf, pp. 183–216. Academic Press, San Diego.

Musser-Lopez, Ruth Arlene, and Steve Miller
2010 Archaeological Trails and Ethnographic Trails: Can They Meet? *Proceedings of the Society for California Archaeology* 24:1–25.

Muto, Guy R., Peter J. Mehringer, Jr., and Claude N. Warren
1976 A Technological Analysis of Projectile Points from a Burial, Amargosa Desert, Nevada. *The Kiva* 41(3–4):267–276.

Myhrer, Keith
1989 Basketmaker and Puebloan Occupation at the Steve Perkins Site, Moapa Valley, Southern Nevada. Manuscript on file, USDI-Bureau of Land Management, Las Vegas District, Nevada.
1991 *Justification Proposal to Limit Archaeological Survey on BLM Land in Las Vegas Valley, Southern Nevada*. Report No. 5-2121. USDI, Bureau of Land Management, Las Vegas.

Myhrer, Keith, and Margaret M. Lyneis
1985 *The Bovine Bluff Site: An Early Puebloan Site in the Upper Moapa Valley*. Contributions to the Study of Cultural Resources Technical Report No. 15. USDI, Bureau of Land Management, Reno.

Myhrer, Keith, and William White
1989 *Archaeology of the Old Spanish Trail/Mormon Road from Las Vegas, Nevada to the California Border*. BLM Report No. 5-1950. USDI, Bureau of Land Management, Nevada State Office.

National Climatic Data Center (NCDC)
2002 *Climate Atlas of the United States [electronic resource]*. U.S. Dept. of Commerce, NOAA, National Climatic Data Center, Asheville.

Negrini, Robert, Daniel Erbes, Karin Faber, Adam Herrera, Andrew Roberts, Andrew Cohen, Peter Wigand and Franklin Foit
2000 A Paleoclimate Record for the Past 250,000 Years from Summer Lake, Oregon, USA: I. Chronology and Magnetic Proxies for Lake Level. *Journal of Paleoclimatology* 24:125–149.

Neild, Ralph E., and James E. Newman
1987 Growing Season Characteristics and Requirements in the Corn Belt. *National Corn Handbook-40.* Purdue University Cooperative Extension Service, West Lafayette, Indiana.

Neitzel, Jill
1991 Hohokam Material Culture and Behavior. In *Exploring the Hohokam,* edited by George J. Gummerman, pp. 177–230. University of New Mexico Press, Albuquerque.

Nelson, Michael E., and James H. Madsen, Jr.
1980 *A Summary of Pleistocene Fossil Vertebrate Localities in the Northern Bonneville Basin of Utah.* Bulletin No. 116. Utah Geological and Mineral Survey, Salt Lake City.

Nissen, Karen M.

1982 Images from the Past: An Analysis of Six Western Great Basin Petroglyph Sites. Unpublished Ph.D. dissertation, Department of Department of Anthropology, University of California, Berkeley, California.

Olsen, Kathryne
1978 Attribute Analysis of Muddy River Ceramics. Unpublished master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Omernik, James M.
2004 Perspectives on the Nature and Definition of Ecological Regions. *Environmental Management* 34:S27–S38, Supplement 1.

Ortman, Scott G.
2010 Genes, Language, and Culture in Tewa Ethnogenesis A.D. 1150–1400. Ph.D. dissertation, Department of Anthropology, Arizona State University, Tempe.

Oviatt, Charles G.
1988 Late Pleistocene and Holocene Lake Fluctuations in the Sevier Lake Basin, Utah, USA. *Journal of Paleolimnology* 1(1):9–21.
1997 Lake Bonneville Fluctuations and Global Climate Change. *Geology* 25(2):155–158.

Palacios-Fest, Manuel R., Andrew S. Cohen, Joaquin Ruiz, and Brian Blank
1993 Comparative Paleoclimatic Interpretations from Nonmarine Ostracodes Using Faunal Assemblages, Trace Element Shell Chemistry and Stable Isotope Data. *Climate Change in Continental Isotopic Records, Geophysical Monographs* 78:179–190.

Peel, M. C., B. L. Finlayson, and T. A. McMahon
2007 Updated World Map of the Köppen-Geiger Climate Classification. *Hydrology and Earth System Sciences* 11:1633–1644.

Pendegraft, Signa W.
2007 Grinding Rock and Pecking Stone: Rock Art and Domestic Archaeology in the Dry Lakes, Pah Rah Range, Nevada. In *Great Basin Rock Art: Archaeological Perspectives*, edited by Angus R. Quinlan, pp. 52-68. University of Nevada Press, Reno.

Perkins, R. F.
1967 Clovis-Like Points in Southern Nevada. *The Nevada Archaeological Survey Reporter* 2(4):4-5.
1979a IMACS Site Form for 26CK1936. Document on file at the Southern Nevada SHPO Data Repository, Harry Reid Center, Barrick Museum of Natural History, University of Nevada, Las Vegas.
1979b IMACS Site Form for 26CK1937. Document on file at the Southern Nevada SHPO Data Repository, Harry Reid Center, Barrick Museum of Natural History, University of Nevada, Las Vegas.

Perry, Laureen M.
2008 Overview of the Second Three Corners Conference. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. v–viii. Nevada Archaeological Association, Las Vegas.

Peterson, Frederick F.
1981 *Landforms of the Basin and Range Province Defined for Soil Survey.* Technical Bulletin No. 28. Nevada Agricultural Experiment Station, Reno.

Peterson, Frederick F., John W. Bell, Ronald I. Dorn, Alan R. Ramelli, and Teh-Lung Ku
1995 Late Quaternary Geomorphology and Soils in Crater Flat, Yucca Mountain Area, Southern Nevada. *GSA Bulletin* 107:379–395.

Phillips, Fred M., Marek G. Zreda, Larry V. Benson, Mitchell A. Plummer, David Elmore, and Pankaj Sharma
1996 Chronology for Fluctuations in Late Pleistocene Sierra Nevada Glaciers. *Science* 274:749–751.

Pigati, Jeffrey S., Jay Quade, Timothy M. Shanahan, and C. Vance Haynes, Jr.
2004 Radiocarbon Dating of Minute Gastropods and New Constraints on the Timing of Late Quaternary Spring-Discharge Deposits in Southern Arizona, USA. *Palaeogeography, Palaeoclimatology, Palaeoecology* 204:33–45.

Pigati, Jeffrey S., Jordon E. Bright, Timothy M. Shanahan, and Shannon A. Mahan
2009 Late Pleistocene Paleohydrology Near the Boundary of the Sonoran and Chihuahuan Deserts, Southeastern Arizona, USA. *Quaternary Science Reviews* 28:286–300.

Pippin, Lonnie C.
1997 Establishing a Culture Chronology for Pahute and Rainier Mesas in the Southern Great Basin. Report on file at Desert Research Institute, Las Vegas.

Pippin, Lonnie C. (editor)
1984 *Limited Test Excavations at Selected Archaeological Sites n the NNWSI Yucca Mountain Project Area, Southern Nye County, Nevada*. Technical Report No. 40. Desert Research Institute, Social Sciences Center, Reno.
1986 *An Overview of Cultural Resources on Pahute and Rainier Mesas on the Nevada Test Site, Nye County, Nevada*. Technical Report No. 45. Desert Research Institute, Quaternary Sciences Center, Reno.

Pippin, L.C., R.L. Clerico, and R.L. Reno
1982 *An Archaeological Reconnaissance of the NNWSI Yucca Mountain Project Area, Southern Nye County, Nevada*. Desert Research Institute, Social Sciences Center, Technical Report No. 28, Reno, Nevada.

Prior-Magee, J. S., K. G. Boykin, D. F. Bradford, W. G. Kepner, J. H. Lowry, D. L. Schrupp, K. A. Thomas, and B. C. Thompson (editors)
2007 *Southwest Regional Gap Analysis Project final report*. USGS, Gap Analysis Program, Moscow, Idaho.

PRISM Climate Group
2006a *United States Average Monthly or Annual Precipitation, 1971–2000*. PRISM Climate Group, Oregon State University. Corvallis.
2006b *United States Average Monthly or Annual Minimum Temperature, 1971–2000*. PRISM Climate Group, Oregon State University, Corvallis.

Quade, Jay
1986 Late Quaternary Environmental Change in the Upper Las Vegas Valley, Nevada. *Quaternary Research* 26:340–357.

Quade, Jay, and William L. Pratt
1989 Late Wisconsin Groundwater Discharge Environments of the Southwestern Indian Springs Valley, Southern Nevada. *Quaternary Research* 31:351–370.

Quade, Jay, Richard M. Forester, and Joseph F. Whelan
2003 Late Quaternary Paleohydrologic and Paleotemperature Change in Southern Nevada. In *Paleoenvironments and Paleohydrology of the Mojave and Southern Great Basin Deserts*, edited by Y. Enzel, S. G. Wells and N. Lancaster, pp. 165–188. Special Paper No. 368. Geological Society of America, Boulder.

Quade, Jay, Richard M. Forester, William L. Pratt, and Claire Carter
1998 Black Mats, Spring-Fed Streams, and Late-Glacial-Age Recharge in the Southern Great Basin. *Quaternary Research* 49:129–148.

Quade, Jay, Martin D. Mifflin, William L. Pratt, William McCoy, and Lloyd Burckle
1995 Fossil Spring Deposits in the Southern Great Basin and their Implications for Changes in Water Table Levels near Yucca Mountain, Nevada, during Quaternary Time. *GSA Bulletin* 107(2):213–230.

Quinlan, Angus R.
1993 Towards an Archaeology of Religion. Unpublished PhD thesis, Department of Archaeology, University of Southampton, UK.
2000 The Ventriloquist's Dummy: a critical review of shamanism and rock art in far western North America. *Journal of California and Great Basin Anthropology* 22(1):92-108.
2010 Grapevine Canyon Petroglyph Site. In *Great Basin Glyph Notes* 9(1):6-7

Quinlan, Angus R. and Alanah Woody
2001 Marking Time at Lagomarsino: The Competing Perspectives of Rock Art Studies. In *American Indian Rock Art, Volume 27*, edited by Steven M. Freers and Alanah Woody, pp. 211-220. American Rock Art Research Association, Tucson, Arizona.
2003 Marks of Distinction: Rock Art and Ethnic Identification in the Great Basin. *American Antiquity* 68(2):372-390.
2009 Rock Art in Archaeological Thought. In, *Nevada Rock Art*, by P. Goin, pp. 29-44. Reno, Black Rock Institute Press.

Quinlan, Angus R., Catherine S. Fowler, and Alanah Woody
2007 The Sloan Canyon (26CK2240/2621) Rock Art Documentation Project: Results of Investigations and Condition Assessment. Report prepared by the Nevada Rock Art Foundation, Reno. Report submitted to the Bureau of Land Management, Las Vegas Field Office.

Rafferty, Kevin A.
1983 *Moapa and Lower Virgin Valley Study Units.* Prepared for Nevada Division of Historic Preservation and Archaeology by the Nevada Museum and Historical Society, Las Vegas.
1984a *On Common Ground: Las Vegas as a Cultural Frontier in Prehistory*. BLM Report No. 5-1381. DAS Report No. 2-5-10. Division of Anthropological Studies, Environmental Research Center, Museum of Natural History, University of Nevada, Las Vegas.
1984b *Cultural Resources of the Las Vegas Valley.* Contributions to the Study of Cultural Resources, Technical Report No. 13. USDI, Bureau of Land Management, Las Vegas District.
1985b *The Las Vegas Valley Revisited: Archaeological Investigations in the Las Vegas Valley, Phase II*. BLM Report No. 5-2185. DAS Report No. 2-5-11 prepared for the Nevada Division of Historic Preservation and Archaeology. Division of Anthropological Studies, Environmental Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Rafferty, Kevin A. (continued)

1985a *Investigation and Mitigation of Six Archaeological Sites Within the Lake at Las Vegas Reservoir Location in Las Vegas Wash, Clark County, Nevada*. DAS Report 5-7-5. Division of Anthropological Studies, Environmental Research Center, Museum of Natural History, University of Nevada, Las Vegas.

1986 *New Investigations in the Northern Las Vegas Valley: The Las Vegas Valley Archaeological Survey, Phase III*. DAS Report 2-5-12. USDI, Bureau of Land Management, Las Vegas, Report 5-1570.

1989 Virgin Anasazi Sociopolitical Organization, A. D. 1 to 1150. In *The Sociopolitical Structure of Prehistoric Southwestern Societies*, edited by Steadman Upham, Kent G. Lightfoot, and Roberta A. Jewett, pp. 557–580. Westview Press, Boulder.

1990a *Geoglyph/Earth Pattern Figures on the Fort Mojave Indian Reservation, Clark County, Nevada*. ARSN Report No. 4-1-4. Archaeological Research of Southern Nevada, North Las Vegas.

1990b *Las Vegas Wash Revisited: A Cultural Resource Survey and Inventory of Property Owned by the Lake at Las Vegas Joint Venture, Henderson, Clark County, Nevada*. Clark County Community College Archaeological Paper No. 1. Department of Social Sciences, Clark County Community College, North Las Vegas.

1990c The Virgin Anasazi and the Pan-Southwestern Trade System, A.D. 900–1150. *Kiva* 56:3–24.

1992 *A Cultural Resource Inventory of Selected Lands in the in the Las Vegas Wash Region for a Proposed Exchange by Transcontinental Properties, Incorporated Clark County, Nevada.* ARSN Report No. 4-3-4. Archaeological Research of Southern Nevada, North Las Vegas.

2006 The Archaeology of the Coyote Springs Valley. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 197–216. Three Corners Conference, Las Vegas.

2008 The Las Vegas Wash Intaglio and Patayan/Yuman Occupation of the Las Vegas Valley. *Nevada Archaeologist* 23:1–16.

Rafferty, Kevin A., and Lynda M. Blair

1984 *Archaeological Mitigation of 26CK3115 and 26CK3117, Midby Site Complex, Paradise Valley, Nevada: Final Phase*. DAS Report No. 5-50-4, Division of Anthropological Studies, Environmental Research Center, University of Nevada, Las Vegas.

Rager, Hal B.

2001 *Burnt Rock Mound (26CK3601): Late Archaic and Ceramic Period Human Use of A Northern Mojave Spring Mound*. Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Raiswell, Rob

2001 Defining the Burial Environment. In *Handbook of Archaeological Sciences*, edited by D. A. Brothwell and A. M. Pollard, pp. 595–603. Wiley, West Sussex.

Raven, Christopher

1990 *Prehistoric Human Geography in the Carson Desert: Part II: Archaeological Field Tests of Model Predictions*. Intermountain Research. Submitted to the U.S. Fish and Wildlife Service. Copies available from Intermountain Research, Silver City, Nevada.

Raven, Christopher, and Robert G. Elston

1989 *Prehistoric Human Geography in the Carson Desert: Part I: A Predictive Model of Land-Use in the Stillwater Wildlife Management Area. Intermountain Research*. Submitted to the U.S. Fish and Wildlife Service. Copies available from Intermountain Research, Silver City, Nevada.

Rector, Carol H.
1985 Rock Art as Hunting Magic: Anthropological Fact or Fiction? In *Rock Art Papers Volume 8*, edited by Ken Hedges, pp. 127-132. San Diego Museum Papers No. 18. San Diego Museum of Man, San Diego.

Reheis, Marith C., Jonathan C. Goodmacher, Jennifer W. Harden, Leslie D. McFadden, Thomas K. Rockwell, Ralph R. Shroba, Janet M. Sowers, and Emily M. Taylor
1995 Quaternary Soils and Dust Deposition in Southern Nevada and California. *GSA Bulletin* 107(9):1003–1022.

Reheis, Marith C., Richard L. Reynolds, Harland Goldstein, Helen M. Roberts, James C. Yount, Yarrow Axford, Linda Scott Cummings, and Nancy Shearin
2005 Late Quaternary Eolian and Alluvial Response to Paleoclimate, Canyonlands, Southeastern Utah. *GSA Bulletin* 117(7/8):1051–1069.

Reineck, H. E., and I. B. Singh
1980 *Depositional Sedimentary Environments*. Springer-Verlag, New York.

Renfrew, A. Colin
1985 *The Archaeology of Cult, the Sanctuary at Phylakopi.* British School at Athens and Thames & Hudson, London

Reno, Ronald L., Gregory H. Henton, Lonnie C. Pippin, and Cari L. Lockett
1989 *Miscellaneous Data Recovery Studies at Yucca Mountain*. Technical Report No. 59. Desert Research Institute, Quaternary Sciences Center, Reno.

Rhode, David
1994 Direct Dating of Brown Ware Ceramics Using Thermoluminescence and Its Relation to the Numic Spread. In *Across the West: Human Population Movement and the Expansion of the Numa,* edited by David B. Madsen and David Rhode, pp.124–132, University of Utah Press, Salt Lake City.

Rick, John W.
1976 Downslope Movement and Archaeological Intrasite Spatial Analysis. *American Antiquity* 41:133–144.

Roberts, Heidi
2000 A Clovis Point Base from Clark County Wetlands Park. *In-Situ. Newsletter of the Nevada Archaeological Association* (Winter):10–16.
2002a *Archaeological Inventory of the Best in the Desert Las Vegas 200, Moapa River Indian Reservation, Clark County, Nevada*. Archaeological Report No. 00-11, HRA, Inc., Conservation Archaeology, Las Vegas.
2002b Settlement and Subsistence Strategies of the Southern Paiute in the St. George Basin, Southern Utah. *Spanish Traces* 8(3):19–25.
2010 *The Mountain's Silhouette is Our MONA LISA: An Ethnographic Assessment and Historic Context for the Davis Dam Switchyard Rebuild Project, Bullhead City, Arizona*. Archaeological Report No. 08-24. HRA, Inc. Conservation Archaeology, Las Vegas.

Roberts, Heidi, and Richard V.N. Ahlstrom
2000 *Fragile Past: Archaeological Investigations in Clark County Wetlands Park, Nevada.* Archaeological Report No. 00-03. HRA, Inc. Conservation Archaeology, Las Vegas.
2001 Patterns of Foraging in the Apex Area. In *Archaeology at the Apex: Excavations in the Apex Project Area, Southern Nevada*, edited by Richard V.N. Ahlstrom and Heidi Roberts, pp. 193–212. Papers in Archaeology No. 2. HRA, Inc., Conservation Archaeology, Las Vegas.
2002 *Archaeological Treatment Plan for the Tule Springs National Register Site and the Harry Allen to Northwest Transmission Line, Clark County, Nevada*. Archaeological Report No. 02-11. HRA Inc., Conservation Archaeology, Las Vegas.
2004 Previous Archaeological Research in the Las Vegas Valley. In *An Archaeological Survey for the Las Vegas Valley Disposal Boundary Environmental Impact Statement, Clark County, Nevada*, edited by Richard V.N. Ahlstrom, Suzanne Eskenazi, and Heidi Roberts, pp. 20–40. Archaeological Report No. 03-15. HRA, Inc. Conservation Archaeology, Las Vegas.
2006 Numic Spread Sure Goes Good With White Bread. Manuscript on file HRA Inc., Conservation Archaeology, Las Vegas.
2010 Farmers on the Go: A Forager-Farming Model for the Las Vegas Valley. Paper Presented at the 75th annual Society for American Archaeology meeting, 2010, St. Louis.
2012 Gray, Buff, and Brown: Untangling Chronology, Trade, and Culture in the Las Vegas Valley, Southern Nevada. In *Meetings at the Margins: Prehistoric Cultural Interactions in the Intermountain West*, edited by David Rhode, pp. 211-228. The University of Utah Press, Salt Lake City.

Roberts, Heidi, and J. Jeffrey Flenniken
2008 New Methods of Analyzing Flaked Stone Quarries. *Nevada Archaeologist* 23:45–56.

Roberts, Heidi, and Sarah Herr
2011 Size Matters: Using the Right Tool for the Job. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V. N. Ahlstrom, pp. 147–166. SAA Press, Washington, D. C.

Roberts, Heidi, and Jerry Lyon
2009 IMACS Site Form for 26NY13533. Document on file at the Southern Nevada SHPO Data Repository, Harry Reid Center, Barrick Museum of Natural History, University of Nevada, Las Vegas.
2011 *Archaeological Excavations at the Corn Creek National Register Site, Desert National Wildlife Refuge, Clark County, Nevada*. Draft Report Prepared for the U.S. Fish and Wildlife Service, Desert National Wildlife Refuge. Archaeological Report No. 08-22. HRA, Inc. Conservation Archaeology, Las Vegas.

Roberts, Heidi, and Gregory R. Seymour
2006 Ten to One: Betting on Pithouses in the Las Vegas Valley. Paper presented at the 30th Great Basin Anthropological Conference, Las Vegas.

Roberts, Heidi, Richard V.N. Ahlstrom, and Barbara Roth (editors)
2004 *From Campus to Corporation: The Emergence of Contract Archaeology in the Southwestern United States.* SAA Press, Washington, D.C.

Roberts, Heidi, Richard V.N. Ahlstrom, Elizabeth von Till Warren, and William Eckerle
2003a *Coyote Named This Place Pakonapanti: An Archaeological Survey of the Corn Creek Dunes Site in the Desert National Wildlife Refuge, Clark County, Nevada.* Archaeological Report No. 02-03. HRA Inc., Conservation Archaeology, Las Vegas.

Roberts, Heidi, Richard V.N. Ahlstrom, and Jerry Lyon
2008 Prehistoric Settlement Patterns in Clark County Wetlands Park, Nevada. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 185–210. Nevada Archaeological Association, Las Vegas.

Roberts, Heidi, Suzanne Eskenazi, and Christopher Harper
2003b *Archaeological Test Excavations at the Corn Creek Dunes Site in the Desert National Wildlife Refuge, Clark County, Nevada*. Archaeological Report No. 02-03t, HRA Inc., Conservation Archaeology, Las Vegas.

Roberts, Heidi, Elizabeth von Till Warren, and Suzanne Eskenazi
2007 *Coyote Named this Place Pakonapanti: Corn Creek National Register Archaeological District, Desert National Wildlife Refuge, Clark County, Nevada*. Prepared for U.S. Fish and Wildlife Service, Desert National Wildlife Refuge, Las Vegas. HRA, Inc., Conservation Archaeology, Las Vegas.

Rogers, Malcolm J.
1939 *Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas*. San Diego Museum of Man Papers No. 3. San Diego.
1941 Aboriginal Culture Relations between Southern California and the Southwest. *Bulletin* 5(3):1–6. San Diego Museum of Man.
1945 An Outline of Yuman Prehistory. *Southwest Journal of Anthropology* 1(1):167-198.
1966 *Ancient Hunters of the Far West.* Union-Tribune Publishing, San Diego.

Rogers, Michael
2011 Archaeological Geophysics: Seeing Deeper with Technology. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V. N. Ahlstrom, pp. 114–137. SAA Press, Washington, D.C.

Roth, Barbara J.
2011 Lessons from Deeply Buried Archaic Sites in the Tucson Basin. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V. N. Ahlstrom, pp. 36–47. SAA Press, Washington, D. C.

Roth, Keven S., and Tommy Dewald
1999 *The National Hydrography Dataset*. USDI, US Geological Survey, Environmental Protection Agency, Reston, Virginia.

Roth, Barbara J., and Claude N. Warren
2008 On the Shores of Pleistocene Lake Mojave: Investigations at Soda Springs Rockshelter. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 211–226. Nevada Archaeological Association, Las Vegas.

Rowland, S. M.
1987 Paleozoic Stratigraphy of Frenchman Mountain, Clark County, Nevada. In *Centennial Field Guide: Geological Society of America, Cordilleran Section,* edited by M. L. Hill, v. 1, pp. 53–56.

Royse, Anya P.
1982 *Ethnic Identities: Strategies of Diversity.* Indiana University Press, Bloomington.

Sample, L. L.
1950 *Trade and Trails in Aboriginal California*. Report No. 8. University of California Archaeological Survey, Berkeley.

Santini, James D.
1974 A Preliminary Report on the Analysis of Incised Stones from Southern Nevada. Nevada Archaeologist 2(1):4-15

Schaafsma, Polly
1980 *Rock Art of the Southwest*. University of New Mexico Press, Albuquerque.
1986 Rock Art. In *Great Basin*, edited by Warren L. d'Azevedo, pp. 215–226. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
1994a *The Rock Art of Utah: from the Donald Scott Collection,* second edition. University of Utah Press.
1994b Trance and Transformation in the Canyons: Shamanism and Early Rock Art on the Colorado Plateau. In *Shamanism and Rock Art in North America*, edited by Solveig Turpin, pp. 45–71. Special Publication No. 1. Rock Art Foundation, San Antonio.

Schaefer, Jerry
2000 *Archaeological Investigations at a Protohistoric Fish Camp on the Receding Shoreline of Ancient Lake Cahuilla, Imperial County, California*. Prepared for Imperial Irrigation District, Imperial. ASM Affiliates, Encinitas.
2006 Multiple Approaches to the Archaeology of the Three Corners Cultural Mosaic. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 301–308. Three Corners Conference, Las Vegas.

Schellbach, Louis, III
1930 An Unusual Burial in Mesa House Ruin. In *Archaeological Explorations in Southern Nevada*, pp. 93–105. Paper No. 4. Southwest Museum, Los Angeles.

Schiffer, Michael B.
1987 *Formation Processes of the Archaeological Record*. University of New Mexico Press, Albuquerque.

Schoolcraft, Henry R.
1851–1857 *Historical and Statistical Information Respecting the History, Condition and Prospects of the Indian tribes of the United States: Collected and Prepared under the Direction of the Bureau of Indian Affairs per Act of Congress of March 3rd 1847*. 6 vols. Lippincott, Grambo, Philadelphia.

Schroeder, Albert H.
1952 *A Brief Survey of the Lower Colorado River from Davis Dam to the International Border*. USDI, Bureau of Reclamation, Region 3, Boulder City, Nevada.
1953a A Few Sites in Moapa Valley, Nevada. *The Masterkey* 27(1):18–24.
1953b A Few Sites in Moapa Valley, Nevada-II. *The Masterkey* 27(2)62–68.
1955 *Archaeology of Zion Park.* Anthropological Papers No. 22. University of Utah, Salt Lake City.

Schroeder, Albert H. (continued)
1961 *The Archaeological Excavations at Willow Beach Arizona.* Anthropological Papers No. 50. University of Utah, Salt Lake City.
1979 Prehistory: Hakayata. In *Handbook of North American Indians: Southwest*, edited by Alfonso Ortiz, Vol. 9, pp. 100–107. Smithsonian Institution, Washington D.C.

Schroedl, Alan R.
1991 Paleo-Indian Occupation in the Eastern Great Basin and Northern Colorado Plateau. *Utah Archaeology* 1(1):1–15.

Seddon, Matthew T.
2011 The Problem of Superficial Archaeology. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V. N. Ahlstrom, pp. 1–15. SAA Press, Washington, D. C.

Seddon, Matthew T., Heidi Roberts, and Richard V.N. Ahlstrom
2011 *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.* SAA Press, Washington, D.C.

Setzler, Frank M., and George C. Marshall
1952 Seeking the Secret of the Giants. *National Geographic* 102(3):389–404.

Seymour, Gregory R.
1997 A Reevaluation of Lower Colorado Buff ware Ceramics: Redefining the Patayan in Southern Nevada. Unpublished Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.
1999 *Cultural Resource Management Plan for the Las Vegas Springs Preserve, Clark County, Nevada*. Report No. 4-9-4. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.
2006 The Four P's: Pots, Puebloans, and Patayan. But where are the Paiutes? In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 113–122. Three Corners Conference, Las Vegas.

Seymour, Gregory R., and Hal B. Rager
2005 The Prehistory of Burnt Rock Spring Mound in the Northern Mojave Desert. *Nevada Archaeologist* 20 and 21:71–83.

Seymour, Gregory R., and Lynn E. Hatzenbuehler
1995 *Cultural Resource Overview for the Clark County Wetlands Park Master Plan, Clark County, Nevada*. SWCA Archaeological Report No. 95-14. Miscellaneous Report No. 59. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Shutler, Richard Jr.
1961 *Lost City: Pueblo Grande de Nevada.* Anthropological Papers No. 5. Nevada State Museum, Carson City.
1967 *Pleistocene Studies in Southern Nevada*, edited by H. Marie Wormington and D. Ellis. Anthropological Papers No. 13. Nevada State Museum, Carson City.

Shutler, Richard Jr., and Mary E. Shutler
1962 *Archaeological Survey in Southern Nevada*. Anthropological Papers No. 5. Nevada State Museum, Carson City.

Shutler, Richard Jr., Mary Elizabeth Shutler, and James S. Griffith
1960 *Stuart Rockshelter: A Stratified Site in Southern Nevada*. Anthropological Papers No. 3, Nevada State Museum, Carson City.

Silberling, N. J.
1991 Allochthonous Terranes of Western Nevada-Current Status. In *Geology and Ore Deposits of the Great Basin, Symposium Proceedings*, edited by G. L. Raines, R. E. Lisle, R. W. Schafer and W. H. Wilkinson, pp. 101–102. Geological Society of Nevada, Reno.

Simms, Steven R.
1989 The Structure of the Bustos Wickiup Site, Eastern Nevada. *Journal of California and Great Basin Anthropology* 11:2-34.

Simms, Steven R., and Francois Gohier
2010 *Traces of Fremont: society and rock art in Ancient Utah*. University of Utah Press, Salt Lake City.

Smith, Ann
1940 An Analysis of Basin Mythology. Unpublished Ph.D. Dissertation, Department of Anthropology, Yale University, New Haven, Connecticut.

Smith, Eric Aiden, and Bruce Winterhalder (editors)
1992 *Evolutionary Ecology and Human Behavior*. Aldine de Gruyter, New York.

Smith, G. I.
1979 *Subsurface Stratigraphy and Geochemistry of Late Quaternary Evaporates, Searles Lake, California.* Professional Paper No. 1043. USDI, US Geological Survey,

Smith, Gerald A.
1974 Ground Figures of the Lower Colorado River: A Report. Manuscript on file, San Bernardino County Museum, Riverside, California.
1983 Geoglyphs, Rock Alignments, and Ground Figures. In *Ancient Images on Stone: Rock Art of the Californias,* edited by Joanne Van Tilburg, pp. 84–95. San Bernardino County Museum, San Bernardino, California.

Smith, Grant D., and Michael McFaul
1997 Paleoenvironmental and Geoarchaeologic Implications of Late Pleistocene and Holocene Sediments and Paleosols: North Central and Western San Juan Basin, New Mexico. *Geomorphology* 21(2):107–138.

Soil Survey Staff
1999 *Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys,* second edition. USDA, Natural Resources Conservation Service. Agriculture Handbook No. 436. US Government Printing Office, Washington D.C.
2006 *U.S. General Soil Map (STATSGO2)*. USDA, Natural Resources Conservation Service. Available online at http://soildatamart.nrcs.usda.gov. Accessed 4/4/2011.

Solari, Elaine M., and Boma Johnson
1982 Intaglios: A Synthesis of Known Information and Recommendations for Management. In *Hohokam and Patayan: Prehistory of Southwestern Arizona*, edited by Randall H. McGuire and Michael B. Schiffer, pp. 417–432. Academic Press, New York.

Spaulding, W. Geoffrey
1977 Late Quaternary Vegetation Change in the Sheep Range, Southern Nevada. *Journal of the Arizona Academy of Sciences* 22(2):183–188.
1981 The Late Quaternary Vegetation of a Southern Nevada Mountain Range. Ph.D. dissertation, Department of Geosciences, University of Arizona, Tucson.
1990 Vegetation Dynamics During the Last Deglaciation, Southeastern Great Basin, U.S.A. *Quaternary Research* 33:88–203.
1991 A Middle Holocene Vegetation Record from the Mojave Desert of North America and its Paleoclimatic Significance. *Quaternary Research* 35(3-1):427–437.

Spaulding, W. Geoffrey, and Lisa J. Graumlich
1986 The Last Pluvial Climatic Episodes in the Deserts of Southwestern North America. *Nature* 320:441–444.

Spaulding, W. G., J. L. McVickar, and D. E. Newman
1994 Paleoenvironments. In *Kern River Pipeline Cultural Resources Data Recovery Report: Utah.* pp. 1–38. Submitted to the Kern River Gas Transmission Company. Contract Number 14641-005-001. Dames & Moore, Las Vegas. Copies available at Utah State Historical Society Library, Salt Lake City.

Sperber, Dan
1975 *Rethinking Symbolism*. Cambridge University Press, Cambridge.

Spier, Leslie
1933 *Yuman Tribes of the Gila River*. University of Chicago Press, Chicago. Reprinted, 1978, by Dover, New York.

Stearns, Robert E. C.
1877 Aboriginal Shell Ornaments, and Mr. F.A. Barber's Paper Thereon. *American Naturalist* 11(8):473–474.

Sterner, Matthew A., and Joseph A. Ezzo
1996 Religion, Ranching, and Railroads: The History of the Muddy and Virgin River Valleys. In *A Class I Cultural Resources Survey of the Moapa and Virgin Valleys, Clark County, Nevada*, edited by Joseph A. Ezzo, pp. 79–130. Statistical Research, Inc., Tucson.

Steward, Julian H.
1929 Petroglyphs of California and Adjoining States. *Publications in American Archaeology and Ethnology* 24(2):47–238.
1938 *Basin Plateau Aboriginal Sociopolitical Groups*. Bureau of American Ethnology Bulletin No. 120. Smithsonian Institution, Washington, D.C.

Stewart, John H., and John E. Carlson
1978 *Geologic Map of Nevada*. USDI, U.S. Geological Survey, Reno.

Stewart, Kenneth M.
1983 Mohave. In *Southwest*, edited by Alfonso Ortiz, pp. 55–70. Handbook of North American Indians, Vol. 10, William C. Sturtevant, general editor. Smithsonian Institution, Washington D.C.

Stine, Scott
1994 Extreme and Persistent Drought in California and Patagonia during Mediaeval Time. *Nature* 369:546–549.

Stockton, E. D.
1973 Shaw's Creek Shelter: Human Displacement of Artifacts and Its Significance. *Mankind* 9:112–117.

Stoffle, Richard W. and Maria N. Zedeño
2000 Historic Memory and Ethnographic Perspectives on the Southern Paiute Homeland. Under review for the *Journal of California and Great Basin Anthropology*.
2001 The Concept of "Power" and Its Connection to People, Places, and Resources. In *American Indians and the Nevada Test Site: A Model of Research and Consultation*, edited by Richard W. Stoffle, Maria N. Zedeño, and David B. Halmo, pp. 58–76. U.S. Government Printing Service, Washington, D.C.

Stoffle, Richard W., and Richard Arnold
2008 Facing the Unimaginable: The Limits of Resilience and the Risk Society. Paper Presented at the First International Sociology Association Forum on Sociology and Public Debate, Barcelona, Spain.

Stoffle, Richard W., Fletcher P. Chmara-Huff, Kathleen A. Van Vlack, and Rebecca S. Toupal
2004 *Puha Flows From It: The Cultural Landscape Study of the Spring Mountains.* Bureau of Applied Research in Anthropology, University of Arizona, Tucson.

Stone, Connie L.
1991 *The Linear Oasis: Managing Cultural Resources along the Lower Colorado River.* Cultural Resource Series No. 6. USDI, Bureau of Land Management, Arizona State Office, Phoenix.

Stoner, Edward J.
2011 Digging Smarter: CRM and Buried Open Sites in the Great Basin. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V.N. Ahlstrom, pp. 71–84. SAA Press, Washington, D.C.

Stoney, Stephen A.
1992 Anthropomorphic Symbolism in Southern Nevada: A case study in cultural diversity. In *Rock Art Papers,* Volume 9, edited by Ken Hedges, pp. 57-66. San Diego Museum Papers No. 28. Museum of Man, San Diego.

Sullivan, Austin
1974 Remote Imagery Studies in Hidden Valley, Nevada. *Journal of California Anthropology* 1:114–117.

Susia, Margaret L.
1964 *Tule Spring Archaeological Surface Survey*. Anthropological Papers No. 12. Nevada State Museum, Carson City.

Sutton, Mark Q.
1992 The Numic Expansion as Seen From the Mojave Desert. Paper Presented at the Kelso Conference on Mojave Desert Prehistory, Joshua Tree National Monument, 29 Palms, California.
1996 The Current Status of Archeological Research in the Mojave Desert. *Journal of California and Great Basin Anthropology* 18:221–257.

Sutton, Mark Q. and David Rhode
1987 A Consideration of the Numic Spread. Ph.D. Dissertation, University of California, Riverside.
1991 Approaches to Linguistic Prehistory. *North American Archaeologist* 12(4): 303–324.
1994 Background to the Numic Problem. In *Across the West: Human Population Movement and the Expansion of the Numa,* edited by David B. Madsen and David Rhode, pp. 6–15. University of Utah Press, Salt Lake City.

Sutton, Mark Q., Mark E. Basgall, Jill K. Gardner, and Mark W. Allen
2007 Advances in Understanding Mojave Desert Prehistory. In *California Prehistory*, edited by Terry L. Dones and Kathryn A. Klar, pp. 229–245. Altamira Press, Lanham, Maryland.

Taddie, Sasha, William Eckerle, and Judson Finley
2010 *Geoarchaeological Analysis of Fairbanks Spring Archaeological Site (26NY1729), Nye County, Nevada.* Western GeoArch Research. Submitted to HRA, Inc., Conservation Archaeology Las Vegas, Nevada. Copies available from Western GeoArch Research. Salt Lake City, Utah.

Talbot, Richard K.
2011 Deep Testing in Areas of Archaeologically High(er) Potential. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V. N. Ahlstrom, pp. 16–35. SAA Press, Washington, D. C.

Talbot, Richard K., Scott E. Billat, Lane D. Richens, Don Southworth, Shane Baker, Teri Christensen, Daren Richards, and James D. Wilde
1991 *A Cultural Resource Inventory of the Proposed Wycal Pipeline through Southern Nevada*. Technical Series No. 90-10. Office of Public Archaeology, Museum of Peoples and Cultures, Brigham Young University, Provo. Report No. 5-2108. USDI, Bureau of Land Management, Las Vegas.

Taylor, Kendrick
1999 Rapid Climate Change. *American Scientist* 87(4):320–327.

Taylor, R. E.
1987 *Radiocarbon Dating: An Archaeological Perspective*. Academic Press, Orlando.

Thiel, J. Homer
1995 *Rock Art in Arizona, A Component of the Arizona Historic Preservation Plan.* Arizona State Parks, State Historic Preservation Office, Phoenix.

Thomas, David Hurst
1983 *The Archaeology of Monitor Valley, 2: Gatecliff Shelter*. Anthropological Papers of the American Museum of Natural History 59(1). New York.

Thompson, Graham R., and Jonathan Turk
1997 *Modern Physical Geology: 2nd ed.* Saunders College Publishing, New York.

Thompson, Robert S.
1992 Late Quaternary Environments in Ruby Valley, Nevada. *Quaternary Research* 37:1–15.

Thompson, Robert S., Cathy Whitlock, Patrick J. Bartlein, Sandy P. Harrison, and W. Geoffrey Spaulding
1993 Climatic Changes in the Western United States since 18,000 yr B.P.. In *Global Climates since the Last Glacial Maximum*, edited by H. E. Wright, Jr., pp. 468–513. University of Minneapolis Press, Minneapolis.

Tobiasson, Virginia "Beezy" Lani, and Georgia May Bagshaw Hall
2010 *Muddy Valley Reflections: 145 Years of Settlement.* Cox Printing, Mesa, Arizona.

Tower, Donald B.
1945 *The Use of Marine Mollusca and Their Value in Reconstructing Prehistoric Trade Routes in the American Southwest*. Papers of the Excavator's Club Vol. 2, No. 3. New York.

Tucker, Gordon C., and Paul R. Nickens
1983 *Results of Archaeological Investigations Along the Nevada Section of the Proposed Intermountain Power Project (IPP) Intermountain-Adelanto Line I (Revised).* HRC Report No. 5-1049 (P). Nickens & Associates, Montrose.

Tuohy, Donald R.
1986 Portable Art Objects. In *Great Basin,* edited by Warren L. d'Azevedo, pp. 227–237. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Turner, Christy G.
1963 *Petrographs of the Glen Canyon Region*. Museum of Northern Arizona Bulletin No. 38; Glen Canyon Series No. 4. Northern Arizona Society of Science and Art, Flagstaff.

Turner, Thomas Hal
1978 Mule Springs Rockshelter, Its Archaeological and Ecological Interpretation within the Southern Great Basin. Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Ucko, Peter J.
1987 Debuts Illusoires Dans la Tradition Artistique. *Prehistoire Ariegoise* 42:15–81.

United States Geological Survey (USGS)
2006 *Great Basin Springs and Wells.* USGS, Great Basin Center for Geothermal Exploration, National Hydrography Dataset. Reno.

Upham, Steadman
1988 Archaeological Visibility and the Underclass of Southwestern Prehistory. *American Antiquity* 53(2):245–261.

Van Heeringen, Robert, and Liesbeth Theunissen
2001 Repeated Water Table Lowering in the Dutch Delta: A Major Challenge to the Archaeological Heritage Management of Pre- and Protohistoric Wetlands. In *Enduring Records: The Environmental and Cultural Heritage of Wetlands*, edited by Barbara A. Purdy, pp. 271–276. Oxbow Books, Oxford.

Vaughan, Sheila J. and Claude N. Warren
1987 Toward a Definition of Pinto Points. *Journal of California and Great Basin Anthropology* 9:199–213.

Villa, Paola
1982 Conjoinable Pieces and Site Formation Processes. *American Antiquity* 47:276–290.

Villa, Paola, and Jean Courtin
1983 The Interpretation of Stratified Sites: A View from Underground. *Journal of Archaeological Science* 10:267–281.

Vokes, Arthur W.
2003 Ornaments. In *The Las Vegas Wash Collections Project: Analysis of Artifacts and Biological Specimens from Past Archaeological Excavations in Clark County Wetlands Park, Southern Nevada*, edited by Richard V.N. Ahlstrom, pp. 133–140. Archaeological Report No. 01-01. HRA, Inc. Conservation Archaeology, Las Vegas.
2005 Ornaments. In *Desert Oasis. The Prehistory of Clark County Wetlands Park, Henderson, Nevada*, edited by Richard V.N. Ahlstrom. Papers in Archaeology No. 4. Prepared for the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

Von Werlhof, Jay
1987 *Spirits of the Earth: A Study of Earthen Art in the North American Deserts,* Vol. I, The North Desert. IVC Museum Society, El Centro, California.
1995 Geoglyphs in Time and Space. *Proceedings of the Society for California Archaeology* 8: 61–68.

Wade, William D.
2009 *Archaeological Investigations in Northwestern Arizona*. Edited and annotated by David E. Purcell. Contributions to Highway Salvage Archaeology in Arizona No. 62. Bulletin No. 64. Museum of Northern Arizona, Flagstaff.

Wallace, William J.
1955 Early Man in Death Valley. *Archaeology* 8:2.
1958 *Archaeological Investigations in Death Valley National Monument*. University of California Archaeological Survey Report No. 42. University of California Press, Berkeley.

Wallace, William J., and Edith Taylor
1955 Archaeology of Wildrose Canyon, Death Valley National Monument. *American Antiquity* 20(4):355–367.
1956 *The Surface Archaeology of Butte Valley, Death Valley National Monument*. Contributions to California Archaeology 1. Archaeological Research Associates, Los Angeles.

Wandsnider, LuAnn
1988 Experimental Investigation of the Effect of Dune Processes on Archaeological Remains. *American Archaeology* 7(1):18–29.

Warner, Ted J. (editor)
1995 *The Domíguez-Escalante Journal: Their Expedition Through Colorado, Utah, Arizona, and New Mexico in 1776.* Translated by Fray Angelico Chavez. University of Utah Press, Salt Lake City.

Warren, Claude N.
1982 *Prehistoric Developments at Atlatl Rock*. Prepared for Nevada Division of State Parks. P.O. No. 10-00130. Institute for American Research, Goleta, California.
1984 The Desert Region. In *California Archaeology*, edited by Michael J. Moratto, pp. 339–430. Academic Press, Orlando.
1991 *Archaeological Investigations at Nelson Wash, Fort Irwin, California*. Fort Irwin Archaeological Project Research Report 23. Dames & Moore, San Diego.
2006 Three Corners: the Region, the Conference, and a Perspective from the Mojave Desert. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 325–332. Three Corners Conference, Las Vegas.

Warren, Claude N., and Robert H. Crabtree
1986 Prehistory of the Southwestern Area. In *Great Basin*, edited by W. L. D'Azevedo, pp 183–193. Handbook of North American Indians*,* Vol. 11, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Warren, Claude N., and Carl Phagen
1988 Fluted Points in the Mojave Desert: Their Technology and Cultural Context. In *Early Human Occupation in Far Western North American: The Clovis-Archaic Interface*, edited by J. A. Willig, C. Melvin Aikens, and J. L. Fagan, pp. 121–130. Anthropological Papers No. 21. Nevada State Museum, Carson City.

Warren, Claude N., K. A. Bergin, and D. D. Ferraro
1985 *The Data Recovery of Three Sites in Bow Willow Wash South [CA-SBr-4204, -5365, and -4786]: The Fieldwork Phase, Fort Irwin, San Bernardino County, California*. Fort Irwin Archaeology Project, Research Report No. 14. Submitted to Interagency Archaeological Services Division, National Park Service, San Francisco. Reprinted and published by Coyote Press, Salinas, California.

Watchman, Alan, and Alanah Woody
2002 Dating Rock Varnishes Associated with Petroglyphs in Nevada*.* Paper presented at the 67th annual meeting of the Society for American Archaeology, Denver, Colorado.

Waters, Michael R.
1982a Ceramic Data from Lowland Patayan Sites. In *Hohokam and Patayan: Prehistory of Southwestern Arizona,* edited by Randall H. McGuire and Michael B. Schiffer, pp. 571–580. Academic Press, New York.
1982b The Lowland Patayan Ceramic Tradition. In *Hohokam and Patayan: Prehistory of Southwestern Arizona,* edited by Randall H. McGuire and Michael B. Schiffer, pp. 275–297. Academic Press, New York.

Waters, Michael R. (continued)
1982c The Lowland Patayan Ceramic Typology. In *Hohokam and Patayan: Prehistory of Southwestern Arizona,* edited by Randall H. McGuire and Michael B. Schiffer, pp. 537–570. Academic Press, New York.
1982d Trail Shrines at Site SDM C-1. In *Hohokam and Patayan: Prehistory of Southwestern Arizona,* edited by Randall H. McGuire and Michael B. Schiffer, pp. 533–536. Academic Press, New York.
1992 *Principles of Geoarchaeology: A North American Perspective*. University of Arizona Press, Tucson.

Watkins, Christopher N.
2006 Parowan Pottery and Fremont Complexity: Late Formative Ceramic Production and Exchange. Master's Thesis, Brigham Young University.

Wells, Philip H.
1983 Paleobiogeography of Montane Islands in the Great Basin since the Last Glaciopluvial. *Ecological Monographs* 53(4):341–382.

Wells, Philip V., and Rainer Berger
1967 Late Pleistocene History of Coniferous Woodland in the Mohave Desert. *Science* 115(3770):1640–1647.

Wells, Stephen G., L. D. McFadden, and J. D. Shultz
1990 Eolian Landscape Evolution and Soil Formation in the Chaco Dune Field, Southern Colorado Plateau, New Mexico. In *Soils and Landscape Evolution,* edited by P. L. K. Knuepfer and L. D. McFadden, pp. 517–546. Elsevier, New York.

Wells, Stephen G., William J. Brown, Yehouda Enzel, Roger Y. Anderson, and Leslie D. McFadden
2003 Late Quaternary Geology and Paleohydrology of Pluvial Lake Mojave, Southern California. In *Paleoenvironments and Paleohydrology of the Mojave and Southern Great Basin Deserts*, edited by Y. Enzel, S. G. Wells and N. Lancaster, pp. 79–114. Special Paper No. 368. Geological Society of America, Boulder, Colorado.

Western Regional Climate Center
2011 Nevada Climate Summaries. Available online at http://www.wrcc.dri.edu/summary/Climsmnv.html. Accessed April 1, 2011.

Wheeler, S. M.
1942 The Archaeology of Etna Cave, Lincoln County, Nevada. Manuscript on file, Nevada State Museum, Carson City.

White, Christopher
1974 Lower Colorado River Aboriginal Warfare and Alliance Dynamics. In *ANTAP California Indian Political and Economic Organization*, edited by Lowell J. Bean and Thomas F. King, pp. 111–136. Anthropological Papers No. 2. Ballena Press, Ramona, California.

White, Eric, and Barbara J. Roth
2009 Fish Traps on Ancient Shores: Exploring the Function of Lake Cahuilla Fish Traps. *Journal of California and Great Basin Anthropology* 29:141–151.

White, John R.
1980 A Closer Look at Clusters. *American Antiquity* 45(1):66–73.

White, William G.
1997 IMACs Site Record for 26CK123.

White, William G.
1997b IMACS record for site 26CK2240/2261.
2002 *Cultural Resource Plan for the Protection and Management of Rock Art Resources, Clark County, Nevada.* HRC Report No. 1-1-43, BLM Report No. 5-2426. Prepared by Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Whitley, David S.
1992 Shamanism and Rock Art in Far Western North America. *Cambridge Archaeological Journal* 2(1):89 -113.
1994 Shamanism, Natural Modeling and the Rock Art of Far Western North American Hunter Gatherers. In *Shamanism and Rock Art in North America*, edited by Solveig A. Turpin, pp. 1-43. Special Publication I. The Rock Art Foundation, San Antonio.
1996 A Guide to Rock Art Sites: Southern California and Southern Nevada. Mountain Press Publishing Company, Missoula, Montana
1998 Meaning and Metaphor in the Coso Petroglyphs: Understanding Great Basin Rock Art. In *Coso Rock Art: A New Perspective*, edited by Elva Younkin, pp. 109-174. Maturango Press, Ridgecrest, California.

Wicander, Reed, and James S. Monroe
1989 *Historical Geology: Evolution of the Earth and Life through Time*. West Publishing, St. Paul.

Wigand, Peter E.
1990 Vegetation History. In *Archaeological and Paleoenvironmental Investigations in the Ash Meadows National Wildlife Refuge, Nye County, Nevada*, by Stephanie D. Livingston and Fred L. Nials, pp. 15–48. Technical Report No. 70. Quaternary Sciences Center, Desert Research Institute, Las Vegas.
1997 A Late-Holocene Pollen Record from Lower Pahranagat Lake, Southern Nevada, USA: High Resolution Paleoclimatic Records and Analysis of Environmental Responses to Climate Change. In *Proceedings of Thirteenth Annual Pacific Climate (PACLIM) Workshop*, edited by C. M. Isaacs and V. L. Tharp, pp. 63–77. International Ecological Program, Technical Report No. 53. California Department of Water Resources, Sacramento.
2007 Postglacial Pollen Records of Southwestern North America. In *Encyclopedia of Quaternary Science*, edited by S. A. Elias, pp. 2773–2783. Elsevier, London.

Wigand, P. E., and D. Rhode
2002 Great Basin Vegetation History and Aquatic Systems: The Last 150,000 Years. In *Great Basin Aquatic Systems History*, edited by R. Hershler, D. B. Madsen and D. R. Currey, pp. 309–367. Contributions to the Earth Sciences No. 33. Smithsonian Institution Press, Washington, D.C.

Wigand, P. E., M. L. Hemphill, S. E. Sharpe, and S. Patra
1995 Great Basin Woodland Dynamics during the Holocene. In *Proceedings of the Workshop-Climate Change in the Four Corners and Adjacent Regions: Implications for Environmental Restoration and Land-Use Planning*, edited by W. J. Waugh, K. L. Petersen, P. E. Wigand, and B. D. Louthan. CONF-9409325, U.S. Department of Energy, Grand Junction, Colorado.

Williams, Peter
1967 IMACS Site Form for 26CK294. Document on file at the Southern Nevada SHPO Data Repository, Harry Reid Center, Barrick Museum of Natural History, University of Nevada, Las Vegas.

Williams, P. A., and R. J. Orlins
1963 *The Corn Creek Dunes Site: A Dated Surface Site in Southern Nevada*. Anthropological Papers No. 10. Nevada State Museum, Carson City.

Willig, Judith A., and C. Melvin Aikens
1988 The Clovis-Archaic Interface in Far Western North America. In *Early Human Occupation in Far Western North America: The Clovis-Archaic Interface,* edited by J. A. Willig, C. M. Aikens, and J. L. Fagan, pp. 1–40. Anthropological Papers No. 21, Nevada State Museum, Carson City.

Winograd, Isaac J., Tyler B. Coplen, Jurate M. Landwehr, Alan C. Riggs, Kenneth R. Ludwig, Barney J. Szabo, Peter T. Kolesar, and Kinga M. Revesz
1992 Continuous 500,000-Year Climate Record from Vein Calcite in Devils Hole, Nevada. *Science* 258:255–260.

Winograd, Isaac J., Jurate M. Landwehr, Tyler B. Coplen, Warren D. Sharp, Alan C. Riggs, Kenneth R. Ludwig, and Peter T. Kolesar
2006 Devils Hole, Nevada, $\delta^{18}O$ Record Extended to the Mid-Holocene. *Quaternary Research* 66:202–212.

Winslow, Diane L.
1996 Restricted Reconnaissance: The History and Archaeology of S. M. Wheeler in Nye County, Nevada. Unpublished master's thesis, Department of Anthropology and Ethnic Studies, University of Nevada, Las Vegas.
2004 Logandale Trails Phase I Mitigation: Sites 26CK192 and 26CK194/1893, Clark County, Nevada. Report prepared by HRC, UNLV, report no. 1-1-42 (3). Report prepared for the Bureau of Land Management, Las Vegas Field Office. BLM Report No. 5-2491
2006 Pithouses, Pithouses, Pithouses: Basketmaker II Architecture at Black Dog Mesa. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 229–248. Three Corners Conference, Las Vegas.
2009 *Pithouse Excavations, Locus 4. Mitigation, Black Dog Mesa Archaeological Complex (26CK5686/BML 53-7216)*, Vol. 3. BLM Report No. 5-2430(3), HRC Report No. 5-4-26(3). Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Winslow, Diane L., and Lynda Blair
2003 *Black Dog Cave, Vol. 2, Mitigation, Black Dog Mesa Archaeological Complex (26CK5686/BLM 53-7216)*. BLM Report No. 5-2430(2), HRC Report No. 5-4-26(2). Harry Reid Center for Environmental Studies, Marjorie Barrick Museum of Natural History, University of Nevada, Las Vegas.

Winslow, Diane L., and Jeffrey R. Wedding
2004 *A Class III Cultural Resource Inventory for the Las Vegas Four Wheelers – Hump and Bump Off-Road Even Logandale Trails ATV System, Clark County, Nevada.* BLM Report No. 5-2504(P), HRC Report No. 1-1-45. Prepared for Bureau of Land Management, Las Vegas District Office. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.
2008 Black Rocks from Near Red Rock: Obsidian Study Results from Three Prehistoric Sites in Clark County, Nevada. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 317–330. Nevada Archaeological Association, Las Vegas.

Wintch, Kenneth L.
2011 The Importance of Testing to Cultural Resource Management. In *Archaeology in 3D: Deciphering Buried Sites in the Western U.S.*, edited by Matthew Seddon, Heidi Roberts, and Richard V. N. Ahlstrom, pp. 183–194. SAA Press, Washington, D. C.

Wood, Raymond W., and Donald L. Johnson
1978 A Survey of Disturbance Processes in Archaeological Site Formation. In *Advances in Archaeological Method and Theory,* Vol. 1, edited by M. B. Schiffer, pp. 315–381. Academic Press, New York.

Woodman, Claudia C., and David W. Valentine
1999 *The Las Vegas Wash Intaglio (26CK4509), Clark County, Nevada*. Archaeological Report No. 99-07. HRA, Inc., Conservation Archaeology, Las Vegas.

Woods, Clyde M.
1986 *The Archaeology of Creation: Native American Ethnology of Cultural Resources at Pilot Knob.* Wirth Environmental Services, San Diego.
2001 *North Baja Pipeline Project Native American Studies.* Woods Cultural Research, Evergreen, Colorado.

Woodward, Arthur
1932 Gigantic Intaglio Pictographs in the California Desert. *The Illustrated London News,* 10 September. London.

Woody, Alanah
1996 *Layer by Layer: A Multigenerational Analysis of the Massacre Lake Rock Art Site*. Department of Anthropology Technical Report 97-1. University of Nevada, Reno.
2000 How to Do Things with Petroglyphs: The Power of Place in Nevada, U.S.A. Unpublished Ph.D. dissertation, Department of Archaeology, University of Southampton, Southampton.

Woody, Alanah, Pat Barker, and Angus R. Quinlan
2008 The Little Red Rocks Documentation Project (2 vols.). Prepared by the Nevada Rock Art Foundation, Reno. Report submitted to the Howard Hughes Corporation, Las Vegas.

Woody, Alanah, Angus R. Quinlan, and Pat Barker
2009 The Lagomarsino Canyon Petroglyph Site (26ST1) Documentation Project. Prepared by the Nevada Rock Art Foundation. Report submitted to the Nevada State Historic Preservation Office, Carson City.

Woody, Alanah and O. Frock
2006 An Experimental Approach to Pigment Analysis: Six Years Later. In *American Indian Rock Art,* Vol. 32, edited by Angus R. Quinlan and Anne McConnell. American Rock Art Research Association, Tucson, Arizona.

Wormington, H. Marie, and Dorothy Ellis
1967 *Pleistocene Studies in Southern Nevada*. Anthropological Papers No. 13. Nevada State Museum, Carson City.

Wright, Barton A.
1954 Excavation of Catclaw Cave, Lower Colorado River. Master's thesis, Department of Anthropology, University of Arizona, Tucson. Reprinted by the Arizona Archaeological Society in 2008.

Yates, Lorenzo
1877 Notes on the Aboriginal Money of California. *American Naturalist* 11(1):30–32.

York, Andrew L., Michael S. Kelly, and William Zukosky
1992 *Kern River Gas Transmission Company: Kern River Pipeline Cultural Resource Data Recovery Report, Nevada*. Dames & Moore, San Diego.

York, Andrew L., R. E. McMullen, P. deLespinasse, and W. G. Spaulding
1996 *Rock Art Sites on the Nellis Range Complex, Nellis Air Force Base, Nevada.* Dames & Moore, Inc., Las Vegas. Submitted to Nellis Air Force Base. Copies available from Nellis Air Force Base.

Zancanella, J. K.
1988 Early Lowland Prehistory in Southeastern Nevada. In *Early Human Occupation in Far Western North America: The Clovis-Archaic Interface*, edited by J. A. Willig, C. M. Aikens, and J. L. Fagan, pp. 251–272. Anthropological Papers No. 21. Nevada State Museum, Carson City.

Zeanah, David William
1996 Predicting Settlement Patterns and Mobility Strategies: an Optimal Foraging Analysis of Hunter-Gatherer Use of Mountain, Desert, and Wetland Habitats in the Carson Desert. Unpublished Ph.D. dissertation, Department of Anthropology, University of Utah.
2000 Transport Costs, Central-Place Foraging, and Hunter-Gatherer Alpine Land-Use Strategies. *Intermountain Archaeology*, edited by. D. B. Madsen and M. D. Metcalfe, pp. 1–14. Anthropological Papers No. 122. University of Utah Press, Salt Lake City.

Zielinski, G. A., P. A. Mayewski, L. D. Meeker, S. Whitlow, M. S. Twickler, M. Morrison, D. A. Meese, A. J. Gow, and R. B. Alley
1994 Record of Volcanism since 7000 BC from the GISP2 Greenland Ice Core and Implications for the Volcano-Climate System. *Science* 264(5161):948–995.

APPENDIX A
SOUTHERN NEVADA RADIOCARBON DATES

Richard V.N. Ahlstrom

SOUTHERN NEVADA RADIOCARBON DATES

Richard V.N. Ahlstrom

As a step in preparing this Prehistoric Context, we have attempted to compile all of the radiocarbon dates that have been obtained over the last 50 or so years from Prehistoric and Protohistoric period archaeological contexts in the southern Nevada study area. This compilation has taken two forms. The first of these is an Excel spreadsheet of the radiocarbon data that is suitable for use in GIS and other kinds of computer manipulation and analysis. The data in the spreadsheet, which is reproduced here as Table A.1, were used for assigning sites in the archaeological site database to time periods and for producing the charts showing the distribution of radiocarbon date ranges that are included in the report. Specifically, the average or mean dates computed from each date range were used in making the period assignments. To match the data in the charts, the dates are listed in Table A.1 in chronological order, as determined by their mean dates. (The "modern" dates that are included in the spreadsheet have no specific date ranges that could be averaged and, therefore, are not included in the date-distribution charts.)

The second form of data compilation consists of a series of tables, numbered below as A.2 through A.19, that present detailed, supporting documentation for the individual dates that are included in the spreadsheet. The latter tables group the radiocarbon dates by geographic areas and archaeological site localities: Ash Meadows, Eglington Escarpment, Wetlands Park Area, and so on. For completeness sake, the set includes a table listing radiocarbon dates from three sites located just outside the southern Nevada project area: O'Malley and Conaway shelters, which lie north of the project area's northeast edge, and Cliff's Edge, located along the Virgin River in far northwestern Arizona. The radiocarbon dates from these are not included in the spreadsheet. Also omitted from the spreadsheet are two dates from the Desert Dry Lake Area whose cultural association is open to question, two dates from Pintwater Cave that may have resulted from the prehistoric burning of a much older packrat midden, and nine dates obtained from organics underlying desert varnish that are of doubtful reliability.

The detailed and sample-specific information presented in Tables A.2 through A.19 can be contrasted with the simpler and more standardized data that appear in the spreadsheet, Table A.1:

- Basic details relating to the individual dated samples—including site number, sample number, sample provenience, sample age and standard error in radiocarbon years, and references—are presented in the tabular summaries *and* in the Excel spreadsheet. Note that the tables include original references, often consisting of hard-to-access gray-literature reports, as well as later relevant published compilations of dates, whereas the spreadsheet emphasizes the more readily available published compilations.
- The tables indicate whether the listed radiocarbon date represents a "conventional radiocarbon age" that has been C^{13}/C^{12} corrected for isotopic fractionation or a basic "radiocarbon age" that has not been corrected in this manner. The spreadsheet does not make this distinction.
- The tables provide a two-sigma (95.4% probability) calibrated or calendar date for each sample and, for a number of samples with calibrations that include two or more separate date ranges, a "most likely" calibrated date that excludes one or more of those date ranges at the "cost" of a slightly lower-than-two-sigma probability—in almost all cases, of 90 percent or more. It is these alternative calibrations that are included in the spreadsheet.
- The tables include the original or published calibration values, which can be accurate to the year or the decade, depending on the source of the calibration. The annual values are rounded in the spreadsheet to the nearest half decade—for example, A.D. 1050, 1055, 1060, and so on—to provide a degree of standardization in the calibrated date ranges.
- The tables include details about the individual dates—whether they were determined by the radiometric or AMS techniques, whether the C^{13}/C^{12} correction is based on measured or estimated values, and the source of the calibration data—that are not incorporated in the spreadsheet. The

calibrations that appeared in project reports or other publications have been used whenever they are available. These calibrations have been produced mostly with either the INTCAL or OxCal calibration routines. Dates for which a previous calibration was not available have been calibrated with the program CALIB. No effort has been made, in other words, to produce a complete set of calibrations using a single program. The alternative "most likely" calibrations mentioned above are based on calibration data provided by either the OxCal or CALIB programs.

Table A.1. Southern Nevada Radiocarbon Dates: Extracted from an Excel Spreadsheet and Listed in Chronological Order

SITE NO. (26-)	SITE NAME	SAMPLE	PROVENIENCE	MATERIAL	RADIO-CARBON AGE	COMBINED CAL DATE	MEAN CAL DATE	REFERENCE
CK5	Gypsum Cave	GF400; Beta-230605	Room 3, in packrat's nest	Wood (basketry)	8270±50	7480–7140 B.C.	-7310	Gilreath 2009
CK3799		5-1164-17; Beta-132702	Feat. 11, hearth (roasting pit?) debris	Charred material	6730±70	5735–5515 B.C.	-5625	Blair et al. 2000
CK3799		5-1164-12; Beta-132698	Feat. 20	Charred material	6160±110	5340–4800 B.C.	-5070	Blair et al. 2000
CK2605	Corn Creek, CL-243	UCLA-526	Hearth	Charcoal	5200±100	4320–3780 B.C.	-4050	Roberts and Lyon 2011
CK415	Flaherty Rockshelter	Beta-132742	Unit F-5, 20-30 cm	Charred material	5190±70	4220–3800 B.C.	-4010	Blair and Wedding 2001
CK2605	Corn Creek, CL-243	UCLA-533	Hearth 8	Charcoal	4900±100	3945–3380 B.C.	-3662.5	Roberts and Lyon 2011
CK2605	Corn Creek, CL-243	UCLA-532	Hearth 7	Charcoal	4610±100	3635–3030 B.C.	-3332.5	Roberts and Lyon 2011
CK2605	Corn Creek, CL-243	UCLA-531	Hearth	Charcoal	4580±100	3630–2935 B.C.	-3282.5	Roberts and Lyon 2011
CK3799		5-1164-82; Beta-132700	Feat. 5, 2-10 cm, rock-lined hearth (roasting pit?)	Charred material	4440±40	3335–2925 B.C.	-3130	Blair et al. 2000
CK2605	Corn Creek, CL-243	UCLA-525	Hearth	Charcoal	4440±100	3365–2885 B.C.	-3125	Roberts and Lyon 2011
CK5434	Firebrand Cave	5-1177-110-1; Beta-112558;	Map Reference 11	Dart component	4430±70	3345–2900 B.C.	-3122.5	Blair and Winslow 2006
CK2605	Corn Creek, CL-243	UCLA-534	Hearth 9	Charcoal	4380±100	3360–2705 B.C.	-3032.5	Roberts and Lyon 2011
CK5434	Firebrand Cave	5-1177-122-5; DRI-3436	Map Reference 23C	Netting	4313±123	3335–2610 B.C.	-2972.5	Blair and Winslow 2006
	Tule S. Loc. 65	A-465	Unit F1, hearth in dune area	Charcoal	4190±170	3335–2305 B.C.	-2820	Haynes 1967
CK8179	Sheep Shelter	8179-F12	N5/W5 (40-70 cm)	Charcoal	4190±50	2900–2625 B.C.	-2762.5	McGuire et al. 2010
CK2605	Corn Creek, CL-243	UCLA-535	Hearth 10	Charcoal	4030±100	2875–2300 B.C.	-2587.5	Roberts and Lyon 2011
CK39	Stuart Rockshelter	M-376	Fire Hearth 4 Pit 2A-2B, 3A-3B; 78" bs, on "original" shelter surface (Early Horizon)	Charcoal	4050±300	3370–1770 B.C.	-2570	Shutler et al. 1960
CK415	Flaherty Rockshelter	Beta-132727	Balk F-7/F-8, 70-80 cm	Charred material	3880±70	2560–2140 B.C.	-2350	Blair and Wedding 2001
CK5	Gypsum Cave	GF865; Beta-230814	Room 3, 3" from surface	Wood (biface hafted)	3880±40	2470–2210 B.C.	-2340	Gilreath 2009
CK5434	Firebrand Cave	103-1; Beta-200622	Map Reference 4A	Bone collagen, mule deer tibia	3850±40	2460–2200 B.C.	-2330	Blair and Winslow 2006
CK3799		5-1164-66; Beta-132697	Feat. 8, hearth (roasting pit?)	Charcoal	3880±110	2620–2025 B.C.	-2322.5	Blair et al. 2000
CK39	Stuart Rockshelter	M-377	Fire Hearth 3; Pit 2A-2B, 3A-3B; 50" bs (Early Horizon)	Charcoal	3870±250	2940–1660 B.C.	-2300	Shutler et al. 1960
CK5434	Firebrand Cave	123-1; DRI-3433	Map Reference 24	Dart component	3834±97	2495–2020 B.C.	-2257.5	Blair and Winslow 2006

SITE NO. (26-)	SITE NAME	SAMPLE	PROVENIENCE	MATERIAL	RADIO-CARBON AGE	COMBINED CAL DATE	MEAN CAL DATE	REFERENCE
CK2605		PRI-08-85-286	Unknown	Unidentified hardwood charcoal	3785±20	2290–2140 B.C.	-2215	Roberts and Lyon 2011
CK5	Gypsum Cave	GF113; Beta-228748	Room 3, west end	Wood (dart shaft)	3760±50	2300–2030 B.C.	-2165	Gilreath 2009
CK5434	Firebrand Cave	131-1; Beta-200625	Map Reference 32A	Cordage	3750±40	2290–2030 B.C.	-2160	Blair and Winslow 2006
CK5434	Firebrand Cave	124-1; Beta-200623	Map Reference 25	Cordage	3680±50	2290–2030 B.C.	-2160	Blair and Winslow 2006
CK5	Gypsum Cave	6F1042; Beta-228757	Room 2, under layer w/ sloth dung & hair	wood (dart shaft)	3740±50	2290–2020 B.C.	-2155	Gilreath 2009
CK5	Gypsum Cave	6F591; Beta-228753	Room 2, under layer w/ sloth dung & hair	Wood (dart shaft)	3740±50	2290–2020 B.C.	-2155	Gilreath 2009
CK5	Gypsum Cave	GF398; Beta-228751	Room 5, Sloth [dung?] 5” deep from Stake 4 at entrance to room	Cane (dart shaft)	3730±40	2280–2020 B.C.	-2150	Gilreath 2009
CK415	Flaherty Rockshelter	Beta-132729	Balk F-7/F-8, 80-90 cm	Charred material	3740±60	2310–1965 B.C.	-2137.5	Blair and Wedding 2001
CK5434	Firebrand Cave	130-1; Beta-200624	Map Reference 31	Cordage	3750±40	2290–1920 B.C.	-2105	Blair and Winslow 2006
CK5	Gypsum Cave	6F1040; Beta-228756	Room 2, general digging, rock slide	Wood (dart shaft)	3640±40	2130–1900 B.C.	-2015	Gilreath 2009
CK5	Gypsum Cave	GF483; Beta-230813	Room 3, found at about 2’ deep	Wood (weaponry bunt)	3620±40	2130–1890 B.C.	-2010	Gilreath 2009
CK5434	Firebrand Cave	133-1; DRI-3438	Map Reference 37	Firebrand	3590±78	2140–1740 B.C.	-1940	Blair and Winslow 2006
CK5	Gypsum Cave	GF397; Beta-228750	Room 3, left of entrance between Rooms 3 and 2	Cane (dart shaft)	3550±40	2010–1760 B.C.	-1885	Gilreath 2009
CK5	Gypsum Cave	GF430; Beta-228752	Room 3, on surface of rock in west of room	Cane (dart shaft)	3540±40	1970–1750 B.C.	-1860	Gilreath 2009
CK5434	Firebrand Cave	127-4; DRI-3431	Map Reference 28G	Dart component	3502±154	2205–1435 B.C.	-1820	Blair and Winslow 2006
CK5434	Firebrand Cave	129-1; DRI-3437	Map Reference 30A	Dart component	3449±55	1890–1610 B.C.	-1750	Blair and Winslow 2006
CK5	Gypsum Cave	GF922; n.d.	Room 5	Wood (dart shaft)	3400± 50	1875–1535 B.C.	-1705	Gilreath 2009
CK253	Pintwater Cave	Beta-65254	Susia test pit, 18-24” below datum	Charcoal	3400±80	1895–1505 B.C.	-1700	Buck and DuBarton 1994
CK5434	Firebrand Cave	128-7; DRI-3428	Map Reference 29D	Cane fragment	3385±88	1885–1500 B.C.	-1692.5	Blair and Winslow 2006
CK5434	Firebrand Cave	133-2; Beta-112560	Map Reference 37	Firebrand	3340±70	1760–1440 B.C.	-1600	Blair and Winslow 2006
CK253	Pintwater Cave	UCLA-752	Pocket No. 1, 3-6” below surface	Twigs	3255±80	1700–1390 B.C.	-1545	Buck and DuBarton 1994
CK415	Flaherty Rockshelter	Beta-132733	Balk F-7/F-8, 40-50 cm	Charred material	3220±70	1650–1380 B.C.	-1515	Blair and Wedding 2001
CK5434	Firebrand Cave	151-1; DRI-3432	Map Reference 16	Basketry	3242±153	1890–1115 B.C.	-1502.5	Blair and Winslow 2006
CK5434	Firebrand Cave	128-22; Beta-112559	Map Reference 29P	Dart component	3230±80	1675–1315 B.C.	-1495	Blair and Winslow 2006
CK5	Gypsum Cave	6F929; Beta-228755	Room 1, Level 2	Wood (dart shaft)	3180±50	1530–1380 B.C.	-1455	Gilreath 2009
CK8179	Sheep Shelter	8179-F13	S6.5/W1.5 (100-115 cm)	Charcoal	3170±50	1535–1315 B.C.	-1425	McGuire et al. 2010
CK415	Flaherty Rockshelter	Beta-132728	Balk F-7/F-8, 60-70 cm	Charred material	3100±60	1500–1215 B.C.	-1357.5	Blair and Wedding 2001

SITE NO. (26-)	SITE NAME	SAMPLE	PROVENIENCE	MATERIAL	RADIO-CARBON AGE	COMBINED CAL DATE	MEAN CAL DATE	REFERENCE
CK415	Flaherty Rockshelter	Beta-132738	Unit G-6, 58 cm	Charred material	3060±60	1435–1130 B.C.	-1282.5	Blair and Wedding 2001
CK415	Flaherty Rockshelter	Beta-132732	Balk F-7/F-8, 50-60 cm	Charred material	3030±60	1420–1105 B.C.	-1262.5	Blair and Wedding 2001
CK2605		PRI-08-85-322	Unknown	*Prosopis* charcoal	2950±15	1260–1110 B.C.	-1185	Roberts and Lyon 2011
CK5	Gypsum Cave	6F592; UCLA-1223	Room 2, 102" deep	Wood (dart shaft)	2900±80	1370–895 B.C.	-1132.5	Gilreath 2009
CK1112B		UGa 761	Pit A8, 60-70 cm	Charcoal	2795±65	1122–815 B.C.	-968.5	Brooks et al. 1975
CK2605	Corn Creek, Locus 1	Beta-172584	Feat. 2 (rp), 53+ cm	Charred material	2760±40	1000–820 B.C.	-910	Roberts and Lyon 2011
CK7454		PRI-08-86-430-143	Unit E, Level 16 (136-146 cmbs)	*Prosopis* twig charcoal	2775±15	980–840 B.C.	-910	DuBarton 2009
CK6078/ 6095	Cedar Basin Midden	6078/6095-F5	Lower Midden, S5/E1 (50-70 cm)	Charcoal	2730±40	975–805 B.C.	-890	McGuire et al. 2010
CK415	Flaherty Rockshelter	Beta-132734	Balk F-7/F-8, 30-40 cm	Charred material	2640±60	905–770 B.C.	-837.5	Blair and Wedding 2001
CK5	Gypsum Cave	GF651; UCLA-1069	Passage to Room 5, 28" deep	Wood (sticks)	2400±60	760–385 B.C.	-572.5	Gilreath 2009
CK1992		UGa-4557	95 cm	Charcoal	2400±80	780–365 B.C.	-572.5	McGuire et al. 2010
CK1091	Roadside Roast	UGa-4442	Unit 3; roasting pit/midden (70-80 cm)	Charcoal	2430±305	1295 B.C.–A.D. 175	-560	Blair 1986
CK1987		UGa-4558	110-120 cm	Charcoal	2450±155	905–190 B.C.	-547.5	McGuire et al. 2010
CK415	Flaherty Rockshelter	Beta-132731	Balk F-7/F-8, 20-30 cm	Charred material	2350±60	750–240 B.C.	-495	Blair and Wedding 2001
CK3201	Collapsed Rock Shelter	3201-F10	N3/E0 (30-40 cm)	Charcoal	2200±40	380–75 B.C.	-277.5	McGuire et al. 2010
CK415	Flaherty Rockshelter	Beta-132743	Unit D-6, 50-60 cm	Charred material	2220±60	395–115 B.C.	-255	Blair and Wedding 2001
CK1474		USGS 04208505	firepit; 7.4 m	Charcoal	2280±80	405–55 B.C.	-230	Ahlstrom 2005
CK6146	Larder site	FN 323; 6146-7; Beta-230255	Feature 14 (pit)	Seed pod	2160±40	360–90 B.C.	-225	Ahlstrom 2008a, 2008b
CK6146	Larder site	FN 426; 6146-12; Beta-232634	Feature 52 (pit)	Seed & pod	2140±40	360–50 B.C.	-205	Ahlstrom 2008a, 2008b
CK6146	Larder site	FN 288; 6146-11; Beta-230259	Feature 47 (pit)	Maize cob fragments	2130±40	350–50 B.C.	-200	Ahlstrom 2008a, 2008b
CK3201	Collapsed Rockshelter	3201-Fll	N3/W1 (126-146 cm)	Charcoal	2110±40	350–40 B.C.	-195	McGuire et al. 2010
CK1474		1474-1; Beta-153771	Locus B, Feat. 1 (ash & charcoal stained sediment, 7 m below surface)	Wood charcoal	2140±120	410 B.C.–A.D. 100	-155	Ahlstrom 2005
CK6146	Larder site	FN 356; 6146-3; Beta-217140	Feature 27 (pit)	Charcoal	2060±50	190 B.C.–A.D. 50	-70	Ahlstrom 2008a, 2008b
CK6355		01-06-01S1; Beta-156144	Feat. 1 (roasting pit), 4.8 m below historic Muddy River floodplain	Charred material	2020±40	110 B.C.–A.D. 70	-20	Ahlstrom et al. 2001
LN4970		Beta-218928	F12, Locus D, surface; FCR concentration	From "charcoal stain"	2000±40	111 B.C.–A.D. 85	-13	Wriston 2008

SITE NO. (26-)	SITE NAME	SAMPLE	PROVENIENCE	MATERIAL	RADIO-CARBON AGE	COMBINED CAL DATE	MEAN CAL DATE	REFERENCE
CK6146	Larder site	FN 263; 6146-5; Beta-217142	Feature 51 (pit)	Charcoal	1990±50	100 B.C.–A.D. 100	0	Ahlstrom 2008a, 2008b
	Barnett site	Average of six dates, from samples A-1015, 1020, 1021, 1023, 1024, and 1025	three burial pits (burned prior to use) and associated midden	Charcoal, primarily *Prosopis*	1950±100	200 B.C.–A.D. 260	30	Mehringer and Warren 1976; Muto et al. 1976
CK3601	Burnt Rock Mound	Beta-143484	Unit 1, 40-50 cm	Charred material	1960±60	80 B.C.–A.D. 155	37.5	Rager 2001; Seymour and Rager 2005
NY1729	Fairbanks Spring	FN 274; Beta-273313	EU 5; F. 09-04, 15-35 cmbs (pit; hearth?)	Charred grass (*Leymus*/wild rye?) seed	1960±40	40 B.C.–A.D. 120	40	Davide et al. 2010
CK6146	Larder site	FN 238; 6146-4; Beta-217141	Feature 49 (pit)	Charcoal	1920±40	A.D. 10–150	80	Ahlstrom 2008a, 2008b
CK415	Flaherty Rockshelter	Beta-132730	Balk F-7/F-8, 10-20 cm	Charred material	1940±60	55 B.C.–A.D. 225	85	Blair and Wedding 2001
CK3601	Burnt Rock Mound	Beta-152722	Unit 1, 30-40 cm	Charred material	1930±60	50 B.C.–A.D. 230	90	Rager 2001; Seymour and Rager 2005
CK1474		5-660-3144; UGa-2925	F. 157, 370-380 cm	Charcoal	1910±60	2 B.C.–A.D. 240	119	Ahlstrom 2005
CK5686	Black Dog Cave	5-1174-51-29; Beta-146245	Feature 8A, Surface to 30 cm	Maize cob	1910+40	A.D. 20–220	120	Winslow and Blair 2003; Winslow 2009
CK1088	Pestisite	UGa-4445	Component I (rockshelter), Unit 2, (roasting-pit) midden (100-110 cm)	Charcoal	1855±275	420 B.C.–A.D. 690	135	Blair 1986
CK6146	Larder site	FN 166; 6146-2; Beta-217139	Feature 18 (pit)	Charcoal	1880±50	A.D. 30–240	135	Ahlstrom 2008a, 2008b
CK7994	Kirk's Grotto Rockshelter	7994-50	Feature 1, interior bottom (10-20 cm)	*Yucca* fiber	1860±50	A.D. 50–255	152.5	McGuire et al. 2010
CK1990		1990-5	Roasting Pit 3 (agave oven), Test Unit (20+ cm)	Charcoal	1850±40	A.D. 70–250	160	McGuire et al. 2010
CK6146	Larder site	FN 271; 6146-10; Beta-230258	Feature 45 (hearth)	Seed	1850±40	A.D. 70–250	160	Ahlstrom 2008a, 2008b
CK8047	Dart Shaft Shelter	8047-5	Rock Shelter 5 (surface)	Maize cob	1820±40	A.D. 85–260	172.5	McGuire et al. 2010
CK6080/ 6081	Ian's Rock Shelter	6080/6081-F3	S3/W5 (66-80 cm)	Charcoal	2030±40	165 B.C.–A.D. 575	205	McGuire et al. 2010
CK5686	Black Dog Cave	5-1174-35-70; Beta-146243	Unit 4-s, Stratum 3	Maize cob	1820+60	A.D. 70–370	220	Winslow and Blair 2003; Winslow 2009
CK6444	Yamashita 1	A228-0085/-0001; Beta-162563	Structure 1, floor, next to burned cottonwood post	Charcoal chunks	1810±40	A.D. 110–330	220	Lyneis 2004
CK6445	Yamashita 2	A229-2173; Beta-170575	220N84W; 170-180 cm; Cist 6 (BM II Component)	Burned maize cob	1800±40	A.D. 120–340	230	Lyneis 2004

SITE NO. (26-)	SITE NAME	SAMPLE	PROVENIENCE	MATERIAL	RADIO-CARBON AGE	COMBINED CAL DATE	MEAN CAL DATE	REFERENCE
CK5686	Black Dog Cave	5-1174-79-38; Beta-146249	Unit 13 South, Stratum 4	Gourd rind	1780±70	A.D. 80–410	245	Winslow and Blair 2003; Winslow 2009
CK6444	Yamashita 1	A228-0159; Beta-186614	Structure 1, Tu #9, SS #2; 44 cm (BM II Component)	Charred *Pluchea sericea*	1780±30	A.D. 150–340	245	Lyneis 2004
CK5686	Black Dog Cave	5-1174-56-3; Beta-146246	Unit 10 North, L. 1 (0-25 cm)	Basketry	1780±40	A.D. 130–370	250	Winslow and Blair 2003; Winslow 2009
CK6445	Yamashita 2	A229-3423; Beta-170578	198N82W; 150-160 cm; Cist 5 (BM II Component)	Burned maize fragment	1780±40	A.D. 135–365	250	Lyneis 2004
CK5686	Black Dog Cave	5-1174-59-6; Beta-146247	Unit 11 South, L. (0-25 cm)	Basketry	1760±50	A.D. 130–400	265	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Mesa	5-1174-712-1-2; Beta-157788	Feature 9, central hearth (F. 9-1), floor to -30 cm	charcoal from feature fill	1750±60	A.D. 130–420	275	Winslow 2009
CK6446	Yamashita 3	A230-3507/ -3508; Beta-172541	223N70W; 145-155 cm; charcoal layer in Cist 8 (BMII Component)	Charcoal	1750±60	A.D. 130–420	275	Lyneis 2004
CK5686	Black Dog Cave	AA25318	Pit 31	Maize cob fragment	1735+45	A.D. 145–415	280	Lyneis 1999
CK5686	Black Dog Mesa	5-1174-700-6; Beta-160768	Feature 40 (roasting pit?)	Charcoal and sediment from fill	1730±60	A.D. 135–425	280	Winslow 2009
CK5686	Black Dog Cave	5-1174-700-6; Beta-160768	charcoal concentration in sediment matrix	Charcoal in sediment matrix	1730±60	A.D. 140–430	285	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Cave	5-1174-101-277; Beta-146252	Unit 2, Stratum 1, 2	Axe handle	1760±30	A.D. 220–370	295	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Cave	5-1174-32-69-74; Beta-146248	Unit 2, Stratum 3	Woven textile	1740±30	A.D. 230–390	310	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Cave	NSM 2-121-BMA; Beta-160761	unknown	Basketmaker-style sandal	1720±40	A.D. 230–410	320	Winslow and Blair 2003; Winslow 2009
CK6080/ 6081	Ian's Rock Shelter	6080/6081-F1	Feature 1, S3/W3 (35-45 cm)	Charcoal	1710±50	A.D. 210–435	322.5	McGuire et al. 2010
CK5686	Black Dog Cave	AA25317S	Pit 31	Maize cob fragment	1710+45	A.D. 230–425	327.5	Lyneis 1999
CK5686	Black Dog Cave	5-1174-33-26; Beta 146242	Unit 4 South, Stratum 1	Woven textile	1710±40	A.D. 240–420	330	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Mesa	5-1174-728-32; Beta-157784	Feature 8, Level 5, (100-125 cm), 1984N 2041E	Charred wooden roof material	1700±40	A.D. 240–420	330	Winslow 2009
CK5686	Black Dog Mesa	5-1174-733-33; Beta-157786	Feature 8, Level 5, (100-125 cm), floor, 1986N 2041E	Carbonized maize	1700±40	A.D. 240–420	330	Winslow 2009
CK5686	Black Dog Mesa	5-1174-718-38; Beta-157787	Feature 9, Level 4, (75-100 cm), floor cleanup	Charred material from floor	1710±50	A.D. 230–430	330	Winslow 2009

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CK1088	Pestisite	UGa-4446	Component II (rockshelter), Unit 3 (front of shelter; 50-60 cm)	unknown	1705±135	A.D. 50–615	332.5	Blair 1986
CK3766	Pardee site	Beta-34061	Ex. U. 1, 40-50 cm, hearth	Charcoal	1710±90	A.D. 125–540	332.5	White et al. 1989
CK5434	Firebrand Cave	142-22; DRI-3430	Map Reference 100; collected w/ corn kernels at 60-70 cm, Test Probe TP1	Charcoal	1722±88	A.D. 130–540	335	Blair and Winslow 2006
CK1474		5-660-3155; UGa-2929	F. 119; 335-350 cm	Charcoal	1675±245	200 B.C.–A.D. 880	340	Ahlstrom 2005
CK1091	Roadside Roast	UGa-4441	Unit 4, charcoal concentration (in front of shelter; 70-80 cm)	Charcoal	1690±100	A.D. 130–570	350	Blair 1986
CK5686	Black Dog Mesa	5-1174-734-2; Beta-157783	Feature 8, Level 5, (100-125 cm), 1984N 2039E	Charred wooden beam fragment	1670±40	A.D. 260–440	350	Winslow 2009
CK5434	Firebrand Cave	100-1; Beta-112556	Map Reference 1	Spirit stick/ regalia	1700±60	A.D. 225–515	370	Blair and Winslow 2006
CK5686	Black Dog Cave	5-1174-51-28; Beta-146244	Feature 8A, Surface to 30 cm	Maize cob	1670+50	A.D. 250–520	385	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Mesa	5-1174-721-50; Beta-157785	Feature 8, Level 4, (75-100 cm), 1984N 2041E	Charred wooden roof material	1660±40	A.D. 320–450	385	Winslow 2009
CK5686	Black Dog Mesa	5-1174-670-44; Beta-157792	Feature 12, Level 3, (50-75 cm), floor, 2010N 2062E	Charred roof material	1660±40	A.D. 320–450	385	Winslow 2009
CK5686	Black Dog Cave	5-1174-101-269; Beta-146250	Unit 2, Stratum 1	Agave knife	1650±40	A.D. 330–520	425	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Cave	NSM 2-121-16; Beta-160763	unknown	Basketmaker-style sandal	1650±40	A.D. 330–520	425	Winslow and Blair 2003; Winslow 2009
CK1474		5-660-1151; UGa-3122	490-500 cm	Charcoal?	1610±115	A.D. 210–655	432.5	Ahlstrom 2005
CK5686	Black Dog Cave	NSM 2-121-28; Beta-160760	unknown	S-shaped stick fragment	1620±40	A.D. 370–540	455	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Mesa	5-1174-576-2; Beta-151047	Feature 11, floor, 2000N 2040E	Wooden beam fragment	1610±60	A.D. 330–580	455	Winslow 2009
CK5686	Black Dog Mesa	5-1174-671-11; Beta-157791	Feature 12, Level 3, (50-75 cm), floor, 2008N 2059E	Charred roof material	1620±40	A.D. 370–540	455	Winslow 2009
CK1474		USGS 2103861	firepit; 5.9 m	Charcoal	1570±100	A.D. 255–660	457.5	Ahlstrom 2005
CK5686	Black Dog Cave	NSM 2-121-BMB; Beta-160762	unknown	Basketmaker-style sandal	1610±40	A.D. 380–540	460	Winslow and Blair 2003; Winslow 2009
LN4970		Beta-230941	F13, Locus E; FCR concentration	From “charcoal stain”	1610±40	A.D. 380–545	462.5	Wriston 2008
CK6139		Beta-283275	Feature 2 (hearth)	Maize cupule	1600±40	A.D. 390–550	470	Eskenazi and Ahlstrom 2011

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CK3601	Burnt Rock Mound	Beta-143483	Unit 2, 50-60 cm	Charred material	1590±70	A.D. 330–625	477.5	Rager 2001; Seymour and Rager 2005
CK5686	Black Dog Cave	NSM 2-121-F8B; Beta-160765	unknown	Figure-8 style sandal; *Yucca*	1580±40	A.D. 400–570	485	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Mesa	5-1174-580; Beta-151048	Feature 11, central hearth (F. 11-1)	Charcoal from feature fill	1570±60	A.D. 380–620	500	Winslow 2009
NY1964	Sever Tanks	Beta-5652	Unit B, 58-67 cmbd, assoc. w/ Gatecliff Split-stemmed point	unknown	2040±220	569 B.C.–A.D. 432	500.5	Buck et al. 1998; Pippin 1984
CK5434	Firebrand Cave	117-1; DRI-3435	Map Reference 18	Basketry	1523±97	A.D. 330–680	505	Blair and Winslow 2006
CK5686	Black Dog Cave	NSM 2-121-F8A; Beta-160764	unknown	Figure-8 style sandal; *Yucca*	1550±50	A.D. 410–620	515	Winslow and Blair 2003; Winslow 2009
CK1282		1282-8A; Beta-189298 & 1282-7A, Beta-189296	Feat. 3 (pithouse); hearth & floor fill/ roof fall	Charred seeds	1560±40 & 1520±40	A.D. 410–630	515.5	Ahlstrom 2005
CK5686	Black Dog Cave	5-1174-101-270; Beta 146251	Unit 2, Stratum 1, 2	Bow	1510±40	A.D. 440–640	540	Winslow and Blair 2003; Winslow 2009
CK7994	Kirk's Grotto Rock Shelter	7994-F6	N14/W28.5 (35-50 cm)	Charcoal	1490±40	A.D. 435–650	542.5	McGuire et al. 2010
CK1282		1283-3; Beta-153770	Feat. 4 (metates and charcoal stain)	Charcoal	1500±40	A.D. 450–640	545	Ahlstrom 2005
CK1086	Windy site	UGa 765	Hearth 1, at 20-30 cm, outside rock structure	Charcoal	1475±85	A.D. 410–690	550	Brooks et al. 1975
CK1088	Pestisite	UGa-4444	Component II (rockshelter), Unit 2 (front of shelter; 60-70 or 70-80 cm)	Unknown	1470±125	A.D. 320–780	550	Blair 1986
CK4893		unknown	unknown	Soil	1400±100	A.D. 425–785	605	McGuire et al. 2010
CK4440		Beta-47987	Feat. 12-1, charcoal stain	Charcoal	1420±60	A.D. 540–690	615	York et al. 1992
CK2605	Corn Creek, Locus 1	Beta-172585	probable pithouse	*Ceratiodes* ? Charcoal	1420±70	A.D. 530–710	620	Roberts and Lyon 2011
CK5434	Firebrand Cave	102-1; DRI-3429	Map Reference 3	Basketry	1407±55	A.D. 545–715	630	Blair and Winslow 2006
CK1282		1282-2; Beta-153769	Feat. 3 (pit structure)	Charcoal	1420±130	A.D. 390–890	640	Ahlstrom 2005
CK5434	Firebrand Cave	102-1; Beta-112557	Map Reference 3	Basketry	1400±100	A.D. 440–865	652.5	Blair and Winslow 2006
CK4908		Beta-132710	Feat. 1 (roasting mound), E-W Trench, 1 m	Charcoal	1390±60	A.D. 560–760	660	Blair et al. 2000
CK3064		unknown	Burial	Unknown	1355±70	A.D. 555–785	670	McGuire et al. 2010
CK5686	Black Dog Mesa	5-1174-507-19; Beta-162122	Feature 10, Level 5, (100-125 cm), 1995N 2046E	S-shaped stick	1360±40	A.D. 605–770	687.5	Winslow 2009

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CK1095	Ishi Comin?	UGa-4461	Roasting Pit 3, slab and boulder-lined hearth (30-40 cm)	unknown	1355±75	540–850	695	Blair 1986
CK6146	Larder site	FN 438; 6146-6; Beta-217143	Feature 55A (pit)	Charcoal	1350±40	A.D. 640–760	700	Ahlstrom 2008a, 2008b
CK5686	Black Dog Mesa	5-1174-677-1; Beta-157793	Feature 12, subfloor feature (F. 12-2), floor to –30 cm	Charcoal & ash from fill	1340±40	A.D. 640–770	705	Winslow 2009
CK1474		5-660-3152; UGa-3123	490 cm	Charcoal?	1345±160	A.D. 400–1020	710	Ahlstrom 2005
CK5686	Black Dog Mesa	5-1174-505-440; Beta-162123	Feature 10, Level 4, (75-100 cm), 1995N 2046E	Carbon from interior of Logandale Gray sherd	1310±40	A.D. 645–780	712.5	Winslow 2009
CK5686	Black Dog Mesa	5-1174-507-20; Beta-160766	Feature 10, Level 5, (100-125 cm), 1995N 2046E	S-shaped stick fragment	1320±40	A.D. 650–775	712.5	Winslow 2009
CK4898		unknown	unknown	Charcoal	1350±80	A.D. 555–875	715	McGuire et al. 2010
CK5686	Black Dog Cave	5-1174-507-20; Beta-160766	unknown	unknown	1320±40	A.D. 650–780	715	Winslow and Blair 2003; Winslow 2009
CK1474		1474-2; Beta-153772	Feat. 12 (ash-stained sediment)	Wood charcoal	1300±40	A.D. 660–790	725	Ahlstrom 2005
CK4892		unknown	unknown	Soil	1320±80	A.D. 580–890	735	McGuire et al. 2010
CK1474		5-660-3140; UGa-2926	F. 142; 350-390 cm	Charcoal	1275±290	A.D. 210–1285	747.5	Ahlstrom 2005
CK5686	Black Dog Mesa	5-1174-507-2; Beta-162121	Feature 10, Level 5, (100-125 cm), 1995N 2046E	Carbonized basketry & maize	1290±40	A.D. 655–855	755	Winslow 2009
CK2072	Steve Perkins site	UGa-791	Struct. V (pit house), hearth	Charcoal	1295±60	A.D. 645–875	760	Myhrer 1989
CK6147	Scorpion Knoll	FN 137; 6147-1; Beta-217144	Feature 4 (pit structure)	Outer rings from a mesquite pole	1280±40	A.D. 660–860	760	Ahlstrom 2008a, 2008b
CK3601	Burnt Rock Mound	Beta-143487	Unit 8, 50-60 cm	Charred material	1280±60	A.D. 650–885	767.5	Rager 2001; Seymour and Rager 2005
CK4891	Riverside Pithouse Village	4891-9	Unit 5, Post Hole 1 (48-54 cm)	Charcoal	1280±60	A.D. 655–880	767.5	McGuire et al. 2010
CK948	Big Springs	unknown	"hearth A"	unknown	1270±40	A.D. 670–870	770	Roberts and Seymour 2006
CK1095	Ishi Comin?	UGa-4440	Unit I, hearth (30-40 cm)	unknown	1275±145	A.D. 510–1030	770	Blair 1986
CK1474		UGa-1827	hearth, 5 m below surface	Charcoal	1280±80	A.D. 640–900	770	Ahlstrom 2005
CK3601	Burnt Rock Mound	Beta-152721	Unit 14, 20-30 cm	Charred material	1270±40	A.D. 670–870	770	Rager 2001; Seymour and Rager 2005
CK5686	Black Dog Mesa	5-1174-598-188; Beta-157789	Feature 10, Level 5, (100-125 cm), floor, 1994N 2045E	Carbonized reed	1270±40	A.D. 670–870	770	Winslow 2009

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CK1309	Metate site	UGa-4450	Unit 2B (60-70 cm); rockshelter midden	Charcoal	1290±190	A.D. 389–1157	772.5	Blair 1986
CK6147	Scorpion Knoll	FN 51; 6147-4; Beta-232636	Feature 2 (pit structure?/roasting feature?)	Charcoal	1250±40	A.D. 670–880	775	Ahlstrom 2008a, 2008b
	Barnett site	A-1016	SW of Barnett site; charcoal lens (hearth?)	unknown	1280±110	A.D. 575–985	780	Mehringer and Warren 1976
CK948	Big Springs	unknown	"A"	unknown	1240±40	A.D. 680–890	785	Roberts and Seymour 2006
CK1098	Basic site	UGa 764	Pit A5, B5, C5 (50 cm-bedrock)	Charcoal	1245±145	A.D. 535–1050	792.5	Brooks et al. 1975
CK2605		PRI-08-85-63		*Atriplex* charcoal	1220±15	A.D. 710–880	795	Roberts and Lyon 2011
CK1474		5-660-3150; UGa-2934	335-350 cm	Charcoal	1220±145	A.D. 550–1050	800	Ahlstrom 2005
CK6147	Scorpion Knoll	FN 49; 6147-3; Beta-232635	Feature 1 (pit structure)	Seed	1200±40	A.D. 690–950	820	Ahlstrom 2008a, 2008b
CK1991	TheAgave Ovens site	1991-F28	Pit 3 (agave oven), Strat IV	Charcoal	1200±60	A.D. 680–970	825	McGuire et al. 2010
CK5686	Black Dog Mesa	5-1174-505; Beta-151045	Feature 10, Level 4, (75-100 cm), 1995N 2046E	Wooden beam fragment	1200±50	A.D. 690–970	830	Winslow 2009
CK415	Flaherty Rockshelter	Beta-132735	Balk F-7/F-8, 0-10 cm	Charred material	1180±50	A.D. 705–980	842.5	Blair and Wedding 2001
CK2605		FN 929; Beta-273311	unknown	unknown	1180±40	A.D. 720–970	845	Roberts and Lyon 2011
CK5686	Black Dog Mesa	5-1174-603-33; Beta-160767	Feature 28 (hearth)	Charcoal and ash from fill	1160±60	A.D. 695–995	845	Winslow 2009
CK3601	Burnt Rock Mound	Beta-143488	Unit 8, 60-70 cm	Charred material	1160±80	A.D. 680–1020	850	Rager 2001; Seymour and Rager 2005
CK5686	Black Dog Cave	5-1174-603-33; Beta-160767	charcoal concentration in sediment matrix	Charcoal	1160±60	A.D. 710–1000	855	Winslow and Blair 2003; Winslow 2009
CK5686	Black Dog Mesa	5-1174-598-189; Beta-157790	Feature 10, Level 5, (100-125 cm), floor, 1994N 2045E	Carbonized maize	1170±40	A.D. 770–980	875	Winslow 2009
CK3091		3091-1	agave oven, TU N0/E0 (30-40 cm)	Charcoal	1140±40	A.D. 780–985	882.5	McGuire et al. 2010
CK7951		7951-5	agave oven, TU 1 (0-10 cm)	Charcoal	1130±40	A.D. 780–990	885	McGuire et al. 2010
CK1112D		UGa 762	roasting pit/midden, at 25-30 cm	Charcoal	1125±75	A.D. 760–1030	895	Brooks et al. 1975
CK5686	Black Dog Mesa	5-1174-507; Beta-151046	Feature 10, Level 5, (100-125 cm), 1995N 2046E	Carbonized maize cobs	1120±50	A.D. 790–1010	900	Winslow 2009
CK2605		PRI-08-85-309	unknown	Maize kernel, charred	1130±15	A.D. 885–975	930	Roberts and Lyon 2011
CK948	Big Springs	unknown	"C"	unknown	1140±40	A.D. 870–1010	940	Roberts and Seymour 2006

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CK6147	Scorpion Knoll	FN 79; 6147-2; Beta-230260	Feature 3 (roasting pit)	Seed	1090±40	A.D. 880–1020	950	Ahlstrom 2008a, 2008b
CK6146	Larder site	FN 370; 6146-9; Beta-230257	Feature 31 (pit)	Seed & pod	1030±40	A.D. 900–1040	970	Ahlstrom 2008a, 2008b
CK6446	Yamashita 3	A230-0852; Beta-71293	240N80W; 40-44 cm; Structure 1, Room H, floor	Charred material	1040±70	A.D. 785–1165	975	Lyneis 2004
CK3130	Bovine Bluff	Beta-9706, A201-1529	Pit 5, clay-lined fire pit	Charcoal	1030 ±80	A.D. 780–1205	992.5	Myhrer and Lyneis 1985
CK4038	Mended Basket site	5-1151-4, DRI-3391	N98-99/E102-103, Level 5 (deepest point in shelter)	Charcoal	1016±58	A.D. 895–1160	1027.5	Blair and Seymour 1998
CK415	Flaherty Rockshelter	Beta-132736	Unit D-6, 30-40 cm	Charred material	1020±50	A.D. 910–1150	1030	Blair and Wedding 2001
CK2072	Steve Perkins site	UGa-793	Struct. VI (surf. room), hearth	Charcoal	1005±60	A.D. 895–1165	1030	Myhrer 1989
CK3130	Bovine Bluff	Beta-9705, A201-1349	Pit 4, sample associated with tortoise bone	Charcoal	1000± 50	A.D. 900–1160	1030	Myhrer and Lyneis 1985
CK6446	Yamashita 3	A230-1982/ -1983; Beta-162562	Structure 1, Room I, floor of burned room	Charcoal	1000±60	A.D. 910–1180	1045	Lyneis 2004
CK3780		Beta-132715	rock-shelter fill	Charred maize cob	1000±40	A.D. 980–1150	1065	Blair and Wedding 2001
CK6446	Yamashita 3	A230-1150/ -0002; Beta-162561	Structure 1, Room B, burned room, floor	Charcoal	990±60	A.D. 960–1180	1070	Lyneis 2004
CK1088	Pestisite	UGa-4447	Roasting pit/midden; Unit 2 (30-40 cm), below Comp. III (rockshelter)	Charcoal	975±95	A.D. 890–1260	1075	Blair 1986
CK6446	Yamashita 3	A230-3690; Beta-172542	Pit structure, fill, 100-110 cm	Burned maize cob fragment	990±40	A.D. 990–1160	1075	Lyneis 2004
CK6007		FN 19; 6007-2; Beta-230254	8N 13E; 80-90 cm	Charred material	980±60	A.D. 970–1200	1085	Ahlstrom 2008b
CK3601	Burnt Rock Mound	Beta-143486	Unit 8, 40-50 cm	Charred material	980±50	A.D. 980–1195	1087.5	Rager 2001; Seymour and Rager 2005
CK2041	Yamashita 5N	A232N-0607/ -0002; Beta-162564	Structure 1, clay-lined hearth, ashy fill	Ashy fill	960±40	A.D. 1000–1180	1090	Lyneis 2004
CK2148	Main Ridge	PD44FS10; Beta-240599	House 20, midden beneath Room A floor	Charred *Prosopis pubescens*	960±40	A.D. 1010–1170	1090	Harry 2008; Harry and Watson 2010
CK5712		Beta-149455	N17E19, Strat. 4, L. 2	*Larrea* charcoal; some cactus areole?	960±50	A.D. 990–1190	1090	Ahlstrom and Roberts 2001c
CK6445	Yamashita 2	A229-2182; PRI-10-164-2182	202N74W; 30 cm-floor; A.D.obe rubble overlying floor, Structure 1	*Salix* twig	950±15	A.D. 1020–1160	1090	Lyneis 2004
CK415	Flaherty Rockshelter	Beta-132737	unknown	unknown	970±60	A.D. 980–1205	1092.5	Blair and Wedding 2001

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CK4038	Mended Basket site	5-1151-C, DRI-3406	N99.54-100/E104-104.28, Level 1, Feature 3 (thermal feature [roasting pit])	Charcoal	947±62	A.D. 990–1220	1105	Blair and Seymour 1998
CK1991	The Agave Ovens site	1991-47	Pit 4 (agave oven), Strat IV	Charcoal	920±30	A.D.1030–1185	1107.5	McGuire et al. 2010
CK6445	Yamashita 2	A229-4186; Beta-170579	Structure 4, hearth	Ashy fill	930±40	A.D. 1015–1205	1110	Lyneis 2004
CK6446	Yamashita 3	A230-1109; Beta-253381	Structure 1, Room A; clay-lined hearth	Ashy fill	930±40	A.D. 1020–1210	1115	Lyneis 2004
CK3201	Collapsed Rock Shelter	3201-F9	N3/W1 (20-30 cm)	Charcoal	900±40	A.D. 1035–1215	1125	McGuire et al. 2010
CK1474		5-660-3166; UGa-3124	F. 12	Charcoal?	920±70	A.D. 990–1265	1127.5	Ahlstrom 2005
CK1139		LCRO-0119-4199; 1139-5; Beta-170115	Unit 7N/2W, 120-130 cm	*Larrea* charcoal	900±50	A.D. 1020–1250	1135	Ahlstrom 2005
CK3780		Beta-132716	Feat. 1, charcoal concentration	Charcoal	900±50	A.D. 1020–1250	1135	Blair and Wedding 2001
CK1139		287-0372; UGa3132	Unit 4N/3W, 20-30 cm	Charcoal	905±50	A.D. 1020–1255	1137.5	Ahlstrom 2005
CK1081		UGa 758	Pit B6, outside rock shelter, 70 cm-bedrock	Charcoal	900±75	A.D. 1000–1280	1140	Brooks et al. 1975
CK6446	Yamashita 3	A230-2050; Beta-253382	Y-3 Structure 1, Room I; clay-lined hearth	Ashy fill	880±40	A.D. 1040–1240	1140	Lyneis 2004
CK4038	Mended Basket site	5-1151-431, DRI-3407	N101-102/E1-3-104. Level 4, Feature 6 (slab-lined cist)	Charcoal	904±72	A.D. 1020–1265	1142.5	Blair and Seymour 1998
CK1081		UGa 760	roasting pit/midden; Pit C3, at 70-80 cm	Charcoal	880±60	A.D. 1020–1280	1150	Brooks et al. 1975
CK1139		LCRO-0119-4200; 1139-3; Beta-170113	Unit 4N/4W, 40-50 cm; tp (test pit?) 1	Saltbush/ greasewood	860±40	A.D. 1040–1260	1150	Ahlstrom 2005
CK	Tule Springs Locus 66	UCLA-638	Unit G, hearths on spring mound	Charcoal	880±80	A.D. 1020–1280	1150	Haynes 1967
CK5	Gypsum Cave	6F693; Beta-228754	Room 1, Level 1.2. 1'11" deep	String (from ornament with spring)	850±40	A.D. 1050–1260	1155	Gilreath 2009
CK3780		Beta-132717	Feat. 1, charcoal concentration	Charcoal	850±50	A.D. 1040–1275	1157.5	Blair and Wedding 2001
CK2072	Steve Perkins site	Beta-17273	Structure II, Room 9, Burial	Charcoal	830±60	A.D. 1045–1280	1162.5	Myhrer 1989
CK2059	A.D.am 2	Beta-6731	Habitation room; burnt, collapsed roof fall	Burnt twigs and sticks	810±50	A.D. 1050–1285	1167.5	Lyneis et al. 1989
CK2148	Main Ridge	PD41FS09; Beta-240598	House 20, Plaza	Charred maize cob	830±40	A.D. 1160–1270	1215	Harry 2008; Harry and Watson 2010

SITE NO. (26-)	SITE NAME	SAMPLE	PROVENIENCE	MATERIAL	RADIO-CARBON AGE	COMBINED CAL DATE	MEAN CAL DATE	REFERENCE
LN4970		Beta-230943	F34, non-locus; FCR concentration	From "charcoal stain"	820±40	A.D. 1155–1275	1215	Wriston 2008
CK8170		8170-11	agave oven, TU 2 (20+ cm)	Charcoal	790±40	A.D. 1175–1280	1227.5	McGuire et al. 2010
CK	Tule Springs, Locus 40	UCLA-516	Unit G, hearth	Charcoal	725±80	A.D. 1070–1410	1240	Haynes 1967
CK501 /1528	Berger site	3; DRI-3221	Unit B 14, L. 32, 67-70 in	unknown	748±47	A.D. 1190–1385	1287.5	Seymour 1997
CK4038	Mended Basket site	5-1151-A, DRI-3408	N99.3-99.8/ E103.25, Level 2, Feature 1 (thermal feature)	Charcoal	705±55	A.D. 1220–1395	1307.5	Blair and Seymour 1998
CK5	Gypsum Cave	6F118; Beta-228749	Room 1, 12" deep	sSring (from ornament with string)	710±50	A.D. 1230–1390	1310	Gilreath 2009
CK1083		UGa 766	Roasting Pit 1, 40-50 cm	unknown	715±60	A.D. 1220–1400	1310	Brooks et al. 1975
CK3799		5-1164-16; Beta-132699	Feat. 40A, hearth (roasting pit)	charred material	710±50	A.D. 1235–1390	1312.5	Blair et al. 2000
CK501/ 1528	Berger site	6; DRI-3224	Unit A 14, L. 8, 18-21 in	unknown	669±62	A.D. 1245–1410	1327.5	Seymour 1997
CK4038	Mended Basket site	5-1151-D, DRI-3409	Level 2	Basket fragments	660±72	A.D. 1240–1420	1330	Blair and Seymour 1998
CK3601	Burnt Rock Mound	Beta-143491	Unit 1, 10-20 cm	Charred material	660±70	A.D. 1250–1420	1335	Rager 2001; Seymour and Rager 2005
CK6007		FN 9; 6007-1; Beta-230253	10N 12E; 15-20 cm bd	Charcoal	660±50	A.D. 1270–1400	1335	Ahlstrom 2008b
CK3799		5-1164-67; Beta-132696	Feat. 40B, hearth (roasting pit?)	Charcoal	660±40	A.D. 1275–1400	1337.5	Blair et al. 2000
CK2461		Beta-47983	Feat. D-1, charcoal stain/ hearth, Shelter 1	Charcoal	630±80	A.D. 1260–1440	1350	York et al. 1992
CK1138		LCRO-0167-3836; 1138-2; Beta-177242	unknown	*Prosopis* seeds	600±40	A.D. 1290–1420	1355	Ahlstrom 2005
CK2042	Yamashita 5S	A232S-1027; Beta-172548	228N104W; 56 cm; charcoal with corrugated pottery from Feature A on caliche	Charcoal flecks and chunks	600±40	A.D. 1290–1420	1355	Lyneis 2004
CK4440		Beta-47985	rock-shelter fill	Charcoal?	610±60	A.D. 1280–1430	1355	York et al. 1992
CK4446	Bighorn Cave	Beta-166377	cave interior; 99N97E; 10-20 cmbs	Charcoal	610±50	A.D. 1290–1420	1355	IMACS Site Form 2002
CK6913		Beta-209401	Feat. 2 (informal hearth)	Charcoal	590±50	A.D. 1300–1410	1355	King et al. 2006
CK3799		5-1164-68; Beta-132701	Feat. 27, hearth (roasting pit?)	Charred material	590±50	A.D. 1290–1425	1357.5	Blair et al. 2000
CK4038	Mended Basket site	5-1151-79, DRI-3393	N101-102/E102-103, Level 2 (associated w/ a metate)	Charcoal	606±61	A.D. 1290–1425	1357.5	Blair and Seymour 1998

SITE NO. (26-)	SITE NAME	SAMPLE	PROVENIENCE	MATERIAL	RADIO-CARBON AGE	COMBINED CAL DATE	MEAN CAL DATE	REFERENCE
CK2041	Yamashita 5N	A232N-1021B; Beta-172546	304N126W; 80-90 cm; Small charcoal, adjoining south edge of Struct. 1	Charcoal	580±40	A.D. 1300–1420	1360	Lyneis 2004
CK501/ 1528	Berger site	4; DRI-3222	Unit 7D, L. 6, 12-15 in	unknown	586±62	A.D. 1295–1430	1362.5	Seymour 1997
CK501/ 1528	Berger site	2; DRI-3220	Unit A 16, L. 4, 6-9 in	unknown	578±62	A.D. 1295–1435	1365	Seymour 1997
CK3601	Burnt Rock Mound	Beta-143492	Unit 5, 20-30 cm	Charred material	580±50	A.D. 1300–1430	1365	Rager 2001; Seymour and Rager 2005
CK3601	Burnt Rock Mound	Beta-152726	Unit 9, 50-60 cm	Charred material	580±50	A.D. 1300–1430	1365	Rager 2001; Seymour and Rager 2005
CK	Tule Springs Locus 41	UCLA-635	Unit G, hearth	Charcoal	570±80	A.D. 1280–1465	1372.5	Haynes 1967
CK501/ 1528	Berger site	5; DRI-3223	Unit A 11, L. 5, 9-12 in	unknown	571±82	A.D. 1280–1470	1375	Seymour 1997
CK2605		PRI-08-85-366	unknown	*Atriplex* charcoal	545±15	A.D. 1320–1430	1375	Roberts and Lyon 2011
CK2605		PRI-08-85-161	unknown	*Atriplex* charcoal	545±15	A.D. 1320–1430	1375	Roberts and Lyon 2011
CK3601	Burnt Rock Mound	Beta-152724	Unit 8, 30-40 cm	Charred material	540±50	A.D. 1310–1440	1375	Rager 2001; Seymour and Rager 2005
CK5712		Beta-149456	N17E19, Strat. 2, L. 1	*Larrea* charcoal	520±60	A.D. 1300–1460	1380	Ahlstrom and Roberts 2001c
CK1139		287-0927; UGa-3131	Unit 7N/2W, 100-110 cm	Charcoal	545±80	A.D. 1288–1480	1384	Ahlstrom 2005
CK4908		Beta-132704	Feat. 3, (roasting mound), E-W Trench, 30 cm	Charred material	510±60	A.D. 1310–1460	1385	Blair et al. 2000
CK1081		UGa 759	hearth; Pit C6, outside rock shelter, 60-70 cm	Charcoal	510±65	A.D. 1300–1480	1390	Brooks et al. 1975
CK2461		Beta-47982	Feat. A-1, charcoal stain/ hearth, Shelter 1	Charcoal	510±60	A.D. 1300–1480	1390	York et al. 1992
CK2459		Beta-149453	Feat. 1 (hearth) & vicinity	*Larrea* charcoal	480±60	A.D. 1320–1500	1410	Ahlstrom and Roberts 2001c
CK6907		Beta-209356	Feat. 1 (stone-lined roasting pit)	Charcoal	520±40	A.D. 1390–1440	1415	King et al. 2006
CK2605		PRO-10-22-1160	unknown	*Atriplex* charcoal	515±20	A.D. 1400–1440	1420	Roberts and Lyon 2011
CK7454		PRI-08-86-349-57	Unit E, Level 10 (76-86 cmbs)	*Prosopis* twig charcoal	510±15	A.D. 1405–1440	1422.5	DuBarton 2009
CK1091	Roadside Roast	UGa-4443	Unit 3, roasting pit/midden (20-30 cm)	Charcoal	580±135	A.D. 1210–1640	1425	Blair 1986
CK7454		PRI-08-86-339-35	Unit B, Level 9 (66-76 cmbs)	*Prosopis* charcoal	495±15	A.D. 1410–1440	1425	DuBarton 2009
CK1139		LCRO-0119-4199; 1139-6; Beta-170116	Unit 7N/2W, 60-70 cm	*Larrea* charcoal	490±40	A.D. 1400–1460	1430	Ahlstrom 2005

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CK6146	Larder site	FN 159; 6146-1; Beta-213430	Feature 12 (pit)	Seeds	490±40	A.D. 1400–1460	1430	Ahlstrom 2008a, 2008b
NY1729	Fairbanks Spring	FN 270; Beta-273312	EU 9, Level 3; sediment (35 cmbs) overlying F. 09-10, possible cultural surface(s)	Charred *Opuntia* ? & *Lycium* ? seed	470±40	A.D. 1410–1460	1435	Davide et al. 2010
CK4908		Beta-132703	Feat. 3 (roasting mound), U. 1, L. 2 (10-20 cm)	Organic sediment	470±40	A.D. 1410–1470	1440	Blair et al. 2000
CK8163		8163-3	Roasting Pit 1 (agave oven), TU 1 (20+ cm)	Charcoal	460±40	A.D. 1400–1495	1447.5	McGuire et al. 2010
CK415	Flaherty Rockshelter	Beta-132744	Unit F-5, 0-10 cm	Charred material	460±50	A.D. 1405–1500	1452.5	Blair and Wedding 2001
CK7454		PRI-08-86-426-46	Unit D, Level 16 (136-146 cmbs)	Asteraceae *Encelia*-type charcoal	425±15	A.D. 1435–1475	1455	DuBarton 2009
NY1964	Sever Tanks	Beta-5651	Unit B, assoc. w/ Rosegate Corner-notched point	unknown	520±100	A.D. 1280–1630	1455	Buck et al. 1998; Pippin 1984
CK2461		Beta-47984	Feat. B-1, charcoal stain/ hearth, Shelt. 1	Charcoal	480±70	A.D. 1310–1620	1465	York et al. 1992
CK4038	Mended Basket site	5-1151-B, DRI-3392	N99.19-99.48/ E101-101.6, Level 2, Feature 4 (ash and charcoal concentration)	Charcoal	477±71	A.D. 1305–1630	1467.5	Blair and Seymour 1998
CK3601	Burnt Rock Mound	Beta-143480	Trench 2	Charred material	460±80	A.D. 1310–1640	1475	Rager 2001; Seymour and Rager 2005
CK4440		Beta-47988	Feat. 13-1, charcoal stain	Charcoal	450±60	A.D. 1330–1630	1480	York et al. 1992
CK6445	Yamashita 2	A229-3766/ -3777; Beta-172539; A29	Overlying Str. 4; scatter of fire-cracked rock, charcoal, and Southern Paiute brownware sherds (Southern Paiute Component)	Charcoal chunks	420±100	A.D. 1310–1660	1485	Lyneis 2004
CK3601	Burnt Rock Mound	Beta-143481	Trench 2	Charred material	460±60	A.D. 1400–1620	1510	Rager 2001; Seymour and Rager 2005
LN2254		Beta-218927	F10, Locus A, surface; FCR concentration	From "charcoal stain"	440±50	A.D. 1405–1630	1517.5	Wriston 2008
CK1139		287-886; UGa-3133	Unit 7N/2W, 100-110 cm	Charcoal	430±60	A.D. 1405–1635	1520	Ahlstrom 2005
CK501/ 1528	Berger site	1; DRI-3219	Unit A 12, L. 12, 30-33 in	unknown	412±46	A.D. 1420–1630	1525	Seymour 1997
CK6146	Larder site	FN 365; 6146-8; Beta-230256	Feature 30 (pit)	Seed & pod	420±40	A.D. 1430–1620	1525	Ahlstrom 2008a, 2008b
CK8163		8163-5	Roasting Pit 2 (agave oven), TU 2 (0-10 cm)	Charcoal	410±40	A.D. 1425–1630	1527.5	McGuire et al. 2010
CK415	Flaherty Rockshelter	Beta-132739	Unit D-5, 30-40 cm	Charred material	400±50	A.D. 1425–1635	1530	Blair and Wedding 2001

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CK1083		UGa-4452	Unit 4 (rock-shelter fill; 30-40 cm)	unknown	395±95	A.D. 1390–1670	1530	Blair 1986
CK4440		Beta-47986	Feat. 2-1, hearth	Charcoal	400±70	A.D. 1410–1650	1530	York et al. 1992
CK4446	Bighorn Cave	Beta-166376	cave interior; 98N97E; 10-20 cmbs	Charcoal	400±50	A.D. 1420–1640	1530	IMACS Site Form 2002
CK7454		PRI-08-86-358-81	Unit B, Level 10 (76-86 cmbs)	Asteraceae *Encelia*-type charcoal	380±15	A.D. 1440–1620	1530	DuBarton 2009
CK7454		PRI-08-86-319-36	Unit D, Level 8 (56-66 cmbs)	Asteraceae *Encelia*-type charcoal	390±15	A.D. 1440–1620	1530	DuBarton 2009
CK1139		LCRO-0119-4199; 1139-7; Beta-170117	Unit 7N/2W, 20-30 cm	*Larrea*	390±60	A.D. 1420–1650	1535	Ahlstrom 2005
CK3601	Burnt Rock Mound	Beta-143490	Unit 9, 30-40 cm	Charred material	380±50	A.D. 1430–1645	1537.5	Rager 2001; Seymour and Rager 2005
CK415	Flaherty Rockshelter	Beta-132726	Unit F-7, 0-10 cm	Sandal	370±40	A.D. 1440–1640	1540	Blair and Wedding 2001
CK1282		LCRO-0173-3002; 1282-4; Beta-170121	Unit 202W/54S, 130-140 cm	saltbush/ greasewood & creosote	360±70	A.D. 1420–1660	1540	Ahlstrom 2005
CK3073		3073-1	isolate roasting pit (agave oven), TU 1 (0-20 cm)	Charcoal	360±40	A.D. 1450–1635	1542.5	McGuire et al. 2010
CK4415		Beta-132723	rock-shelter fill	Charred material	360±50	A.D. 1435–1650	1542.5	Blair and Wedding 2001
CK415	Flaherty Rockshelter	Beta-132740	Unit D-5, 40-50 cm	Charred material	350±50	A.D. 1440–1650	1545	Blair and Wedding 2001
CK1282		LCRO-0173-3001; 1282-5; Beta-170122	Unit 202W/54S, 150-160 cm	*Larrea*	350±60	A.D. 1430–1660	1545	Ahlstrom 2005
CK2041	Yamashita 5N	A232N-0407/-0572; Beta-172545	300N108; 70 cm-caliche; fill in pit, base of deposit	unknown	350±60	A.D. 1430–1660	1545	Lyneis 2004
CK3601	Burnt Rock Mound	Beta-152725	Unit 9, 40-50 cm	Charred material	350±50	A.D. 1440–1650	1545	Rager 2001; Seymour and Rager 2005
CK4415		Beta-132721	packrat midden	*Yucca* sandal	350±40	A.D. 1445–1645	1545	Blair and Wedding 2001
CK4908		Beta-132705	Feat. 2 (roasting mound), E-W Trench, 40 cm	Charred material	350±60	A.D. 1435–1660	1547.5	Blair et al. 2000
CK1991	The Agave Ovens Site	1991-F25	Pit 4 (agave oven), Strat I	Charcoal	330±50	A.D. 1455–1650	1552.5	McGuire et al. 2010
	Barnett ite	A-1161	400 m W of Barnett site; cultural(?) sand-dune churn zone	Charcoal	440±280	A.D. 1150–1955	1552.5	Mehringer and Warren 1976
CK1282		LCRO-0173-3000; 1282-6; Beta-176515	Unit 202W/54S; 170-180 cm	*Prosopis* seed	330±40	A.D. 1460–1650	1555	Ahlstrom 2005
CK3093		3093-2	agave oven, TU 1 (0-20 cm)	Charcoal	320±50	A.D. 1455–1655	1555	McGuire et al. 2010

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CK3601	Burnt Rock Mound	Beta-143482	Unit 2, 10-20 cm	Charred material	320±50	A.D. 1450–1660	1555	Rager 2001; Seymour and Rager 2005
CK3601	Burnt Rock Mound	Beta-143489	Unit 9, 10-20 cm	Charred material	310±50	A.D. 1455–1665	1560	Rager 2001; Seymour and Rager 2005
CK4415		Beta-132724	packrat midden	Charred material	300±50	A.D. 1460–1665	1562.5	Blair and Wedding 2001
CK5701		Beta-149454	Feat. 1 (shelter?)	*Larrea* charcoal	290±40	A.D. 1490–1660	1575	Ahlstrom and Roberts 2001c
CK1164		UGa 763	Hearth 1, Pit 10, at 20-30 cm	Charcoal	260±75	A.D. 1450–1950	1632.5	Wriston 2008
CK4446	Bighorn Cave	Beta-166379	98N96E; 30-40 cmbs	Charcoal	290±50	A.D.1470–1800	1635	IMACS Site Form 2002
CK4415		Beta-132720	packrat midden	*Yucca* sandal	270±40	A.D. 1510–1795	1652.5	Blair and Wedding 2001
CK6445	Yamashita 2	A229-1138; Beta-170574	208N70W, extramural hearth	Charcoal chunks	300±60	A.D. 1450–1945	1697.5	Lyneis 2004
CK1081		UGa 757	hearth; Pit A2, inside rock shelter, 15-30 cm	Charcoal	250±75	A.D. 1470–1950	1710	Brooks et al. 1975
CK6080/ 6081	Ian's Rock Shelter	6080/6081-F2	Feature 3, S3/W5 (5-10 cm)	Charcoal	250±60	A.D. 1470–1950	1710	McGuire et al. 2010
CK1139		287-426; UGa-3130	Unit 4N/3W, 80-90 cm	Charcoal	235±75	A.D. 1475–1950	1712.5	Ahlstrom 2005
CK1282		1282-1; Beta-153768	Feat. 1 (roasting pit or hearth)	Wood charcoal	210±80	A.D. 1490–1950	1720	Ahlstrom 2005
	Barnett site	A-1137	SW of Barnett site; hearth assoc. w/ Paiute pottery	unknown	220±100	A.D. 1490–1950	1720	Mehringer and Warren 1976
CK6445	Yamashita 2	A229-0830; Beta-71292	200N74W; 45-60 cm; extra-mural hearth	Charcoal	220±70	A.D. 1510–1950	1730	Lyneis 2004
CK4908		Beta-132706	F. 2 (roasting mound), U. 1, L. 2 (10-20 cm)	Charred material	220±60	A.D. 1515–1950	1732.5	Blair et al. 2000
CK8013	Dune Field ite	8013-F7	S1/E49 and S1/E51 (0-15 cm)	Charcoal	250±40	A.D. 1515–1950	1732.5	McGuire et al. 2010
CK1991	The Agave Ovens ite	1991-48	Pit IV (agave oven), Strat IV	Charcoal	250±30	A.D. 1520–1950	1735	McGuire et al. 2010
CK2954	Coyote Springs Rockshelter	FN83, Beta-196002	bottom level of cultural deposits	Charcoal	230±50	A.D. 1520–1950	1735	Harper 2005
CK3601	Burnt Rock Mound	Beta-152723	Unit 8, 20-30 cm	Charred material	230±50	A.D. 1520–1950	1735	Rager 2001; Seymour and Rager 2005
CK4446	Bighorn Cave	Beta-166378	98N96E; 10-20 cmbs	Charcoal	240±50	A.D. 1520–1950	1735	IMACS Site Form 2002
LN4970		Beta-230942	F28, non-locus; FCR concentration	From “charcoal stain”	240±40	A.D. 1520–1950	1735	Wriston 2008
CK8172		8172-2	agave oven, TU 1 (20+ cm)	Charcoal	220±40	A.D. 1525–1950	1737.5	McGuire et al. 2010
CK6446	Yamashita 3	A230-1734; Beta-172540	240N70W; 35-45 cm; extramural hearth (Southern Paiute Component?)	Small chunks of charcoal	230±40	A.D. 1530–1950	1740	Lyneis 2004
NY8004		Beta-53980	unknown	Winnowing tray	200±60	A.D. 1525–1955	1740	Buck et al. 1998

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CK5712		Beta-151075	Feat. 4 (rp)	*Larrea* charcoal	170±70	A.D. 1630–1950	1790	Ahlstrom and Roberts 2001c
CK4415		Beta-132722	packrat midden	Charred material	180±50	A.D. 1645–1950	1797.5	Blair and Wedding 2001
CK1139		LCRO-0095-2969; 1139-8; Beta-176513	Unit 7N/3W, 70-80 cm	*Prosopis* seed	190±40	A.D. 1650–1950	1800	Ahlstrom 2005
CK1282		LCRO-0173-3939; 1282-2; Beta-170119	Unit 209W/28S, 80-90 cm, Feat. 6	Unknown seed	170±40	A.D. 1650–1950	1800	Ahlstrom 2005
CK2041	Yamashita 5N	A232N-0259; Beta-162560	Dispersed charcoal in sand overlying Str. 1 (4 sherds of Southern Paiute Brownware, Southern Paiute Component?)	Dispersed charcoal	190±40	A.D. 1650–1950	1800	Lyneis 2004
CK2042	Yamashita 5S	A232S-1266; Beta-172550	293.55N103.20W; 53-75 cm; depress-ion in adobe layer	Fine charcoal	190±40	A.D. 1650–1950	1800	Lyneis 2004
CK2042	Yamashita 5S	A232S-1028; Beta-172549	286N105W; 32 cm	Charcoal soil	180±40	A.D. 1650–1950	1800	Lyneis 2004
CK2042	Yamashita 5S	A232S-0240; Beta-172543	298N108W; 20-30 cm; ashy fill	Small chunks of charcoal	170±40	A.D. 1650–1950	1800	Lyneis 2004
CK2954	Coyote Springs Rockshelter	FN21, Beta-196003	Feature 1 (hearth)	Charcoal	180±40	A.D. 1650–1950	1800	Harper 2005
CK3601	Burnt Rock Mound	Beta-143485	Unit 8, 10-20 cm	Charred material	200±60	A.D. 1715–1885	1800	Rager 2001; Seymour and Rager 2005
CK5712		Beta-151074	Feat. 7 (rp/ hearth)	Human coprolite	140±70	A.D. 1640–1960	1800	Ahlstrom and Roberts 2001c
CK6445	Yamashita 2	A229-2997; Beta-170576	206N80W; 40-50 cm	Charred *Prosopis pubescens* pod	180±40	A.D. 1650–1950	1800	Lyneis 2004
CK1139		LCRO-0176-3977; 1139-1; Beta-170111	unknown	Maize kernel	160±40	A.D. 1660–1950	1805	Ahlstrom 2005
CK1282		LCRO-0173-3004; 1282-3; Beta-170120	Unit 202W/54S, 170-180 cm, Feat. 3	*Larrea* charcoal	130±40	A.D. 1660–1950	1805	Ahlstrom 2005
CK1282		LCRO-0173-3009; 1282-1; Beta-170118	Unit 211W/28S, 60-70 cm; vicinity of Feat. 6	Maize kernel	150±40	A.D. 1660–1950	1805	Ahlstrom 2005
CK2605		PRI-08-85-274	unknown	*Atriplex* charcoal	100±15	A.D. 1690–1920	1805	Roberts and Lyon 2011
CK4415		Beta-132719	rock-shelter fill	Sinew wrapped *Salix* stick	170±30	A.D. 1660–1950	1805	Blair and Wedding 2001
CK6078/ 6095	Cedar Basin Midden	6078/6095-F4	Upper Midden, S5/E1 (20-30 cm)	Charcoal	170±40	A.D. 1655–1955	1805	McGuire et al. 2010
CK7454		PRI-08-86-322-49	Unit F, Level 8 (56-66 cmbs)	Asteraceae *Hymenoclea*-type twig charcoal	150±20	A.D. 1660–1950	1805	DuBarton 2009

SITE NO. (26-)	SITE NAME	SAMPLE	PROVENIENCE	MATERIAL	RADIO-CARBON AGE	COMBINED CAL DATE	MEAN CAL DATE	REFERENCE
CK7454		PRI-08-86-392-83	Unit F, Level 11 (86-96 cmbs)	Asteraceae *Hymenoclea*-type twig charcoal	115±15	A.D. 1680–1930	1805	DuBarton 2009
CK7454		PRI-08-86-395-39	Unit H, Level 12 (96-106 cmbs)	Asteraceae *Hymenoclea*-type twig charcoal	95±15	A.D. 1690–1920	1805	DuBarton 2009
CK1139		1139-9; LCRO-0097-3999; Beta-176514	Unit 3N/6W, 30-40 cm	Piñon nut hull[6]	110±40	A.D. 1670–1950	1810	Ahlstrom 2005
CK1991	The Agave Ovens ite	1991-F26	Pit 4 (agave oven), Strat II	Charcoal	160±40	A.D. 1665–1955	1810	McGuire et al. 2010
CK1991	The Agave Ovens ite	1991-F27	Pit 3 (agave oven), Strat III	Charcoal	160±40	A.D. 1665–1955	1810	McGuire et al. 2010
CK6445	Yamashita 2	A229-3071; Beta-170577	204N82W; rock-lined hearth	Chunk charcoal	100±50	A.D. 1665–1955	1810	Lyneis 2004
CK7454		PRI-08-86-298-3	Unit J, Level 6 (41-46 cmbs)	Asteraceae *Hymenoclea*-type twig charcoal	135±20	A.D. 1670–1950	1810	DuBarton 2009
NY1011	Alice Hill	Beta-62990	Ref. No. 1501-3 bag 2	unknown	150±70	A.D. 1670–1950	1810	Buck et al. 1998
NY8438		Beta-67467	unknown	Willow twig from bundle	130±50	A.D. 1670–1955	1812.5	Buck et al. 1998
CK4908		Beta-132711	U. 100N/90E (A. 3), L. 1? (2-10cm)	Charred material (charcoal)	80±50	A.D. 1675–1955	1815	Blair et al. 2000
CK4908		Beta-132713	U. 103N/90E (A. 3), L. 1 (2-10 cm)	Charred material (charcoal)	80±50	A.D. 1675–1955	1815	Blair et al. 2000
CK7932		7932-1	agave oven, TU 1 (0-10 cm)	Charcoal	100±40	A.D. 1680–1955	1817.5	McGuire et al. 2010
CK8047	Dart Shaft Shelter	8047-F8	Lower Mid-den, S1/W4, Rock Shelter 5 (surf.)	Charcoal	90±40	A.D. 1680–1955	1817.5	McGuire et al. 2010
CK1139		LCRO-0095-2971; 1139-4; Beta-170114	Unit 4N/8W, 20-30 cm	Piñon nut hull	80±40	A.D. 1680–1960	1820	Ahlstrom 2005
CK4908		Beta-132712	U. 103N/90E (A. 3), L. 2 (10-20 cm), secondary hearth?	Charred material (charcoal)	60±40	A.D. 1685–1955	1820	Blair et al. 2000
CK1139		LCRO-0095-2995; 1139-2; Beta-170112	Unit 4N/4W, 0-10 cm	Maize cob	50±40	A.D. 1690–1960+	1825	Ahlstrom 2005
CK1138		LCRO-0170-3871; 1138-1; Beta-170110	Feat. 101, SE¼, 0-5 cm	*Larrea*	50±30	A.D. 1700–1960	1830	Ahlstrom 2005
CK1474		5-660-3154; UGa-2932	370 cm bd	Charcoal	21,025± 2870	unknown	unknown	Ahlstrom 2005
CK5434	Firebrand Cave	112-1; DRI-3434	Map Reference 3	Arrow component	152±74	A.D. 1660+	NA	Blair and Winslow 2006
NY1011	Alice Hill	Beta-62935	Ref. No. 1501-3	unknown	modern±60	NA	NA	Buck et al. 1998
NY3021		Beta-5653	Unit A, 5-12 cmbs	unknown	modern±100	NA	NA	Buck et al. 1998; Pippin 1984

SITE NO. (26-)	SITE NAME	SAMPLE	PROVENIENCE	MATERIAL	RADIO-CARBON AGE	COMBINED CAL DATE	MEAN CAL DATE	REFERENCE
NY4042		Beta-5654	Units A& B, 1-11 cmbs	unknown	modern±70	NA	NA	Buck et al. 1998; Pippin 1984
NY4042		Beta-5655	Unit E, hearth, 1-9 cmbs	unknown	modern±130	NA	NA	Buck et al. 1998; Pippin 1984
NY3055		Beta-5656	Unit D, 10-19 cmbs	unknown	modern±60	NA	NA	Buck et al. 1998; Pippin 1984
NY3062		Beta-5657	Unit B, hearth, 10.5-12 cmbs	unknown	modern±70	NA	NA	Buck et al. 1998; Pippin 1984
NY3099		Beta-5658	Unit B, hearth, 15-20 cmbs	unknown	modern±70	NA	NA	Buck et al. 1998; Pippin 1984
CK1138		–	Feat. 1 (hearth)	Charcoal	modern	NA	NA	Ahlstrom 2005
CK1138		LCRO-0180-3986; 1138-3; Beta-177243	unknown	Piñon nut hull	modern	NA	NA	Ahlstrom 2005
CK1139		287-0718; UGa-3134	Unit 7N/2W, 40-50 cm	Charcoal	modern	NA	NA	Ahlstrom 2005
CK1282		UGa-3127	80-90 cm below surf.	Charcoal	modern	NA	NA	Ahlstrom 2005
CK1474		LCRO-0098-3494; 1474-1; Beta-177244	unknown	Piñon nut hull	modern	NA	NA	Ahlstrom 2005

Table A.2. Radiocarbon Dates from the Apex and Dry Lake Areas

Site (26-)	Sample Data			Radiocarbon Data		
	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
CK415 (Flaherty Shelter)	Beta-132740	Unit D-5, 40-50 cm	Charred material	350±50[1-3]	A.D. 1440–1650[6]	c,d
"	Beta-132726	Unit F-7, 0-10 cm	Sandal	370±40[3]	A.D. 1440–1640[6]	c,d
"	Beta-132739	Unit D-5, 30-40 cm	Charred material	400±50[1-3]	A.D. 1425–1635[6]	c,d
"	Beta-132744	Unit F-5, 0-10 cm	Charred material	460±50[1]	A.D. 1405–1500[6]	c,d
"	Beta-132737	Unit D-6, 60-70 cm	Charred material	970±60[1-3]	A.D. 980–1205[6]	c,d
"	Beta-132736	Unit D-6, 30-40 cm	Charred material	1020±50[1-3]	A.D. 910–920, 955–1055, 1085–1150[6]	c,d
"	Beta-132735	Balk F-7/F-8, 0-10 cm	Charred material	1180±50[1-3]	A.D. 705–980[6]	c,d
"	Beta-132730	Balk F-7/F-8, 10-20 cm	Charred material	1940±60[1-3]	55 B.C.–A.D. 225[6]	c,d
"	Beta-132743	Unit D-6, 50-60 cm	Charred material	2220±60[1-3]	395–115 B.C.[6]	c,d
"	Beta-132731	Balk F-7/F-8, 20-30 cm	Charred material	2350±60[1-3]	750–695, 540–360, 280–240 B.C.[6]	c,d
"	Beta-132734	Balk F-7/F-8, 30-40 cm	Charred material	2640±60[1-3]	905–770 B.C.[6]	c,d
"	Beta-132732	Balk F-7/F-8, 50-60 cm	Charred material	3030±60[1-3]	1420–1105 B.C.[6]	c,d
"	Beta-132738	Unit G-6, 58 cm	Charred material	3060±60[1-3]	1435–1130 B.C.[6]	c,d
"	Beta-132728	Balk F-7/F-8, 60-70 cm	Charred material	3100±60[1-3]	1500–1215 B.C.[6]	c,d
"	Beta-132733	Balk F-7/F-8, 40-50 cm	Charred material	3220±70[1-3]	1650–1380 B.C.[6]	c,d
"	Beta-132729	Balk F-7/F-8, 80-90 cm	Charred material	3740±60[1-3]	2310–1965 B.C.[6]	c,d
"	Beta-132727	Balk F-7/F-8, 70-80 cm	Charred material	3880±70[1-3]	2560–2525, 2495–2140 B.C.[6]	c,d
CK415 (Flaherty Shelter)	Beta-132742	Unit F-5, 20-30 cm	Charred material	5190±70[1-3]	4220–3915, 3880–3800 B.C.[6]	c,d
CK3780	Beta-132718	rock-shelter fill	Burned bush	100±50[1-3]	A.D. 1665–1955[6]	c
CK5712 (Garrett Shelter)	Beta-151074	Feature 7 (roasting pit/hearth)	Human coprolite	140±70[1/3]	A.D. 1640–1960[6]	d
CK4415	Beta-132719	rock-shelter fill	*Salix* stick (sinew-wrapped)	170±30[1-3]	A.D. 1660–1700, 1720–1820, 1835–1880, 1915–1950[6]	c
CK5712	Beta-151075	Feature 4 (roasting pit)	*Larrea* charcoal	170±70[1/3]	A.D. 1530–1550, 1630–1950[6,8]	d
CK4415	Beta-132722	packrat midden	Charred material	180±50[1-3]	A.D. 1645–1950[6]	c
CK4415	Beta-132720	packrat midden	*Yucca* sandal	270±40[3]	A.D. 1510–1595, 1615–1670, 1780–1795[6]	c
CK5701	Beta-149454	Feature 1 (shelter?)	*Larrea* charcoal	290±40[3]	A.D. 1490–1660[6]	d
CK4415	Beta-132724	packrat midden	Charred material	300±50[1-3]	A.D. 1460–1665[6]	c
CK4415	Beta-132721	packrat midden	*Yucca* sandal	350±40[3]	A.D. 1445–1645[6]	c
CK4415	Beta-132723	rock-shelter fill	Charred material	360±50[1-3]	A.D. 1435–1650[6]	c
CK4440	Beta-47986	Feature 2-1, hearth	Charcoal	400±70[1-3]	A.D. 1410–1650[7]	b

Site (26-)	Sample Data			Radiocarbon Data		
	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
CK4440	Beta-47988	Feature 13-1, charcoal stain	Charcoal	450±60[1-3]	A.D. 1330–1630[7]	b
CK2461	Beta-47984	Feature B-1, charcoal stain/ hearth, Shelter 1	Charcoal	480±70[1-3]	A.D. 1310–1620[7]	b
CK2459	Beta-149453	Feature 1 (hearth) and vicinity	*Larrea* charcoal	480±60[1/3]	A.D. 1320–1500[6]	d
CK2461	Beta-47982	Feature A-1, charcoal stain/hearth, Shelter 1	Charcoal	510±60[1-3]	A.D. 1300–1480[7]	b
CK5712	Beta-149456	N17E19, Stratum 2, Level 1	*Larrea* charcoal	520±60[1/3]	A.D. 1300–1460[6]	d
CK4440	Beta-47985	rock-shelter fill	Charcoal?	610±60[1-3]	A.D. 1280–1430[7]	b
CK2461	Beta-47983	Feature D-1, charcoal stain/ hearth, Shelter 1	Charcoal	630±8[1-3]	A.D. 1260–1440[7]	b
CK3780	Beta-132717	Feature 1, charcoal concentration	Charcoal	850±50[1-3]	A.D. 1040–1275[6]	c
CK3780	Beta-132716	Feature 1, charcoal concentration	Charcoal	900±50[1-3]	A.D. 1020–1250[6]	c
CK5712	Beta-149455	N17E19, Stratum 4, Level 2	*Larrea* charcoal, possibly some cactus areole	960±50[1/3]	A.D. 990–1190[6]	d
CK3780	Beta-132715	rock-shelter fill	Charred maize cob	1000±40[1-3]	A.D. 980–1055, 1085–1150[6]	c
CK4440	Beta-47987	Feature 12-1, charcoal stain	Charcoal	1420±60[1-3]	A.D. 540–690[7]	b
Dry Lake Area						a
CK1164	UGa 763	Hearth 1, Pit 10, at 20-30 cm	Charcoal	260±75[4]	A.D. 1450–1700, 1725–1815, 1835–1880, 1915–1950[7-1]	

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed to be estimated C13/C12 ratio; radiometric date.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[1/3]conventional radiocarbon age; measured C13/C12 ratio; type of date unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*

[7-x]alternative calibration using the University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, Revision 4.0, Method B: [7-1]sample has a "most likely" (86%) calibrated range of A.D. 1450–1815.

References: a = Brooks et al. 1975:Table 29 and text; b = York et al. 1992; c =Blair and Wedding 2001; d = Ahlstrom and Roberts 2001.

Table A.3. Radiocarbon Dates from Ash Meadows

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
26NY1729 (Fairbanks Spring)	FN 270; Beta-273312	EU 9, Level 3; sediment (35 cmbs) overlying F. 09-10, possible cultural surface(s)	Charred *Opuntia*(?) seed and *Lycium*(?) seed	470±40[3]	A.D. 1410–1460[6]	a
"	FN 274; Beta-273313	EU 5; F. 09-04, 15-35 cmbs (pit; hearth?)	Charred grass (*Leymus*?) seed	1960±40[3]	40 B.C.–A.D. 120[6]	a
(Barnett site)	A-1015, A-1020, A-1021, A-1023, A-1024, A-1025	Three burial pits (burned prior to use) and associated midden	Charcoal, primarily *Prosopis*	1950±100[4-1]	199 B.C. –A.D. 260, A.D. 280–292, 297–323[7-1]	b, c
(SW of Barnett site)	A-1016	Charcoal lens (hearth?)	Unknown	1280±110[4]	A.D. 577–986[7]	b
"	A-1137	Hearth assoc. w/ Paiute pottery	Unknown	220±100[4]	A.D. 1490–1603, 1609–1951[7]	b
(400 m W of Barnett site)	A-1161	Cultural(?) sand-dune churn zone	Charcoal	440±280[4]	A.D. 1048–1087, 1122–1138, 1150–1954[7-2]	b

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[2x]conventional radiocarbon age; estimated or assumed to be estimated C13/C12 ratio; radiometric date, extended count.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[4-1]average of six radiocarbon ages; unknown or uncertain if the individual measurements are C13/C12 corrected; radiometric dates.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

[7-x]alternative calibration from program CALIB REV*.*: [7-1]sample has a "most likely" (93%) calibrated range of 200 B.C.-A.D. 260; [7-2]sample has a "most likely" (93%) calibrated range of A.D. 1150-1954.

[8]calibrated with the program OxCal v*.*.

References: a = Davide et al. 2010; b = Mehringer and Warren 1976; c = Muto et al. 1976.

Table A.4. Radiocarbon Dates from the Corn Creek Dunes Site

	Sample Data			Radiocarbon Data		
Site Area	Sample	Provenience	Material	Date/Age (B.P.)	Date[4] (B.C.)	Ref.[7]
CL-243	UCLA-535	Hearth 10, depth=30”	Charcoal	4030±100[2]	2876–2302[5]	a
"	UCLA-534	Hearth 9, depth=42”	Charcoal	4380±100[2]	3359–2707[5]	a
"	UCLA-525	Hearth 3, surface	Charcoal	4440±100[2]	3366–2886[5]	a
"	UCLA-531	Hearth 6, depth=48”	Charcoal	4580±100[2]	3631–2935[5]	a
"	UCLA-532	Hearth 7, depth=42”	Charcoal	4610±100[2]	3636–3031[5]	a
"	UCLA-533	Hearth 8, depth=102”	Charcoal	4900±100[2]	3945–3382[5]	a
"	UCLA-526	Hearth 1, surface	Charcoal	5200±100[2]	4318–3779[5]	a
Locus 1	Beta-172585	probable pithouse	*Ceratoides?* Charcoal	1420±70	A.D. 530–710[6]	b
"	Beta-172584	Feat. 2 (roasting pit), 53+ cm bgs	Charred material	2760±40	1000–820 B.C.[6]	b
	FN 929; Beta-273311			1180±40	A.D. 720–740, 770–970	c
	PRI-08-85-63		*Atriplex* charcoal	1220±15	A.D. 710–750, 760–880	c
	PRI-08-85-309		*Zea mays* kernel, charred	1130±15	A.D. 885–975	c
	PRI-08-85-322		*Prosopis* charcoal	2950±15	1260–1110 B.C.	c
	PRI-08-85-286		Unidentified hardwood charcoal	3785±20	2290–2190, 2180–-2140 B.C.	c
	PRI-08-85-274		*Atriplex* charcoal	100±15	A.D. 1690–1730, 1810–1920	c
	PRI-08-85-366		*Atriplex* charcoal	545±15	A.D. 1320–1350, 1390–1430	c
	PRO-10-22-1160		*Atriplex* charcoal	515±20	A.D. 1400–1440	c
	PRI-08-85-161		*Atriplex* charcoal	545±15	A.D. 1320–1350, 1390–1430	c

Notes: [1] radiometric date; C13/12 corrected.

[2] radiometric date; not C13/12 correct, or not known if corrected.

[3] AMS (Accelerator Mass Spectrometry) date; all ages from AMS dating are C13/12 corrected.

[4] 2-sigma (95.4%), calibrated.

[5] calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV4.4.2.

[6] calibration provided by Beta Analytic (INTCAL 98 Radiocarbon Age Calibration, Stuiver et al. 1998, Radiocarbon 40[3]:1041-1083).

References: a = Williams and Orlins 1963; b = Roberts et al. 2003c; c = Roberts and Lyon 2011.

Table A.5. Radiocarbon Dates from Desert Dry Lake

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
LN4970	Beta-230942	F28, non-locus; FCR concentration	From "charcoal stain"	240±40[1-3]	A.D. 1520–1592, 1619–1685, 1732–1807, 1928–1952[7]	a
LN2254	Beta-218927	F10, Locus A, surface; FCR concentration	From "charcoal stain"	440±50[1-3]	A.D. 1406–1524, 1558–1631[7]	a
LN4970	Beta-230943	F34, non-locus; FCR concentration	From "charcoal stain"	820±40[1-3]	A.D. 1058–1065, 1066–-1072, 1155–1277[7-1]	a
LN4970	Beta-230941	F13, Locus E; FCR concentration	From "charcoal stain"	1610±40[1-3]	A.D. 349–368, 379–547[7-2]	a
LN4970	Beta-218928	F12, Locus D, surface; FCR concentration	From "charcoal stain"	2000±40[1-3]	151–149 B.C., 111 B.C.–A.D. 83[7-3]	a
LN4970	Beta-218929	Trench 1, contact of Strata IV-V & III (aeolian sands/phreato-phyte flat) [9]	Charcoal[9]	6970±50[3]	5981–5943, 5926–5739 B.C.[7]	a
LN4970	Beta-230944	Trench 3, Stratum III[9]	Charcoal[9]	7120±40[3]	6065–5971, 5954–5909 B.C.[7]	a

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date

[2x]conventional radiocarbon age; estimated or assumed to be estimated C13/C12 ratio; radiometric date, extended count

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date

[1-3]conventional radiocarbon age; other details unknown

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date

[5]2-sigma (95.4%) calibrated radiocarbon date

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*

[7-x]alternative calibration from program CALIB REV*.*: [7-1]sample has a "most likely" (94%) calibrated range of A.D. 1155-1277; [7-2]sample has a "most likely" (93%) calibrated range of A.D. 379-547; [7-3]sample has a "most likely" (95%) calibrated range of 111 B.C.-A.D. 83

[8]calibrated with the program OxCal v*.*

[9]"cultural" (as opposed to "geological") association of the sample is open to question (see Wriston 2008:341)

References: a = Wriston 2008.

Table A.6. Radiocarbon Dates from Duck Creek

Site Number (26-)	Sample Data			Radiocarbon Data		Refs.
	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	
CK501/1528 (Berger site)	1; DRI-3219	Unit A12, L. 12, 30-33 in	unknown	412±46[4]	1421–1632[7]	A
"	5; DRI-3223	Unit A 11, L. 5, 9-12 in	unknown	571±82[4]	1279–1472[7]	A
"	2; DRI-3220	Unit A16, L. 4, 6-9 in	unknown	578±62[4]	1296–1435[7]	A
"	4; DRI-3222	Unit 7D, L. 6, 12-15 in	unknown	586±62[4]	1294–1432[7]	A
"	6; DRI-3224	Unit A14, L. 8, 18-21 in	unknown	669±62[4]	1245–1410[7]	A
"	3; DRI-3221	Unit B14, L. 32, 67-70 in	unknown	748±47[4]	1188–1385[7]	A

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[2x]conventional radiocarbon age; estimated or assumed to be estimated C13/C12 ratio; radiometric date, extended. count.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

References: a = Seymour 1997:Table 10.

Table A.7. Radiocarbon Dates from the Eglington Escarpment Area

	Sample Data			Radiocarbon Data[4]		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Date (A.D.)	Refs.
(Tule Springs Locus 41	UCLA-635	Unit G, hearth	Charcoal	570±80[2]	1280–1466[5]	a
40	UCLA-516	Unit G, hearth	Charcoal	725±80[2]	1071–1409[5]	a
66	UCLA-638	Unit G, hearths on spring mound	Charcoal	880±80[2]	1020–1278[5]	a
65)	A-465	Unit F1, hearth in dune area	Charcoal	4190±170[2]	3335–2305 B.C.[5]	a
CK3601 (Burnt Rock Mound)	Beta-143485	Unit 8, 10-20 cm	Charred material	200±60[1/3]	1715–1885[6]	d,f
"	Beta-152723	Unit 8, 20-30 cm	Charred material	230±50[1/3]	1520–1570, 1630–1690, 1730–1810, 1920–1950[6]	d,f
"	Beta-143489	Unit 9, 10-20 cm	Charred material	310±50[1/3]	1455–1665[6]	d
"	Beta-143482	Unit 2, 10-20 cm	Charred material	320±50[1/3]	1450–1660[6]	d
"	Beta-152725	Unit 9, 40-50 cm	Charred material	350±50[1/3]	1440–1650[6]	d
"	Beta-143490	Unit 9, 30-40 cm	Charred material	380±50[1/3]	1430–1645[6]	d
"	Beta-143481	Trench 2	Charred material	460±60[1/3]	1400–1515, 1590–1620[6]	d
"	Beta-143480	Trench 2	Charred material	460±80[1/3]	1310–1638[5]	d
"	Beta-152724	Unit 8, 30-40 cm	Charred material	540±50[1/3]	1310–1440[6]	d,f
"	Beta-143492	Unit 5, 20-30 cm	Charred material	580±50[1/3]	1300–1430[6]	d
"	Beta-152726	Unit 9, 50-60 cm	Charred material	580±50[1/3]	1300–1430[6]	d
"	Beta-143491	Unit 1, 10-20 cm	Charred material	660±70[1/3]	1250–1420[6]	d
	"	"	"	580±50[1/3]	1560–1630	f
"	Beta-143486	Unit 8, 40-50 cm	Charred material	980±50[1/3]	980–1195[6]	d,f
"	Beta-143488	Unit 8, 60-70 cm	Charred material	1160±80[1/3]	680–1020[6]	d,f
"	Beta-152721	Unit 14, 20-30 cm	Charred material	1270±40[1/3]	670–870[6]	d
	"	Unit 1, 20-30 cm	"	"	"	f
"	Beta-143487	Unit 8, 50-60 cm	Charred material	1280±60[1/3]	650–885[6]	d,f
"	Beta-143483	Unit 2, 50-60 cm	Charred material	1590±70[1/3]	330–625[6]	d
"	Beta-152722	Unit 1, 30-40 cm	Charred material	1930±60[1/3]	50 B.C.–230[6]	d,f
"	Beta-143484	Unit 1, 40-50 cm	Charred material	1960±60[1/3]	80 B.C.–155[6]	d,f
CK3766 (Pardee site)	Beta-34061	Excavation Unit 1, 40-50 cm, hearth	Charcoal	1710±90[1]	92–539[5-1]	b
CK3799	5-1164-68; Beta-132701	Feat. 27, hearth (roasting pit?)	Charred material	590±50[1]	1290–1425[6]	c
"	5-1164-67; Beta-132696	Feat. 40B, hearth (roasting pit?)	Charcoal	660±40[1]	1275–1400[6]	c
"	5-1164-16; Beta-132699	Feat. 40A, hearth (roasting pit)	Charred material	710±50[1]	1235–1315, 1350–1390[6]	c
"						c
"	5-1164-66; Beta-132697	Feat. 8, hearth (roasting pit?)	Charcoal	3880±110[1]	2620–2025 B.C.[6]	c
"	5-1164-82; Beta-132700	Feat. 5, 2-10 cm, rock-lined hearth (roasting pit?)	Charred material	4440±40[3]	3335–3205, 3195–2925 B.C.[6]	c

Site (26-)	Sample Data			Radiocarbon Data[4]		Refs.
	Sample	Provenience	Material	Age (B.P.)	Date (A.D.)	
"	5-1164-12; Beta-132698	Feat. 20	Charred material	6160±110[1]	5340–4800 B.C.[6]	c
"	5-1164-17; Beta-132702	Feat. 11, hearth (roasting pit?) debris	Charred material	6730±70[1]	5735–5515 B.C.[6]	c
CK6907	Beta-209356	Feat. 1 (stone-lined roasting pit)	Charcoal	520±40	1320–1340, 1390–1440[5-2]	e
CK6913	Beta-209401	Feat. 2 (informal hearth)	Charcoal	590±50	1300–1410	e

Notes: [1]radiometric age; C13/12 corrected.

[2]radiometric date; not C13/12 correct, or not known if corrected.

[3]AMS (Accelerator Mass Spectrometry) age; all ages from AMS dating are C13/12 corrected.

[4]conventional radiocarbon age; 2-sigma (95.4%) calibrated radiocarbon date.

[5]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV4.4.2 (Stuiver and Reimer 1993, *Radiocarbon* 35:215-230.

[5-1]Beta-34061: the sample has a "most likely" (95.2%) calibrated range of A.D. 127-539 (CALIB REV4.4.2).

[5-2]Beta-209356: sample has a most likely date of 1390-1440.

[6]calibration provided by Beta Analytic (INTCAL98 Radiocarbon Age Calibration, Stuiver et al. 1998, *Radiocarbon* 40[3]:1041-1083).

References: a = Haynes 1967:51-59, 74: b = White et al. 1989; c = Blair et al. 2000; d = Rager 2001:Table 4; e = King et al. 2006; f = Seymour and Rager 2005:Table 2.

Table A.8. Radiocarbon Dates from Gold Butte/Virgin Mountains Area

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
CK1987	UGA-4558	Roasting Pit 12, 110-120 cm	Charcoal	2450±155[4]	904–191 B.C.[7]	b, c
CK1990	1990-5	Roasting Pit 3 (agave oven), Test Unit (20+ cm)	Charcoal	1850±40[1-3]	A.D. 71–249[7]	b
CK1991 (The Agave Ovens site)	1991-F25	Pit 4 (agave oven), Strat I	Charcoal	330±50[1-3]	A.D. 1454–1648[7]	b
"	1991-F26	Pit 4 (agave oven), Strat II	Charcoal	160±40[1-3]	A.D. 1663–1709, 1717–1828, 1831–1890, 1910–1953[7]	b
"	1991-F27	Pit 3 (agave oven), Strat III	Charcoal	160±40[1-3]	A.D. 1663–1709, 1717–1828, 1831–1890, 1910–1953[7]	b
"	1991-F28	Pit 3 (agave oven), Strat IV	Charcoal	1200±60[1-3]	A.D. 682–905, 912–970[7]	b
"	1991-47	Pit 4 (agave oven), Strat IV	Charcoal	920±30[1-3]	A.D. 1028–1184[7]	b
"	1991-48	Pit IV (agave oven), Strat IV	Charcoal	250±30[1-3]	A.D. 1522–1574, 1584–1587, 1626–1680, 1764–1800, 1939–1951[7]	b
CK1992	UGa-4557	Roasting Pit 3, 95 cm	Charcoal	2400±80[4]	782–363, 267–265 B.C.[7-1]	b, c
CK3064	UGa-4559	Roasting Pit 2, 70-80 cm	Charcoal	1355±70[1-3]	A.D. 557–784, 787–824, 841–861[7-2]	b, c
CK3073	3073-1	isolate roasting pit (agave oven), TU 1 (0-20 cm)	Charcoal	360±40[1-3]	A.D. 1450–1532, 1536–1635[7]	b
CK3091	3091-1	agave oven?, TU N0/E0 (30-40 cm)	Charcoal	1140±40[1-3]	A.D. 779–794, 800–987[7]	b
CK3093	3093-2	agave oven, TU 1 (0-20 cm)	Charcoal	320±50[1-3]	A.D. 1455–1654[7]	b
CK3201 (Collapsed Rock Shelter)	3201-F9	N3/W1 (20-30 cm)	Charcoal	900±40[1-3]	A.D. 1034–1214[7]	b
"	3201-F10	N3/E0 (30-40 cm)	Charcoal	2200±40[1-3]	382–174 B.C.[7]	b
"	3201-Fll	N3/W1 (126-146 cm)	Charcoal	2110±40[1-3]	350–302, 226–225, 209–38, 9–4 B.C.[7-3]	b
CK5434 (Firebrand Cave)	5-1177-110-1; Beta-112558;	Map Reference 11	Dart component	4430±70[2]	3345–2900 B.C.[6]	a
"	5-1177-122-5; DRI-3436	Map Reference 23C	Netting	4313±123[1/3]	3336–2609, 2600–2590 B.C.[8-1]	a
"	5-1177-123-1; DRI-3433	Map Reference 24	Dart component	3834±97[1/3]	2560–2530, 2497–2020, 2003–1979 B.C.[8-2]	a

Site (26-)	Sample Data			Radiocarbon Data		Refs.
	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	
"	5-1177-130-1; Beta-200624	Map Reference 31	Cordage (2 ply S-spun, Z-twisted; *Apocynum cannabinum*)	3750±40[3]	2290–1920 B.C.[6]	a
"	5-1177-103-1; Beta-200622	Map Reference 4A	Bone collagen, butcher-marked mule deer tibia	3850±40[3]	2460–2200 B.C.[6]	a, b
"	5-1177-133-1; DRI-3438	Map Reference 37	Firebrand	3590±78[1/3]	2138–1740, 1712–1700 B.C.[8-3]	a
"	5-1177-131-1; Beta-200625	Map Reference 32A	Cordage (single ply, S-spun; *Yucca* sp.)	3750±40[3]	2290–2030 B.C.[6]	a
"	5-1177-127-4; DRI-3431	Map Reference 28G	Dart component	3502±154[1/3]	2274–2253, 2203–1436 B.C.[8-4]	a
"	5-1177-129-1; DRI-3437	Map Reference 30A	Dart component	3449±55[1/3]	1891–1611, 1552–1541 B.C.[8-5]	a
"	5-1177-124-1; Beta-200623	Map Reference 25	Cordage (2 ply, S-spun, Z-twisted; *Yucca* sp.)	3680±50[3]	2290–2030 B.C.[6]	a
"	5-1177-128-7; DRI-3428	Map Reference 29D	Cane fragment	3385±88[1/3]	1886–1501, 1484–1451 B.C.[8-6]	a
"	5-1177-133-2; Beta-112560	Map Reference 37	Firebrand	3340±70[2]	1760–1440 B.C.[6]	a
"	5-1177-115-1; DRI-3432	Map Reference 16	Basketry (coiled, 2-rod and bundle)	3242±153[1/3]	1890–1115, 1091–1082 B.C.[8-7]	a, b
"	5-1177-128-22; Beta-112559	Map Reference 29P	Dart component	3230±80[2]	1675–1315 B.C.[6]	a
"	5-1177-142-22; DRI-3430	Map Reference 100; collected w/ corn kernels at 60-70 cm, Test Probe TP1	Charcoal	1722±88[1/3]	A.D. 128–538[8]	a
"	5-1177-100-1; Beta-112556	Map Reference 1	Spirit stick/ regalia	1700±60[2]	A.D. 225–465, 475–515[6]	a
"	5-1177-117-1; DRI-3435	Map Reference 18	Basketry (coiled, 2-rod and bundle)	1523±97[1/3]	A.D. 265–279, 332–682[8-8]	a, b
"	5-1177-102-1; DRI-3429	Map Reference 3	Basketry (coiled, 2-rod and bundle)	1407±55[1/3]	A.D. 546–716, 741–766[8-9]	a, b
"	5-1177-102-1; Beta-112557	Map Reference 3	Basketry (coiled, 2-rod and bundle)	1400±100[2]	A.D. 440–865[6]	a, b
"	5-1177-112-1; DRI-3434	Map Reference 3	Arrow component	152±74[1/3]	A.D. 1660+[8]	a
CK6078/ 6095 (Cedar Basin Midden)	6078/6095-F4	Upper Midden, S5/E1 (20-30 cm)	Charcoal	170±40[1-3]	A.D. 1655–1707, 1719–1826, 1832–1886, 1912–1953[7]	b
"	6078/6095-F5	Lower Midden, S5/E1 (50-70 cm)	Charcoal	2730±40[1-3]	974–956, 941–807 B.C.[7]	b
CK6080/ 6081 (Ian's Rock Shelter)	6080/6081-F1	Feature 1 (large, rock-lined hearth), S3/W3 (35-45 cm)	Charcoal	1710±50[1-3]	A.D. 174–191, 211–433, 498–501[7-5]	b

Site (26-)	Sample Data			Radiocarbon Data		Refs.
	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	
"	6080/6081-F2[?]	Feature 3 (ash lens), S3/W5 (5-10 cm)	Charcoal	250±60[1-3]	A.D. 1468–1695, 1726–1813, 1837–1843, 1852–1868, 1873–1876, 1918–1952[7]	b
"	6080/6081-F3[?]	S3/W5, buried midden (66-80 cm)	Charcoal	2030±40[1-3]	164–129 B.C., 120 B.C.–A.D. 57[7.]	b
CK7932	7932-1	agave oven, TU 1 (0-10 cm)	Charcoal	100±40[1-3]	A.D. 1680–1763, 1801–1938, 1951–1954[7]	b
CK7951	7951-5	agave oven?, TU 1 (0-10 cm)	Charcoal	1130±40[1-3]	A.D. 780–792, 803–992[7]	b
CK7994 (Kirk's Grotto Rock Shelter)	7994-F6	N14/W28.5 (35-50 cm)	Charcoal	1490±40[1-3]	A.D. 436–489, 513–516, 530–648[7]	b
"	7994-50	Feature 1, interior bottom (10-20 cm)	Yucca fiber	1860±50[1-3]	A.D. 29–38, 51–256, 302–316[7-6]	b
CK8013 (Dune Field Site)	8013-F7	S1/E49 and S1/E51 (0-15 cm)	Charcoal	250±40[1-3]	A.D. 1514–1600, 1617–1683, 1735–1805, 1933–1951[7]	b
CK8047 (Dart Shaft Shelter)	8047-F8	Lower Mid-den, S1/W4, Rock Shelter 5 (surface)	Charcoal	90±40[1-3]	A.D. 1681–1739, 1745–1747, 1751–1763, 1802–1938, 1951–1954[7]	b
"	8047-5	Rock Shelter 5 (surface)	Corn cob	1820±40[1-3]	A.D. 85–259, 284–289, 291–322[7-7]	b
CK8163	8163-3	Roasting Pit 1 (agave oven), TU 1 (20+ cm)	Charcoal	460±40[1-3]	A.D. 1401–1497, 1509–1510, 1602–1615[7-8]	b
"	8163-5	Roasting Pit 2 (agave oven), TU 2 (0-10 cm)	Charcoal	410±40[1-3]	A.D. 1427–1524, 1558–1631[7]	b
CK8170	8170-11	agave oven, TU 2 (20+ cm)	Charcoal	790±40[1-3]	A.D. 1174–1281[7]	b
CK8172	8172-2	agave oven, TU 1 (20+ cm)	Charcoal	220±40[1-3]	A.D. 1525–1557, 1631–1695, 1726–1813, 1838–1842, 1853–1867, 1874–1875, 1918–1952[7]	b
CK8179 (Sheep Shelter)	8179-F12	N5/W5 (40-70 cm)	Charcoal	4190±50[1-3]	2898–2828, 2824–2625 B.C.[7]	b
"	8179-F13	S6.5/W1.5 (100-115 cm)	Charcoal	3170±50[1-3]	1602–1591, 1533–1368, 1360–1314 B.C.[7-4]	b

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

[7-x]alternative calibration from program CALIB REV*.*: [7-1]sample has a "most likely" (95%) calibrated range of 782-363 B.C.; [7-2]sample has a "most likely" (90%) calibrated range of A.D. 557-784; [7-3]sample has a "most likely" (95%) calibrated range of 350-38 B.C.; [7-4]sample has a "most likely" (95%) calibrated range of 1533-1314 B.C.; [7-5]sample has a "most likely" (94%) calibrated range of A.D. 211-433; [7-6]sample has a "most likely" (93%) calibrated range of A.D. 51-256; [7-7]sample has a "most likely" (89%) calibrated range of A.D. 85-259; [7-8]sample has a "most likely" (93%) calibrated range of A.D. 1401-1497.

[8]calibrated with the program OxCal v*.*.

[8-x]alternative calibration from program OxCal v*.*: [8-1]sample has a "most likely" (94.4%) calibrated range of 3336-2609 B.C.; [8-2]sample has a "most likely" (92.5%) calibrated range of 2497-2020 B.C.; [8-3]sample has a "most likely" (94.4%) calibrated range of 2138-1740 B.C.; [8-4]sample has a "most likely" (94.4%) calibrated range of 2203-1436 B.C.; [8-5]sample has a "most likely" (94.4%) calibrated range of 1891-1611 B.C.; [8-6]sample has a "most likely" (93.5%) calibrated range of 1886-1501 B.C.; [8-7]sample has a "most likely" (95.4%) calibrated range of 1890-1115 B.C.; [8-8]sample has a "most likely" (94.4%) calibrated range of A.D. 332-682; [8-9]sample has a "most likely" (91.6%) calibrated range of A.D.546-716.

References: a = Blair and Winslow 2006; b = McGuire et al. 2010:Tables 12 and 13; c = Ellis et al. 1982.

Table A.9. Radiocarbon Dates from Goodsprings Valley

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Ref.
CK4446 (Bighorn Cave)	Beta-166376	cave interior; 98N97E; 10-20 cmbs	charcoal	400±50[1-3]	A.D. 1420–1640[6]	a
"	Beta-166377	cave interior; 99N97E; 10-20 cmbs	charcoal	610±50[1-3]	A.D. 1290–1420[6]	a
"	Beta-166378	98N96E; 10-20 cmbs	charcoal	240±50[1-3]	A.D. 1520–1950[6]	a
"	Beta-166379	98N96E; 30-40 cmbs	charcoal	290±50[1-3]	A.D.1470–1800[6]	a

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[2x]conventional radiocarbon age; estimated or assumed to be estimated C13/C12 ratio; radiometric date, extended count.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

Reference: a = IMACS Site Form, Site 26CK4446, 2002 Update

Table A.10. Radiocarbon Dates from Gypsum Cave

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Ref.
CK5 (Gypsum Cave)	6F118; Beta-228749	Room 1, 12" deep	String (from ornament with string)	710±50[3]	A.D. 1230–1320, 1350–1390[6]	a
"	6F693; Beta-228754	Room 1, Level 1.2. 1'11" deep	String (from ornament with spring)	850±40[3]	A.D. 1050–1090, 1130–1140, 1140–1260[6]	a
"	6F929; Beta-228755	Room 1, Level 2	Wood (dart shaft)	3180±50[3]	1530–1380 B.C.[6]	a
	6F592; UCLA-1223	Room 2, 102" deep	Wood (dart shaft)	2900±80[4]	1371–897 B.C.[7]	a
"	6F1040; Beta-228756	Room 2, general digging, rock slide	Wood (dart shaft)	3640±40[3]	2130–1900 B.C.[6]	a
"	6F1042; Beta-228757	Room 2, under layer w/ sloth dung & hair	Wood (dart shaft)	3740±50[3]	2290–2020 B.C.[6]	a
"	6F591; Beta-228753	Room 2, under layer w/ sloth dung & hair	Wood (dart shaft)	3740±50[3]	2290–2020 B.C.[6]	a
"	GF430; Beta-228752	Room 3, on surface of rock in west of room	Cane (dart shaft)	3540±40[3]	1970–1750 B.C.[6]	a
"	GF397; Beta-228750	Room 3, left of entrance between Rooms 3 and 2	Cane (dart shaft)	3550±40[3]	2010–2000, 1980–1760 B.C.[6]	a
"	GF483; Beta-230813	Room 3, found at about 2' deep	Wood (bunt)	3620±40[3]	2130–2090, 2050–1890 B.C.[6]	a
"	GF113; Beta-228748	Room 3, west end	Wood (dart shaft)	3760±50[3]	2300–2030 B.C.[6]	a
"	GF865; Beta-230814	Room 3, 3" from surface	Wood (hafted biface)	3880±40[3]	2470–2260, 2260–2210 B.C.[6]	a
"	GF400; Beta-230605	Room 3, in packrat's nest	Wood (basketry)	8270±50[3]	7480–7140 B.C.[6]	a
"	GF651; UCLA-1069	Passage to Room 5, 28" deep	Wood (sticks)	2400±60	762–387 B.C.[4]	a
"	GF922; n.d.	Room 5	Wood (dart shaft)	3400± 50[1-3]	1877–1840, 1827–1794, 1783–1605, 1585–1535 B.C.[7]	a
"	GF398; Beta-228751	Room 5, Sloth [dung?] 5" deep from Stake 4 at entrance to room	Cane (dart shaft)	3730±40[3]	2280–2250, 2220–-2020 B.C.[6]	a

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown; actual standard error for sample GF922 is unknown but is estimated to be 50± radiocarbon years (Gilreath 2009:Table 9).

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

[8]calibrated with the program OxCal v*.*.

References: a = Gilreath 2009:Table 9, Appendix A.

TableA.11. Radiocarbon Dates from the Lower Moapa Valley (and Hidden Valley)

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Ref.
CK1482 (in Hidden Valley)	UGa-4453	roasting pit	–	3305±125[4]	1908–1313 B.C.[7]	e
CK2059 (Adam 2)	Beta-6731	Habitation room; burnt, collapsed roof fall	Burnt twigs and sticks	810±50[2]	A.D. 1051–1081, 1127–1135, 1152–1284[6]	a
CK2072 (Steve Perkins)	UGa-791	Structure V (large pit house), hearth	Charcoal	1295±60[4]	A.D. 647–877[7]	d
"	UGa-793	Structure VI (surface room), hearth	Charcoal	1005±60[4]	A.D. 894–927, 934–1165[7]	d
"	Beta-17273	Structure II, Room 9, Burial	Charcoal	830±60[4]	A.D. 1043–1104, 1118–1144, 1146–1279[7]	d
CK6355	01-06-01S1; Beta-156144	Feat. 1 (roasting pit), 4.8 m below historic Muddy River floodplain	Charcoal	2020±40[3]	110 B.C.–A.D. 70[6]	c
CK6444 (Yamashita 1)	A228-0159; Beta-186614	Structure 1, Tu #9, SS #2; 44 cm (BM II Component)	Charred *Pluchea sericea*	1780±30[2]	A.D. 150–340[6]	b
"	A228-0085/ -0001; Beta-162563	Structure 1, floor (BM II Component)	Charcoal chunks adjacent to burned cotton-wood post	1810±40[2]*	A.D. 110–330[6]	b
CK6445 (Yamashita 2)	A229-0830; Beta-71292	200N74W; 45-60 cm; extra-mural hearth	Charcoal	220±70[3]	A.D. 1510–1600, 1620–1950[7]	b
"	A229-3766/ -3777; Beta-172539; A29	Overlying Str. 4; scatter of fire-cracked rock, charcoal, and Southern Paiute brownware sherds (Southern Paiute Component)	Charcoal chunks	420±100[2x]*	A.D. 1310–1360, 1390–1660[6]	b
"	A229-4186; Beta-170579	Structure 4, hearth	Ashy fill	930±40[3]	A.D. 1015–1205[6]	b
"	A229-3423; Beta-170578	198N82W; 150-160 cm; Cist 5 (BM II Component)	Burned maize fragment	1780±40[3]	A.D. 135–365[6]	b
"	A229-3071; Beta-170577	204N82W; rock-lined hearth	Chunk charcoal	100±50[2]*	A.D. 1665–1955[6]	b
"	A229-2997; Beta-170576	206N80W; 40-50 cm	Charred *Prosopis pubescens* pod	180±40[3]	A.D. 1650–1705, 1715–1885, 1910–1950[6]	b
"	A229-1138; Beta-170574	208N70W	Charcoal chunks from extramural hearth	300±60[2]*	A.D. 1450–1675, 1775–1800, 1940–1945[6]	b
"	A229-2173; Beta-170575	220N84W; 170-180 cm; Cist 6 (BM II Component)	Burned maize cob	1800±40[3]	A.D. 120–340[6]	b

Site (26-)	Sample Data			Radiocarbon Data		Ref.
	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	
"	A229-2182; PRI-10-164-2182	202N74W; 30 cm-floor; adobe rubble overlying floor, Structure 1	*Salix* twig	950±15[3]	A.D. 1020–1060, 1070–1160[6]	–
CK6446 (Yamashita 3)	A230-0852; Beta-71293	240N80W; 40-44 cm; Structure 1, Room H, floor	Charred material on floor	1040±70[2]	A.D. 783–787, 816–843, 589–1163[7]	b
"	A230-2050; Beta-253382	Y-3 Structure 1, Room I; clay-lined hearth	Ashy fill	880±40[3]	A.D. 1040–1240[6]	–
"	A230-1109; Beta-253381	Structure 1, Room A; clay-lined hearth	Ashy fill	930±40[3]	A.D. 1020–1210[6]	–
"	A230-3690; Beta-172542	Pit structure, fill, 100-110 cm	Burned maize cob fragment	990±40[3]	A.D. 990–1160[6]	–
"	A230-3507/ -3508; Beta-172541	223N70W; 145-155 cm; charcoal layer in Cist 8 (BMII Component)	Charcoal	1750±60[2]*	A.D. 130–420[6]	–
"	A230-1734; Beta-172540	240N70W; 35-45 cm; extramural hearth (Southern Paiute Component?)	Small chunks of charcoal	230±40[2]*	A.D. 1530–1550; 1630–1680; 1930–1950[6]	b
"	A230-1982/ -1983; Beta-162562	Structure 1, Room I, floor of burned room	Charcoal	1000±60[2]*	A.D. 910–920; 960–1180[6]	b
"	A230-1150/ -0002; Beta-162561	Structure 1, Room B, burned room, floor	Charcoal from floor	990±60[2]*	A.D. 960–1180[6]	b
CK2041 (Yamashita 5N)	A232N-1021B; Beta-172546	304N126W; 80-90 cm; Small charcoal flecks adjoining south edge of Struct. 1	Charcoal	580±40[3]	A.D. 1300–1420[6]	b
"	A232N-0407/-0572; Beta-172545	300N108; 70 cm-caliche; fill in pit, base of deposit	unknown	350±60[2x]*	A.D. 1430–1660[6]	b
"	A232N-0607/ -0002; Beta-162564	Structure 1, clay-lined hearth, ashy fill	Ashy fill	960±40[3]	A.D. 1000–1180[6]	b
"	A232N-0259; Beta-162560	Dispersed charcoal in sand overlying Str. 1 (4 sherds of Southern Paiute Brownware, Southern Paiute Component?)	Dispersed charcoal	190±40[3]	A.D. 1650–1700, 1720–1820, 1840–1880, 1920–1950[6]	b
CK2041 (Yamashita 5S)	A232S-1266; Beta-172550	293.55N103.20W; 53-75 cm; depress-ion in adobe layer	Fine charcoal	190±40[3]	A.D. 1650–1700, 1720–1820, 1920–1950[6]	b
"	A232S-1028; Beta-172549	286N105W; 32 cm	Charcoal soil	180±40[3]	A.D. 1650–710, 1720–1880, 1910–1950[6]	b

Site (26-)	Sample Data			Radiocarbon Data		Ref.
	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	
"	A232S-1027; Beta-172548	228N104W; 56 cm; charcoal with corrugated pottery from Feature A on caliche	Charcoal flecks and chunks	600±40[3]	A.D. 1290–1420[6]	b
"	A232S-1024; Beta-172547	290N99W; extra-mural thermal feature	unknown		(result is outside calibration range)	b
"	A232S-0405; Beta-172544	300N108W; 50-60 cm	unknown		(result is outside calibration range)	b
"	A232S-0240; Beta-172543	298N108W; 20-30 cm; ashy fill	Small chunks of charcoal	170±40[3]	A.D. 1650–1890, 1910–1950[6]	–

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[2x]conventional radiocarbon age; estimated or assumed to be estimated C13/C12 ratio; radiometric date, extended count.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

References: a = Lyneis et al. 1989; b = Lyneis 2004; c = Ahlstrom et al. 2001; d = Myhrer 1989; e = Ellis et al. 1982

Table A.12. Radiocarbon Dates from Miscellaneous Las Vegas Valley Sites

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
CK1098 (Basic ite)	UGa 764	Pit A5, B5, C5 (50 cm-bedrock)	Charcoal	1245±145[4]	A.D. 535–1049, 1085–1124, 1137–1151[7-3]	d
CK4038 (Mended Basket)	5-1151-4, DRI-3391	N98-99/E102-103, Level 5 (deepest point in shelter)	Charcoal	1016±58[1/3]	A.D. 894–925, 932–1161[7]	b
"	5-1151-79, DRI-3393	N101-102/E102-103, Level 2 (associated w/ a metate)	Charcoal	606±61[1/3]	A.D. 1288–1423[7]	b
"	5-1151-B, DRI-3392	N99.19-99.48/ E101-101.6, Level 2, Feature 4 (ash and charcoal concentration)	Charcoal	477±71[1/3]	A.D. 1303–1368, 1384–1525, 1559–1630[7]	b
"	5-1151-C, DRI-3406	N99.54-100/E104-104.28, Level 1, Feature 3 (thermal feature [roasting pit])	Charcoal	947±62[1/3]	A.D. 988–1218[7]	b
"	5-1151-D, DRI-3409	Level 2	Basket fragments	660±72[1/3]	A.D. 1225–1226, 1241–1419[7-1]	b
"	5-1151-431, DRI-3407	N101-102/E1-3-104. Level 4, Feature 6 (slab-lined cist)	Charcoal	904±72[1/3]	A.D. 1004–1007, 1017–1263[7-2]	b
"	5-1151-A, DRI-3408	N99.3-99.8/ E103.25, Level 2, Feature 1 (thermal feature)	Charcoal	705±55[1/3]	A.D. 1220–1330, 1342–1396[7]	b
CK4908	Beta-132709	Unit 103N/81E (Alcove 1), L. 1 (2-10 cm), Feat. 8 (informal hearth?)	Charred material (charcoal)	101.1±66 pMC[2]	"modern"	a
"	Beta-132712	Unit 103N/90E (Alcove 3), L. 2 (10-20 cm), secondary hearth?	Charred material (charcoal)	60±40[2]	1685–1735, 1810–1925, 1950–1955[6]	a
"	Beta-132711	Unit 100N/90E (Alcove 3), L. 1? (2-10 cm)	Charred material (charcoal)	80±50[2]	1675–1775, 1800–1940, 1945–1955[6]	a
"	Beta-132713	Unit 103N/90E (Alcove 3), L. 1 (2-10 cm), informal hearth?	Charred material (charcoal)	80±50[2]	1675–1775, 1800–1940, 1945–1955[6]	a
"	Beta-132706	Feat . 2 (roasting mound), Unit 1, L. 2 (10-20 cm)	Charred material	220±60[2]	1515–1590, 1620–1705, 1715–1885, 1910–1950[6]	a
"	Beta-132705	Feat. 2 (roasting mound), E-W Trench, 40 cm	Charred material	350±60[2]	1435–1660[6]	a
"	Beta-132703	Feature 3 (roasting mound), Unit 1, L. 2 (10-20 cm)	Organic sediment	470±40[2]	1410–1470[6]	a
"	Beta-132704	Feat. 3 (roasting mound), E-W Trench, 30 cm	Charred material	510±60[2]	1310–1365, 1380–1470[6]	a
"	Beta-132710	Feat. 1 (roasting mound), E-W Trench, 1 m	Charcoal	1390±60[2]	560–760[6]	a

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
CK7454	PRI-08-86-339-35	Unit B, Level 9 (66-76 cmbs)	*Prosopis* charcoal	495±15[3]	A.D. 1410–1440[8]	c
"	PRI-08-86-358-81	Unit B, Level 10 (76-86 cmbs)	Asteraceae *Encelia*-type charcoal	380±15[3]	A.D. 1440–1520, 1590–1620[8]	c
"	PRI-08-86-319-36	Unit D, Level 8 (56-66 cmbs)	Asteraceae *Encelia*-type charcoal	390±15[3]	A.D. 1440–1510, 1600–1620[8]	c
"	PRI-08-86-426-46	Unit D, Level 16 (136-146 cmbs)	Asteraceae *Encelia*-type charcoal	425±15[3]	A.D. 1435–1475[8]	c
"	PRI-08-86-349-57	Unit E, Level 10 (76-86 cmbs)	*Prosopis* twig charcoal	510±15[3]	A.D. 1405–1440[8]	c
"	PRI-08-86-430-143	Unit E, Level 16 (136-146 cmbs)	*Prosopis* twig charcoal	2775±15[3]	980–890, 880–840 B.C.[8]	c
"	PRI-08-86-322-49	Unit F, Level 8 (56-66 cmbs)	Asteraceae *Hymenoclea*-type twig charcoal	150±20[3]	A.D. 1660–1770, 1720–1820, 1830–1880, 1910–1950[8]	c
"	PRI-08-86-392-83	Unit F, Level 11 (86-96 cmbs)	Asteraceae *Hymenoclea*-type twig charcoal	115±15[3]	A.D. 1680–1740, 1800–1930[8]	c
"	PRI-08-86-395-39	Unit H, Level 12 (96-106 cmbs)	Asteraceae *Hymenoclea*-type twig charcoal	95±15[3]	A.D. 1690–1730, 1810–1920[8]	c
"	PRI-08-86-298-3	Unit J, Level 6 (41-46 cmbs)	Asteraceae *Hymenoclea*-type twig charcoal	135±20[3]	A.D. 1670–1780, 1790–1950[8]	c

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[1/3]conventional radiocarbon age; measured C13/C12 ratio; type of date unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

[7-x]alternative calibration using the University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*, Method B: [7-1]sample has a "most likely" (95%) calibrated range of A.D. 1241-1419; [7-2]sample has a "most likely" (95%) calibrated range of A.D. 1017-1263; [7-3]sample has a "most likely" (94%) calibrated range of A.D. 535-1049.

[8]calibrated with the program OxCal v*.*.

References: a = Blair et al. 2000:Tables 16 and 35, Appendix II; b = Blair and Seymour 1998; c = DuBarton 2009; d = Brooks et al. 1975:Table 29, text.

Table A.13. Radiocarbon Dates from O'Malley and Conaway Shelters

Sample Data				Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Ref.
LN126 (Conaway Shelter)	FS 6; RL-36	Stratum I, Hearth 2 [roasting pit]	Charcoal	230±100[4]	A.D. 1476–1953[7]	a
"	FS 64; RL-37	Stratum IV, Hearth 4 [roasting pit]	Charcoal	1050±100[4]	A.D. 729–735, 772–1211[7-1]	a
"	FS 91; RL-38	Stratum V, at edge of Hearth 5	Charcoal	940±100[4]	A.D. 896–923, 939–1270[7-2]	a
"	FS 155; RL-39	Stratum VI, amorphous charcoal lens	Charcoal	2050±110[4]	380 B.C.–A.D. 139, A.D. 158–166, 196–208[7-3]	a
"	FS 154; RL-40	Stratum VII, charcoal concentration (3.5 mbd)	Charcoal	2090±100[4]	382 B.C.–A.D. 80[7]	a
"	FS 163; RL-41	Stratum VII, charcoal concentration (3.6 mbd)	Charcoal	1980±110[4]	353–292, 230–218 B.C., 214 B.C.–A.D. 258, A.D. 299–319[7-4]	a
LN418 (O'Malley Shelter)	FS 30; RL-42	Unit V, Stratum 17	Charcoal	890±100[4]	A.D. 908–911, 972–1287[7-5]	a
"	FS 33; RL-43	Unit V, Stratum 17	Charcoal	870±100[4]	A.D. 982–1294[7]	a
"	FS 39; RL-44	Unit IV, Stratum 12	Charcoal	2970±100[4]	1423–927 B.C.[7]	a
"	FS 348; RL-93	Unit III, Stratum 9	Charcoal	3740±170[4]	2620–2591, 2590–1689 B.C.[7-6]	a
"	FS 49; RL-45	Unit II, Stratum 4	Charcoal	3940±120[4]	2866–2804, 2776–2769, 2763–2132, 2084–2057 B.C.[7-7]	a
"	FS 275; RL-106	Unit II, Stratum 4	Charcoal	3920±170[4]	2880-1972, 1968-1965 B.C.[7-8]	a
"	FS 289; RL-91	Unit II, Stratum 3	Charcoal	4630±170[4]	3708–2907 B.C.[7]	a
"	FS 52; RL-46	Unit I, Stratum 2	Charcoal	6520±140[4]	5712–5217 B.C.[7]	a
"	FS 325; RL-92	Unit I, Stratum 1	Charcoal	7100±190[4]	6364–6282, 6274–5644 B.C.[7-9]	a

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[1/3]conventional radiocarbon age; measured C13/C12 ratio; type of date unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date; given that the samples from the Conaway and O'Malley shelters were analyzed no later than 1973 and that there is no reference to "conventional radiocarbon ages, it seems most likely that the dates were *not* C13/C12 corrected.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

[7-1]sample has a "most likely" (95%) calibrated range of A.D. 772-1211; [7-2]sample has a "most likely" (93%) calibrated range of A.D. 939-1270; [7-3]sample has a "most likely" (93%) calibrated range of 380 B.C.-A.D. 139; [7-4]sample has a "most likely" (91%) calibrated range of 214 B.C.-A.D. 258; [7-5]sample has a "most likely" (95%) calibrated range of A.D. 972-1287; [7-6]sample has a "most likely" (95%) calibrated range of 2590-1689 B.C.; [7-7]sample has a "most likely" (90%) calibrated range of 2763-2132 B.C.; [7-8]sample has a "most likely" (95%) calibrated range of 2880-1972 B.C.; [7-9]sample has a "most likely" (91%) calibrated range of 6274-5644 B.C.

[8]calibrated with the program OxCal v*.*.

Reference: a = Fowler et al. 1973.

Table A.14. Radiocarbon Dates from Pintwater Cave (Associated with Cultural Materials)

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Ref.
CK253 (Pint-water Cave)	UCLA-752	Pocket No. 1, 3-6" below surface (assoc. w/ 1 Elko Side-notched & 2 Gypsum Cave points)	Twigs	3255±80[4]	1739–1706, 1698–1389 B.C.[7-1]	A
"	Beta-65254	Susia test pit, 18-24" below datum (assoc. w/ 1 Gypsum Cave & 4 Elko series points)	Charcoal	3400±80[1-3]	1895–1505 B.C.[7]	A
"	UCLA-553[9]	hearth, just below surface	Charcoal	9200±200[4]	9131–8981, 8930–7825 B.C.[7-2]	A
"	Beta-72675[9]	hearth, just below surface	Charcoal	9300±170[1-3]	9173–9167, 9158–-8227 B.C.[7-3]	A

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[1/3]conventional radiocarbon age; measured C13/C12 ratio; type of date unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date; Samples UCLA-752 and 553: Buck and DuBarton (1992:Table 3) report the dates for these samples as "conventional radiocarbon ages," but the fact that they were first reported in the mid-1960s raises the possibility that they are not in fact C13/C12 corrected.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

[7-1]sample has a "most likely" (93%) calibrated range of 1698-1389 B.C.; [7-2]sample has a "most likely" (91%) calibrated range of 8930-7825 B.C.; [7-3]sample has a "most likely" (95%) calibrated range of 9158-8227 B.C.

[8]calibrated with the program OxCal v*.*.

[9]sample collected in 1963 by Vance Haynes, who concluded "that the date was the result of later prehistoric burning of packrat midden from the cave" (Buck and DuBarton 1994:239).

Reference: a = Buck and DuBarton .1994.

Table A.15. Radiocarbon Dates from the Upper California Wash Area.

	Sample Data			Radiocarbon Data[5]		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Date	Refs.
CK1081	UGa 758	Pit B6, outside rock shelter, 70 cm-bedrock	charcoal	900±75[4]	1000–1280[7]	a
CK1081B	UGa 760	roasting pit/midden; Pit C3, at 70-80 cm	charcoal	880±60[4]	1020–1280[7]	a
CK1081	UGa 759	hearth; Pit C6, outside rock shelter, 60-70 cm	charcoal	510±65[4]	1300–1480[7]	a
CK1081	UGa 757	hearth; Pit A2, inside rock shelter, 15-30 cm	charcoal	250±75[4]	1470–1950[7]	a
CK1083 (Burial site)	UGa 766	Roasting Pit 1, 40-50 cm	unknown	715±60[4]	1220–1400[7]	a
CK1083	UGa-4452	Unit 4 (rock-shelter fill; 30-40 cm)	unknown	395±95[4]	1330–1790[7-4]	b
CK1086	UGa 765	Hearth 1, at 20-30 cm, outside rock structure	Charcoal	1475±85[4]	410–690[7]	a
CK1088 (Pestisite)	UGa-4445	Component I (rockshelter), Unit 2, (roasting-pit) midden (100-110 cm)	Charcoal	1855±275[4]	507–458, 454–439 B.C., 419 B.C.–A.D. 689, A.D. 753–760[7-7]	b
CK1088	UGa-4446	Component II (rockshelter), Unit 3 (front of shelter; 50-60 cm)	unknown	1705±135[4]	A.D. 30–37, 52–613[7-8]	b
CK1088	UGa-4444	Component II (rockshelter), Unit 2 (front of shelter; 60-70 or 70-80 cm)	unknown	1470±125[4]	A.D. 260–780[7-2]	b
CK1088	UGa-4447	Roasting pit/midden; Unit 2 (30-40 cm), below Component III rockshelter	Charcoal	975±95[4]	A.D. 890–1260[7]	b
CK1091 (Roadside Roast)	UGa-4442	Unit 3; roasting pit/midden (70-80 cm)	unknown	2430±305[4]	1297 B.C.–A.D. 174, A.D. 192–211[7-5]	b
CK1091	UGa-4441	Unit 4, charcoal concentration (in front of shelter; 70-80 cm)	Charcoal	1690±100[4]	90–600[7-1]	b
CK1091	UGa-4443	Unit 3, roasting pit/midden (20-30 cm)	Charcoal	580±135[4]	1210–1640[7]	b
CK1095 (Ishi Comin?)	UGa-4461	Roasting Pit 3, slab and boulder-lined hearth (30-40 cm)	unknown	1355±75[4]	540–850[7]	b
CK1095	UGa-4440	Unit I, hearth (30-40 cm)	unknown	1275±145[4]	A.D. 435–490, 509–517, 529–1030[7-9]	b
CK1112D	UGa 762	roasting pit/midden, at 25-30 cm	Charcoal	1125±75[4]	690–1030[7-3]	a
CK1112B	UGa 761	Pit A8, 60-70 cm	Charcoal	2795±65[4]	1122–815 B.C.[7]	a
CK1309 (Metate site)	UGa-4450	Unit 2B (60-70 cm); rockshelter midden	Charcoal	1290±190[4]	A.D. 389–1157[7]	b
CK1309	UGa-4449	Unit 1 (30-40 cm)	Charcoal	710±755[4]	–[7]	b
CK2130 (Low-Way-Back)	UGa-4448	Unit 6; bottom of "hearth structure" (60-70 cm)	Charcoal	2305±155[4]	793–39, 7–5 B.C.[7-6]	b

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*; sample UGa-4449 is not calibrated here because of the excessive size (±755 radiocarbon years) of its standard error both in absolute terms and in relation to the sample's age (710 radiocarbon years).

[7-x]alternative calibration from program CALIB REV*.*: [7-1]sample has a "most likely" (95%) calibrated range of A.D. 130-570; [7-2]sample has a "most likely" (92%) calibrated range of A.D. 320–780; [7-3]sample has a "most likely" (91%) calibrated range of A.D. 760-1030; [7-4]sample has a "most likely (92%) calibrated range of A.D. 1390–1670; [7-5]sample has a "most likely" (95%) calibrated range of 1297 B.C.-A.D. 174;[7-6]sample has a "most likely" (95%) calibrated range of 793-39 B.C.; [7-7]sample has a "most likely" (94%) calibrated range of 419 B.C.-A.D. 689; [7-8]sample has a "most likely" (95%) calibrated range of A.D. 52-613; [7-9]sample has a "most likely" (93%) combined calibrated range of A.D. 509-1030.

References: a = Brooks et al. 1975:Table 29 and text; b = Blair 1986.

Table A.16. Radiocarbon Dates from the Upper Moapa Valley and Lower Meadow Valley Wash

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
CK39 (Stuart Rockshelter)	M-376	Fire Hearth 4 Pit 2A-2B, 3A-3B; 78" bs, on "original" shelter surface (Early Horizon)	Charcoal	4050±300[4]	3483–3476, 3370–1769 B.C.[7-1]	e
"	M-377	Fire Hearth 3; Pit 2A-2B, 3A-3B; 50" bs (Early Horizon)	Charcoal	3870±250[4]	3010–2980, 2957–2953, 2940–1662, 1651–1640 B.C.[7-2]	e
CK2954 (Coyote Springs Rock-shelter)	FN83, Beta-196002	bottom level of cultural deposits	Charcoal	230±50[1]	A.D. 1520–1580, 1630–1690, 1730–1810, 1920–1950[6]	a
"	FN21, Beta-196003	Feature 1 (hearth)	Charcoal	180±40[1]	A.D. 1650–1710, 1720–1880, 1910–1950[6]	a
CK5686 (BLM 53-7216; Black Dog Cave)	AA25317S	Pit 31	Maize cob fragment	1710±45[3]	A.D. 232–425[7]	b
"	AA25318	Pit 31	Maize cob fragment	1735±45[3]	A.D.144–147, 171–193, 211–415[7]	b
"	5-1174-33-26; Beta 146242	Unit 4 South, Stratum 1	Woven textile	1710±40[3]	A.D. 240–420[6]	c
"	5-1174-35-70; Beta-146243	Unit 4 South, Stratum 3	Maize cob	1820±60[1x]	A.D. 70–370[6]	c
"	5-1174-51-28; Beta-146244	Feature 8A, Surface to 30 cm	Maize cob	1670±50[1x]	A.D. 250–460, 480–520[6]	c
"	5-1174-51-29; Beta-146245	Feature 8A, Surface to 30 cm	Maize cob	1910±40[3]	A.D. 20–220[6]	c
"	5-1174-56-3; Beta-146246	Unit 10 North, L. 1 (0-25 cm)	Basketry	1780±40[3]	A.D. 130–370[6]	c
"	5-1174-59-6; Beta-146247	Unit 11 South, L. (0-25 cm)	Basketry	1760±50[3]	A.D. 130–400[6]	c
"	5-1174-32-69-74; Beta-146248	Unit 2, Stratum 3	Woven textile	1740±30[3]	A.D. 230–390[6]	c
"	5-1174-79-38; Beta-146249	Unit 13 South, Stratum 4	Gourd rind	1780±70[3]	A.D. 80–410[6]	c
"	5-1174-101-269; Beta-146250	Unit 2, Stratum 1	Agave knife	1650±40[3]	A.D. 330–460, 480–520[6]	c
"	5-1174-101-270; Beta 146251	Unit 2, Stratum 1, 2	Bow	1510±40[3]	A.D. 440–640[6]	c
"	5-1174-101-277; Beta-146252	Unit 2, Stratum 1, 2	Axe handle	1760±30[3]	A.D. 220–370[6]	c
"	NSM 2-121-28; Beta-160760	–	S-shaped stick fragment	1620±40[3]	A.D. 370–540[6]	c
"	NSM 2-121-BMA; Beta-160761	–	Basketmaker-style sandal	1720±40[3]	A.D. 230–410[6]	c
"	NSM 2-121-BMB; Beta-160762	–	Basketmaker-style sandal	1610±40[3]	A.D. 380–540[6]	c

Site (26-)	Sample Data			Radiocarbon Data		Refs.
	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	
"	NSM 2-121-16; Beta-160763	–	Basketmaker-style sandal	1650±40[3]	A.D. 330–460, 480–520[6]	c
"	NSM 2-121-F8A; Beta-160764	–	Figure-8 style sandal; *Yucca*	1550±50[3]	A.D. 410–620[6]	c
"	NSM 2-121-F8B; Beta-160765	–	Figure-8 style sandal; *Yucca*	1580±40[3]	A.D. 400–570[6]	c
"	5-1174-507-20; Beta-160766	–	unknown	1320±40[3]	A.D. 650–780[6]	c
"	5-1174-603-33; Beta-160767	charcoal concentration in sediment matrix	Charcoal	1160±60[2]	A.D. 710–1000[6]	c
"	5-1174-700-6; Beta-160768	charcoal concentration in sediment matrix	Concentration of charcoal in sediment matrix	1730±60[2]	A.D. 140–430[6]	c
"	5-1174-734-2; Beta-157783	Feature 8, Level 5, (100-125 cm), 1984N 2039E	Charred wooden beam fragment	1670±40[2x]	A.D. 260–440[6]	f
"	5-1174-728-32; Beta-157784	Feature 8, Level 5, (100-125 cm), 1984N 2041E	Charred wooden roof material	1700±40[2x]	A.D. 240–420[6]	f
"	5-1174-721-50; Beta-157785	Feature 8, Level 4, (75-100 cm), 1984N 2041E	Charred wooden roof material	1660±40[2x]	A.D. 260–290, 320–450[6-2]	f
"	5-1174-733-33; Beta-157786	Feature 8, Level 5, (100-125 cm), floor, 1986N 2041E	Carbonized maize	1700±40[3]	A.D. 240–420[6]	f
"	5-1174-718-38; Beta-157787	Feature 9, Level 4, (75-100 cm), floor cleanup	Charred material from floor	1710±50[2x]	A.D. 230–430[6]	f
"	5-1174-712-1-2; Beta-157788	Feature 9, central hearth (F. 9-1), floor to -30 cm	Charcoal from feature fill	1750±60[1]	A.D. 130–420[6]	f
"	5-1174-598-188; Beta-157789	Feature 10, Level 5, (100-125 cm), floor, 1994N 2045E	Carbonized reed	1270±40[3]	A.D. 670–870[6]	f
"	5-1174-598-189; Beta-157790	Feature 10, Level 5, (100-125 cm), floor, 1994N 2045E	Carbonized maize	1170±40[1x]	A.D. 770–980[6]	f
"	5-1174-507-2; Beta-162121	Feature 10, Level 5, (100-125 cm), 1995N 2046E	Carbonized basketry & maize	1290±40[3]	A.D. 655–785, 790–815, 845–855[6]	f
"	5-1174-507-19; Beta-162122	Feature 10, Level 5, (100-125 cm), 1995N 2046E	S-shaped stick	1360±40[3]	A.D. 605–715, 745–770[6]	f
"	5-1174-505-440; Beta-162123	Feature 10, Level 4, (75-100 cm), 1995N 2046E	Carbon from interior of Logandale Gray sherd	1310±40[3]	A.D. 645–780[6]	f
"	5-1174-507-20; Beta-160766	Feature 10, Level 5, (100-125 cm), 1995N 2046E	S-shaped stick fragment	1320±40[1-3]	A.D. 650–775[7]	f

Site (26-)	Sample Data			Radiocarbon Data		Refs.
	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	
"	5-1174-505; Beta-151045	Feature 10, Level 4, (75-100 cm), 1995N 2046E	Wooden beam fragment	1200±50[2]	A.D. 690–970[6]	f
"	5-1174-507; Beta-151046	Feature 10, Level 5, (100-125 cm), 1995N 2046E	Carbonized maize cobs	1120±50[1]	A.D. 790–1010[6]	f
"	5-1174-576-2; Beta-151047	Feature 11, floor, 2000N 2040E	Wooden beam fragment	1610±60[2]	A.D. 330–580[6]	f
"	5-1174-580; Beta-151048	Feature 11, central hearth (F. 11-1)	Charcoal from feature fill	1570±60[2]	A.D. 380–620[6]	f
"	5-1174-671-11; Beta-157791	Feature 12, Level 3, (50-75 cm), floor, 2008N 2059E	Charred roof material	1620±40[2x]	A.D. 370–540[6]	f
"	5-1174-670-44; Beta-157792	Feature 12, Level 3, (50-75 cm), floor, 2010N 2062E	Charred roof material	1660±40[2x]	A.D. 260–290, 320–450[6-1]	f
"	5-1174-677-1; Beta-157793	Feature 12, subfloor feature (F. 12-2), floor to –30 cm	Charcoal & ash from fill	1340±40[2x]	A.D. 640–770[6]	f
"	5-1174-603-33; Beta-160767	Feature 28 (hearth)	Charcoal and ash from fill	1160±60[1-3]	A.D. 695–705, 705–750, 765–995[7]	f
"	5-1174-700-6; Beta-160768	Feature 40 (roasting pit?)	Charcoal and sediment from fill	1730±60[1-3]	A.D. 135–425[7]	f
3130 (Bovine Bluff)	Beta-9705, A201-1349	Pit 4	Charcoal associated with tortoise bone	1000± 50[2]	899–919, 953–956, 961–1162[7]	d
"	Beta-9706, A201-1529	Pit 5	Charcoal from clay-lined fire pit	1030 ±80[2]	782–789, 812–845, 856–1187, 1199–1206[7]	d

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[1x]conventional radiocarbon age; measured C13/C12 ratio; radiometric date, extended count.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[2x]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date, extended count.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration; [6-1]examination of calibration plot provided by Beta Analytic indicates that the sample has a "most likely" calibrated range of A.D. 320-450; [6-2]examination of calibration plot provided by Beta Analytic indicates that the sample has a "most likely" calibrated range of A.D. 320-450.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

[7-x]alternative calibration from program CALIB REV*.*: [7-1]sample has a "most likely" (95%) calibrated range of 3370-1769 B.C.; [7-2]sample has a "most likely" (95%) calibrated range of 2940-1662 B.C.

References: a = Harper 2006; b = Winslow and Blair 2003:Tables 34 and 37; d = Myhrer and Lyneis 1985:Figure 5, p.57, Appendix 2; e = Shutler et al. 1960; f = Winslow 2009.

Table A.17. Radiocarbon Dates from the Virgin River Valley

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
CK4891 (Riverside Pithouse Village)	4891-9	Unit 5, Post Hole 1 (48-54 cm)	Charcoal	1280±60[1-3]	A.D. 653–881[7]	b
CK4892			Soil	1320±80[1-3]	A.D. 580–890[7]	b, c
CK4893			Soil	1400±100[1-3]	A.D. 427–784, 786–828, 839–865[7-1]	b, c
CK4898			Charcoal	1350±80[1-3]	A.D. 556–876[7]	b, c
AZ A:1:30 (Cliffs Edge)	UGa-3424	Room 4, NW corner, mound of disturbed roof fall	Large charcoal pieces	690±70[2]	A.D. 1217–1408[7]	a
"	UGa-3470	Room 11, burned roof	Charcoal pieces	1180±60[2]	A.D. 689–752, 761–983[2]	a
"	UGa-3707	Roof support, Ramada 19	Large burned branches on floor	1040±80[2]	A.D. 780–792, 804–1169[2]	a

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed estimated C13/C12 ratio; radiometric date.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]conventional radiocarbon age; other details unknown.

[4]radiocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.*.

[7-1]sample has a "most likely (90%) calibrated range of A.D. 427-784.

References: a = Jenkins 1981:179; b = McGuire et al. 2010:Tables 12 and 13; c = Larson 1987.

Table A.18. Radiocarbon Dates from the Wetlands Park Area

	Sample Data			Radiocarbon Data[4]		
Site 26CK	Sample	Provenience	Material	Age (B.P.)	Date	Refs.
1138	–	Feat. 1 (hearth)	charcoal	"more active than modern"[2]		B
"	LCRO-0180-3986; 1138-3; Beta-177243	–	Piñon nut hull	118.1±0.6 pMC[3]	post–A.D. 1950[6]	a
"	LCRO-0170-3871; 1138-1; Beta-170110	Feat. 101, SE ¼, 0-5 cm	Charred *Larrea*	50±30[3]	A.D. 1700–1720, 1820–1840, 1880–1920, 1950–1960+[6]	a
"	LCRO-0167-3836; 1138-2; Beta-177242	–	Charred *Prosopis* seeds	600±40[3]	A.D. 1290–1420[6]	a
1139	287-0718; UGa-3134	Unit 7N/2W, 40-50 cm	Charcoal	"modern" 2		
"	LCRO-0095-2995; 1139-2; Beta-170112	Unit 4N/4W, 0-10 cm	Charred maize cob fragment	50±40[3]	A.D. 1690–1730, 1810–1920, 1950–1960+[6]	a
"	LCRO-0095-2971; 1139-4; Beta-170114	Unit 4N/8W, 20-30 cm	Piñon nut hull	80±40[3]	A.D. 1680–1740, 1800–1930, 1950–1960[6]	a
"	1139-9; LCRO-0097-3999; Beta-176514	Unit 3N/6W, 30-40 cm	Piñon nut hull	110±40[3]	A.D. 1670–1780, 1800–1950[6]	a
"	LCRO-0176-3977; 1139-1; Beta-170111	–	Charred maize kernel	160±40[3]	A.D. 1660–1950[6]	a
"	LCRO-0095-2969; 1139-8; Beta-176513	Unit 7N/3W, 70-80 cm	Charred *Prosopis* seed	190±40[3]	A.D. 1650–1700, 1720–1820, 1840–1880, 1920–1950[6]	a
"	287-426; UGa-3130	Unit 4N/3W, 80-90 cm	Charcoal	235±75[2]	A.D. 1477–1951[5]	e
"	LCRO-0119-4199; 1139-7; Beta-170117	Unit 7N/2W, 20-30 cm	Charred *Larrea*	390±60[1]	A.D. 1420–1650[6]	a
"	287-886; UGa-3133	Unit 7N/2W, 100-110 cm	Charcoal	430±60[2]	A.D. 1405–1635[5]	e
"	LCRO-0119-4199; 1139-6; Beta-170116	Unit 7N/2W, 60-70 cm	Charred *Larrea*	490±40[1]	A.D. 1400–1460[6]	a
"	287-0927; UGa-3131	Unit 7N/2W, 100-110 cm	Charcoal	545±80[2]	A.D. 1288–1480[5]	e
"	LCRO-0119-4200; 1139-3; Beta-170113	Unit 4N/4W, 40-50 cm; tp (test pit?) 1	Charred *Atriplex*/*Sarcobatus*	860±40[1]	A.D. 1040–1260[6]	a
"	LCRO-0119-4199; 1139-5; Beta-170115	Unit 7N/2W, 120-130 cm	Charred *Larrea*	900±50[1]	A.D. 1020–1250[6]	a
"	287-0372; UGa3132	Unit 4N/3W, 20-30 cm	Charcoal	905±50[2]	A.D. 1020–1255	e
1282	UGa-3127	80-90 cm below surf.	Charcoal	"modern"[2]		e
"	LCRO-0173-3004; 1282-3; Beta-170120	Unit 202W/54S, 170-180 cm, Feat. 3	Charred *Larrea*	130±40[3]	A.D. 1660–1950[6]	a
"	LCRO-0173-3009; 1282-1; Beta-170118	Unit 211W/28S, 60-70 cm; vicinity of Feat. 6	Charred maize kernel	150±40[3]	A.D. 1660–1950[6]	a
"	LCRO-0173-3939; 1282-2; Beta-170119	Unit 209W/28S, 80-90 cm, Feat. 6	Unknown charred seed	170±40[3]	A.D. 1650–1890, 1910–1950[6]	a
"	1282-1; Beta-153768	Feat. 1 (roasting pit or hearth)	Wood charcoal	210±801	A.D. 1490–1950[6]	f
"	LCRO-0173-3000; 1282-6; Beta-176515	Unit 202W/54S; 170-180 cm	Charred *Prosopis* seed	330±40[3]	A.D. 1460–1650[6]	a

Site 26CK	Sample Data			Radiocarbon Data[4]		Refs.
	Sample	Provenience	Material	Age (B.P.)	Date	
"	LCRO-0173-3001; 1282-5; Beta-170122	Unit 202W/54S, 150-160 cm	Charred *Larrea*	350±60[1]	A.D. 1430–1660[6]	a
"	LCRO-0173-3002; 1282-4; Beta-170121	Unit 202W/54S, 130-140 cm	Charred *Atriplez/Sarcobatus* and *Larrea*	360±70[1]	A.D. 1420–1660[6]	a
"	1282-2; Beta-153769	Feat. 3 (pit structure)	Charcoal	1420±130[1]	A.D. 390–890[6]	f
"	1283-3; Beta-153770	Feat. 4 (metates and charcoal stain)	Charcoal	1500±40[3]	A.D. 450–640[6]	f
1474	LCRO-0098-3494; 1474-1; Beta-177244	–	Piñon nut hull	135.6±0.7 pMC[3]	post–A.D. 1950[6]	a
"	5-660-3166; UGa-3124	F. 12	Charcoal?	920±70[2]	A.D. 989–1264[5]	e
"	5-660-3150; UGa-2934	335-350 cm	Charcoal	1220±145[2]	A.D. 544–1155[5-4]	d, e
"	5-660-3140; UGa-2926	F. 142; 350-390 cm	Charcoal	1275±290[2]	A.D. 132–1292[5-3]	d, e
"	UGa-1827	hearth, 5 m below surface	Charcoal	1280±80[2]	A.D. 621–959[5-1]	c
"	1474-2; Beta-153772	Feat. 12 (ash-stained sediment)	Wood charcoal	1300±40[3]	A.D. 660–790[6]	f
"	5-660-3152; UGa-3123	490 cm	Charcoal?	1345±160[2]	A.D. 402–1018[5]	e
"	5-660-1151; UGa-3122	490-500 cm	Charcoal?	1610±115[2]	A.D. 134–658[5-5]	e
"	5-660-3155; UGa-2929	F. 119; 335-350 cm	Charcoal	1675±245[2]	A.D. 200 B.C.–882[5]	d, e
"	5-660-3144; UGa-2925	F. 157, 370-380 cm	Charcoal	1910±60[2]	41 B.C.–A.D. 241[5-2]	d, e
"	1474-1; Beta-153771	Locus B, Feat. 1 (ash & charcoal stained sediment, 7 m below surface	Wood charcoal	2140±120[1]	410 B.C.–A.D. 100[6]	f
"	5-660-3154; UGa-2932	370 cm bd	Charcoal	21,025± 2870[2,5-y]	–[13]	d, e
6007	FN 9; 6007-1; Beta-230253	10N 12E; 15-20 cm bd	Charcoal	660±50[3]	A.D. 1270–1400	h
"	FN 19; 6007-2; Beta-230254	8N 13E; 80-90 cm	Charred material	980±60[3]	A.D. 970–1200	h
6139	Beta-283275	Feature 2 (hearth)	Maize cupule	1600±40[3]	A.D. 390–550	g
6146 (Larder site)	FN 159; 6146-1; Beta-213430	Feature 12 (pit)	Seed	490±40[3]	A.D. 1400–1460	h
"	FN 323; 6146-7; Beta-230255	Feature 14 (pit)	Seed pod	2160±40[3]	360–90 B.C.	h
"	FN 166; 6146-2; Beta-217139	Feature 18 (pit)	Charcoal	1880±50[3]	A.D. 30–240	h
"	FN 356; 6146-3; Beta-217140	Feature 27 (pit)	Charcoal	2060±50[3]	190 B.C.–A.D. 50	h
"	FN 365; 6146-8; Beta-230256	Feature 30 (pit)	Seed & pod	420±40[3]	A.D. 1430–1620	h

Site 26CK	Sample Data			Radiocarbon Data[4]		Refs.
	Sample	Provenience	Material	Age (B.P.)	Date	
"	FN 370; 6146-9; Beta-230257	Feature 31 (pit)	Seed & pod	1030±40[3]	A.D. 900–1040	h
"	FN 271; 6146-10; Beta-230258	Feature 45 (hearth)	Seed	1850±40[3]	A.D. 70–250	h
"	FN 288; 6146-11; Beta-230259	Feature 47 (pit)	Maize cob fragmens	2130±40[3]	350–50 B.C.	h
"	FN 238; 6146-4; Beta-217141	Feature 49 (pit)	Charcoal	1920±40[3]	A.D. 10–150	h
"	FN 263; 6146-5; Beta-217142	Feature 51 (pit)	Charcoal	1990±50[3]	100 B.C.–A.D. 100	h
"	FN 426; 6146-12; Beta-232634	Feature 52 (pit)	Seed & pod	2140±40[3]	360–50 B.C.	h
"	FN 438; 6146-6; Beta-217143	Feature 55A (pit)	Charcoal	1350±40[3]	A.D. 640–760	h
6147 (Scorpion Knoll	FN 49; 6147-3; Beta-232635	Feature 1 (pit structure)	Seed	1200±40[3]	A.D. 690–900 & 920–950	h
	FN 51; 6147-4; Beta-232636	Feature 2 (pit structure?/roasting feature?)	Charcoal	1250±40[3]	A.D. 670–880	h
	FN 79; 6147-2; Beta-230260	Feature 3 (roasting pit)	Seed	1090±40[3]	A.D. 880–1020	h
	FN 137; 6147-1; Beta-217144	Feature 4 (pit structure)	Outer rings from a *Prosopis* pole	1280±40[3]	A.D. 660–810 & 840–860[2]	h

Notes: [1]radiometric age; C13/12 corrected.

[2]radiometric date; not C13/12 correct, or not known if corrected .

[3]AMS (Accelerator Mass Spectrometry) age; all ages from AMS dating are C13/12 corrected.

[4]conventional radiocarbon age; 2-sigma (95.4%) calibrated date.

[5]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, Revision 4.3, Method A.

[5-x]alternative calibration using the University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration. Program, Revision 4.3, Method B: [5-1]the sample has a "most likely" (91.8%) calibrated range of A.D. 638-899; [5-2]the sample has a "most likely" (91.4%) calibrated range of 2 B.C.-A.D. 240; [5-3]the sample has a "most likely" (94.9%) calibrated range of A.D. 212-1285; [5-4]the sample has a "most likely" (92.9%) calibrated range of A.D. 548-1048; [5-5]the sample has a "most likely" 94.8%) calibrated range of A.D. 212-656.

[5-y]the radiocarbon age determined for Sample 5-660-3154, UGa-2932 from Site 26CK1474 is too great for the University of Washington calibration program and, according to Ferraro "appears to be much too old. No other cultural, geologic, or radiocarbon evidence supports the 21,025 years B.P. age for this sample" (Ferraro 1979a:3).

[6]calibration provided by Beta Analytic.

References: a = Ahlstrom 2003:Appendix D; b = Ferraro 1975a:33; c = Ferraro 1978a:2-3; Ferraro and Bachhuber 1977; d = Ferraro 1979a; e = Ferraro and Ellis 1982a:113-114, 1982b; f = Ahlstrom and Roberts 2001:Appendix A; Ahlstrom 2003:Appendix D; g = Eskenazi and Ahlstrom 2010; h = Ahlstrom 2008a, 2008b.

Table A.19. Radiocarbon Dates from the Yucca Mountain Area

	Sample Data			Radiocarbon Data		
Site (26-)	Sample	Provenience	Material	Age (B.P.)	Cal Date[5]	Refs.
NY1011 (Alice Hill)	Beta-62935	Ref. No. 1501-3	unknown	modern ±60[1-3]	–	a
NY1011	Beta-62990	Ref. No. 1501-3 bag 2	unknown	150±70[1-3]	A.D. 1668–1699, 1721–1782, 1797–1818, 1833–1880, 1915–1948, 1950–1952[7]	a
NY1011	Beta-71094	Biface 1134-3	Subvarnish organics[8]	4750±60[1-3]	–	a
NY1011	Beta-71102	Biface 1112-1	Subvarnish organics[8]	4250±50[1-3]	–	a
NY1964 (Sever Tanks)	Beta-5651	Unit B, assoc. w/ Rosegate Corner-notched point	unknown	520±100[1-3]	A.D. 1278–1526, 1556–1632[7]	a, b
NY1964	Beta-5652	Unit B, 58-67 cmbd, assoc. w/ Gatecliff Split-stemmed point	unknown	2040 ±220[1-3]	749–687, 666–642, 592–577 B.C., 569 B.C.–A.D. 432, A.D. 500–500[7-1]	a, b
NY3021	Beta-5653	Unit A, 5-12 cmbs	unknown	modern ±100[1-3]	–	a, b
NY3039	Beta-71095	Geoglyph 1B	Subvarnish organics[8]	4550±70[1-3]	–	a
NY3039	Beta-71097	Geoglyph 1A	Subvarnish organics[8]	5610±60[1-3]	–	a
NY3039	Beta-71098	Geoglyph 1A	Subvarnish organics[8]	5350±60[1-3]	–	a
NY3039	Beta-71101	Biface 3039-1	Subvarnish organics[8]	10,450 ±60[1-3]	–	a
NY4042	Beta-5654	Units A& B, 1-11 cmbs	unknown	modern ±70[1-3]	–	a, b
NY4042	Beta-5655	Unit E, hearth, 1-9 cmbs	unknown	modern ±130[1-3]	–	a, b
NY3055	Beta-5656	Unit D, 10-19 cmbs	unknown	modern ±60[1-3]	–	a, b
NY3062	Beta-5657	Unit B, hearth, 10.5-12 cmbs	unknown	modern ±70[1-3]	–	a, b
NY3099	Beta-5658	Unit B, hearth, 15-20 cmbs	unknown	modern ±70[1-3]	–	a, b
NY8004	Beta-53980	-	Winnowing tray	200±60[1-3]	A.D. 1524–1558, 1631–1896, 1902–1953[7]	a
NY8238	Beta-70689	Flake 8238-1 B	Subvarnish organics[8]	1330±60[1-3]	–	a
NY8238	Beta-71099	Flake 8238-2	Subvarnish organics[8]	2400±60[1-3]	–	a
NY8238	Beta-71100	Flake 8238-1 A	subvarnish organics[8]	1340±60[1-3]	–	a
NY8438	Beta-67467	-	Willow twig from bundle	130±50[1-3]	A.D. 1669–1781, 1798–1946, 1950–1953[7]	a

Notes: [1]conventional radiocarbon age; measured C13/C12 ratio; radiometric date.

[2]conventional radiocarbon age; estimated or assumed to be estimated C13/C12 ratio; radiometric date.

[3]conventional radiocarbon age; measured C13/C12 ratio; AMS date.

[1-3]presumably the conventional radiocarbon age; other details unknown.

[1/3]conventional radiocarbon age; measured C13/C12 ratio; type of date unknown.

[4]rA.D.iocarbon age; not C13/C12 corrected or unknown or uncertain if corrected; radiometric date.

[5]2-sigma (95.4%) calibrated radiocarbon date.

[6]calibration provided by Beta Analytic; INTCAL** Radiocarbon Age Calibration.

[7]calibrated with University of Washington, Quaternary Isotope Lab, Radiocarbon Calibration Program, CALIB REV*.* .

[7-x]alternative calibration from program CALIB REV*.*: [7-1]sample has a "most likely" (93%) CALIBRATED RANGE OF 569 B.C.-A.D. 432.

[8]"Nine dates are from sub-varnish organics…on tuff artifacts or from a rock alignment, none of which are time-sensitive. This technique is controversial and at present these dates cannot be considered reliable" (Buck et al. 1994:13).

References: a = Buck et al. 1998; b= Pippin 1984.

REFERENCES CITED

Ahlstrom, Richard V.N.

2003 *Archaeological Investigations in Clark County Wetlands Park: The 170-A Pipeline Project*. HRA, Inc. Archaeological Report No. 01-27. Submitted to the Southern Nevada Water Authority, Las Vegas and Bureau of Reclamation, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

2008a Re-Imagining the History of Maize Farming in the Las Vegas Valley. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 1–20. Nevada Archaeological Association, Las Vegas.

Ahlstrom, Richard V.N. (editor)

2005 *Desert Oasis. The Prehistory of Clark County Wetlands Park, Henderson, Nevada*. HRA Papers in Archaeology No. 4. Prepared for the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

2008b *Persistent Place: Archaeological Investigations at the Larder and Scorpion Knoll Sites, Clark County Wetlands Park, Southern Nevada*. HRA Papers in Archaeology No. 7. HRA Inc., Conservation Archaeology, Las Vegas.

Ahlstrom, Richard V.N. and Heidi Roberts

2001 *Archaeological Test Excavations at Sites 26CK1282 and 26CK1474, Clark County Wetlands Park, Southern Nevada*. HRA, Inc. Archaeological Report No. 00-07. Submitted to the Southern Nevada Water Authority, Las Vegas. HRA, Inc., Conservation Archaeology, Las Vegas.

Ahlstrom, Richard V.N., Claudia Woodman, and Heidi Roberts

2001 *Archaeological Survey along the Channel of the Muddy River near Overton, Clark County, Nevada*. HRA, Inc. Archaeological Report No. 01-06. HRA, Inc., Conservation Archaeology, Las Vegas.

Blair, Lynda M.

1986 A New Interpretation of Archaeological Features in the California Wash Region of Southern Nevada. Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Blair, Lynda M., and Gregory R. Seymour

1998 *Mended Basket Rockshelter and Quarry. An Archaeological Excavation in the Southwestern Las Vegas Valley*. Report 5-164-6. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Blair, Lynda M. and Jeffrey R. Wedding

2001 *Archaeological Excavations for the Apex Land Exchange, Clark County, Nevada*, Vol. 1, *Rockshelters 26CK415, 26CK3780, and 26CK4415.* USDI, Bureau of Land Management Report No. 5-2377(P), Las Vegas. Report No. 5-164-13. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Blair, Lynda M. and Diane L. Winslow

2006 *Firebrand Cave: An Archaic Ceremonial Site in Southern Nevada*. HRC Anthropological Series, Vol. 1, No. 1. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Blair, Lynda M., Diane L. Winslow, and Jeffrey R. Wedding.
2000 *Northern Beltway Data Recovery Program Archaeological Sites 26CK3799 and 26CK4908, Clark County, Nevada,* Vol. 1. BLM Report #5-2373.

Brooks, Richard H., Daniel O. Larson, Kathryn Olson, Joseph King, Gregory King, Robert Leavitt, and Patricia Anderson
1975 *Prehistoric and Historic Research along the Navajo-McCullough Transmission Line Right-of-way*. Report No. 4-2-1. Nevada Archaeological Survey, University of Nevada, Las Vegas.

Buck, Paul E., and Anne DuBarton
1994 Archaeological Investigations at Pintwater Cave, Nevada, During the 1963–64 Field Season. *Journal of California and Great Basin Anthropology* 16(2):221–242.

Buck, Paul E., William T. Hartwell, Gregory Haynes, and David Rhode
1998 *Archaeological Investigations at Two Early Holocene Sites near Yucca Mountain, Nye County, Nevada*. Quaternary Sciences Center, Desert Research Center, Las Vegas.

Davide, Robert, Jerry D. Lyon, Suzanne Eskenazi, and Christopher Harper
2010 *Archaeological Testing at the Fairbanks Spring Site (26NY1729), Ash Meadows National Wildlife Refuge, Nye County, Nevada*. Draft Report. Prepared for U.S. Fish and Wildlife Service, Ash Meadows National Wildlife Refuge. HRA, Inc. Archaeological Report No. 08-19. HRA, Inc., Conservation Archaeology, Las Vegas.

DuBarton, Anne
2009 *Northeast C1 Detention Basin Cultural Resources Data Recovery River Mountains, Nevada*. Final Report, Vols. 1 and 2. Bureau of Reclamation Project No: LC-NV-06-06-01D. NewFields, Las Vegas.

Ellis, Robert R., Richard H. Brooks, Eileen Green, and Teri Swearingen
1982 *A Cultural Resources Survey and Limited Test Excavations in the Vicinities of Quail Point, Bunkerville Ridge, and Hackberry Spring, Virgin and Mormon Mountains, Southern Nevada*. BLM Report No. 5-1107 (HRC 2-5-8). Submitted to USDI, Bureau of Land Management, Las Vegas Field Office.

Eskenazi, Suzanne, and Richard V.N. Ahlstrom
2011 *Data Recovery at 26CK6139, Clark County Wetlands Park, Clark County, Nevada*. Bureau of Reclamation Report LC-NV-09-17P. Archaeological Report 09-06. HRA, Inc. Conservation Archaeology, Las Vegas.

Ferraro, David D.
1975 *Colorado River Basin Salinity Control Project Title II-Ls Vegas Wash Unit-Nevada Archaeological Research in the Las Vegas Wash for the Bureau of Reclamation Lower Colorado Region, Boulder City, Nevada*. Report No. 1-3-2. Nevada Archaeological Survey, Southern Division, University of Nevada, Las Vegas.
1978 Test Excavation of 26CK1474. Manuscript on file at the Bureau of Reclamation, Lower Colorado River Region, Boulder City, Nevada.
1979 The Las Vegas Wash Archaeological Project: Sites 26CK1126 and 26CK1294. ARC Report 1-3-9. Manuscript on file at the Bureau of Reclamation, Lower Colorado River Region, Boulder City, Nevada.

Ferraro and Bachhuber
1977 Preliminary Pollen Analysis of the Las Vegas Wash. Journal of the Arizona Academy of Science (abs.) 12:54.

Ferraro, David, and Robert R. Ellis
1982 *The Survey and Mitigation of Thirteen Archaeological Sites within the Las Vegas Wash Project.* ARC Report No. 1-3-13. Archaeological Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Fowler, Don D., David B. Madsen, and Eugene M. Hattori
1973 *Prehistory of Southeastern Nevada*. Publication in the Social Sciences No. 6. Desert Research Institute, Reno, Nevada.

Gilreath, Amy J.
2009 *Gypsum Cave Revisited*, Vol. I and II. Nevada Cultural Resources Report # CR5-2462-4(P). Far Western Anthropological Research Group, Davis, California.

Harper, Christopher
2006 *A Room with a View: Data Recovery of an Early Historical Rockshelter Site Located in the Upper Moapa Valley, Clark County, Nevada*. Papers in Archaeology No. 5. HRA, Inc., Conservation Archaeology, Las Vegas.

Harry, Karen G.
2008 *Main Ridge 2006 Research Project: Condition Assessments, Test Excavations, and Data Analyses for the UNLV Fall 2006 Field School.* Prepared for the Lake Mead National Recreation Area. Department of Anthropology & Ethnic Studies and the Public Lands Institute, University of Nevada Las Vegas, Las Vegas.

Harry, Karen G., and James T. Watson
2010 The Archaeology of Pueblo Grande de Nevada: Past and Current Research within Nevada's "Lost City." *Kiva* 78(4):403–424.

Haynes, C. Vance
1967 Quarternary Geology of the Tule Springs Area, Clark County, Nevada. In *Pleistocene Studies in Southern Nevada*, edited by H. Marie Wormington and Dorothy Ellis, pp. 15–104. Anthropological Papers No. 13. Nevada State Museum, Carson City.

Jenkins, Dennis L.
1981 Cliff's Edge: A Pueblo I Site on the Lower Virgin River. Unpublished Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

King, Jerome, Allika Ruby, and Amy Gilreath
2006 *Mitigation of Sites 26CK6907 and 26CK6913, Northern Las Vegas Valley, Clark County, Nevada.* BLM Report No. 5-2524. Far Western Anthropological Research Group, Davis, California.

Larson, Daniel O.
1987 An Economic Analysis of the Differential Effects of Population Growth and Climatic Variability among Hunters and Gatherers and Food Producers. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Santa Barbara.

Lyneis, Margaret M.
1999 Basketmaker Maize from Southern Nevada. Presented at the 64th Annual Meeting of the Society for American Archaeology, Chicago.
2004 Radiocarbon Dates from the Yamashita Sites near Logandale, Moapa Valley, Southern Nevada. Paper presented at the Nevada Archaeological Association Meeting, Winnemucca. Copy on file, Special Collections, Lied Library, University of Nevada, Las Vegas.

Lyneis, Margaret M., Mary K. Rusco, and Keith Myhrer
1989 *Investigations at Adam 2 (26CK2059): A Mesa House Phase Site in the Moapa Valley*. Anthropological Papers No. 22. Nevada State Museum, Carson City.

McGuire, Kelly, William Hildebrandt, Amy Gilreath, Jerome King, and John Berg
2010 *Final Research Results for the Gold Butte Study Area, Clark County, Nevada*, Vol. I, *Prehistoric Resources*. BLM Report No. 5-2617. Far Western Anthropological Research Group, Davis, California.

Mehringer, Peter J., Jr., and C. N. Warren
1976 Marsh, Dune, and Archaeological Chronology, Ash Meadows, Amargosa Desert, Nevada. In *Holocene Environmental Change in the Great Basin*, edited by R. G. Elston and P. Headrick, pp. 120–150. Research Papers, No. 6. Nevada Archaeological Society, Reno.

Muto, Guy R., Peter J. Mehringer, Jr., and Claude N. Warren
1976 A Technological Analysis of Projectile Points from a Burial, Amargosa Desert, Nevada. *The Kiva* 41(3–4):267–276Muto et al. 1976.

Myhrer, Keith
1989 Basketmaker and Puebloan Occupation at the Steve Perkins Site, Moapa Valley, Southern Nevada. Manuscript on file, USDI-Bureau of Land Management, Las Vegas District, Nevada.

Myhrer, Keith, and Margaret M. Lyneis
1985 *The Bovine Bluff Site: An Early Puebloan Site in the Upper Moapa Valley*. Contributions to the Study of Cultural Resources Technical Report No. 15. USDI, Bureau of Land Management, Reno.

Pippin, Lonnie C. (editor)
1984 *Limited Test Excavations at Selected Archaeological Sites n the NNWSI Yucca Mountain Project Area, Southern Nye County, Nevada*. Technical Report No. 40. Desert Research Institute, Social Sciences Center, Reno.

Rager, Hal B.
2001 *Burnt Rock Mound (26CK3601): Late Archaic and Ceramic Period Human Use of A Northern Mojave Spring Mound*. Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Roberts, Heidi, and Jerry Lyon
2011 *Archaeological Excavations at the Corn Creek National Register Site, Desert National Wildlife Refuge, Clark County, Nevada*. Draft Report Prepared for the U.S. Fish and Wildlife Service, Desert National Wildlife Refuge. Archaeological Report No. 08-22. HRA, Inc. Conservation Archaeology, Las Vegas.

Roberts, Heidi, and Gregory R. Seymour
2006 Ten to One: Betting on Pithouses in the Las Vegas Valley. Paper presented at the 30th Great Basin Anthropological Conference, Las Vegas.

Roberts, Heidi, Suzanne Eskenazi, and Christopher Harper
2003 *Archaeological Test Excavations at the Corn Creek Dunes Site in the Desert National Wildlife Refuge, Clark County, Nevada*. Archaeological Report No. 02-03t, HRA Inc., Conservation Archaeology, Las Vegas.

Seymour, Gregory R.
1997 A Reevaluation of Lower Colorado Buff ware Ceramics: Redefining the Patayan in Southern Nevada. Unpublished Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Seymour, Gregory R., and Hal B. Rager
2005 The Prehistory of Burnt Rock Spring Mound in the Northern Mojave Desert. *Nevada Archaeologist* 20 and 21:71–83.

Shutler, Richard Jr., Mary Elizabeth Shutler, and James S. Griffith
1960 *Stuart Rockshelter: A Stratified Site in Southern Nevada*. Anthropological Papers No. 3, Nevada State Museum, Carson City.

White, William G., Susan R. Edwards, Martha E. Roberson, and Monique E. Kimball
1989 *The Mitigation of Archaeological Sites 26CK3766 and 26CK3767 for Pardee Construction Company in the City of North Las Vegas, Clark County, Nevada*. ERC Report No. 5-125-1. BLM Report No. 5-1964.

Williams, P. A., and R. J. Orlins
1963 *The Corn Creek Dunes Site: A Dated Surface Site in Southern Nevada*. Anthropological Papers No. 10. Nevada State Museum, Carson City.

Winslow, Diane L.
2009 *Pithouse Excavations, Locus 4. Mitigation, Black Dog Mesa Archaeological Complex (26CK5686/BML 53-7216)*, Vol. 3. BLM Report No. 5-2430(3), HRC Report No. 5-4-26(3). Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Winslow, Diane L., and Lynda Blair
2003 *Black Dog Cave, Vol. 2, Mitigation, Black Dog Mesa Archaeological Complex (26CK5686/BLM 53-7216)*. BLM Report No. 5-2430(2), HRC Report No. 5-4-26(2). Harry Reid Center for Environmental Studies, Marjorie Barrick Museum of Natural History, University of Nevada, Las Vegas.

Wriston, Teresa
2008 Prehistoric Occupation of the Desert Dry Lake Basin. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 331–354. Nevada Archaeological Association, Las Vegas.

York, Andrew L., Michael S. Kelly, and William Zukosky
1992 *Kern River Gas Transmission Company: Kern River Pipeline Cultural Resource Data Recovery Report, Nevada*. Dames & Moore, San Diego.

APPENDIX B
OBSIDIAN SOURCING DATA

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
NY13101	192	Elko Corner-Notched point			Airfield Canyon	NV	Geochemical Research	R.E. Hughes	
NY1101	459	Great Basin Stemmed, Lake Mohave point			Bodie Hills	CA	Northwest Research	Haarklau et al. 2005	
NY3	12-10 390	Elko Eared point			Bodie Hills	CA	Northwest Research	Haarklau et al. 2005	
NY3	12-10 464	Humboldt point			Bodie Hills	CA	Northwest Research	Haarklau et al. 2005	
CK7045		Flake		Surface	Bristol Mountain	CA	Geochemical Research	Winslow and Wedding 2008	
CK7045		Flake		Surface	Bristol Mountain	CA	Geochemical Research	Winslow and Wedding 2008	
CK7045		Flake		Surface	Bristol Mountain	CA	Geochemical Research	Winslow and Wedding 2008	
CK7045		Flake		Surface	Bristol Mountain	CA	Geochemical Research	Winslow and Wedding 2008	
NY10682	NY10682-0001	Great Basin Stemmed, Borax Lake point			Castle Mountains	CA	Northwest Research	Haarklau et al. 2005	
NY809	1108B	unknown			Coso (Sugarloaf Mountain)	CA	Geochemical Research	Lyneis Bowman	A
NY10845	NY10845-0001	Great Basin Stemmed, Borax Lake point			Crow Spring	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0083	Great Basin Stemmed, Silver Lake point			Crow Spring	NV	Northwest Research	Haarklau et al. 2005	
NY10910	NY10910-0002	Great Basin Stemmed, Borax Lake point			Crow Spring	NV	Northwest Research	Haarklau et al. 2005	
NY1101	225	Great Basin Stemmed, Lake Mohave point			Crow Spring	NV	Northwest Research	Haarklau et al. 2005	
NY12787	50	Desert Side-Notched point			Delamar Mountains	NV	Geochemical Research	Lyon et al. 2008	
CK2605	907	Parowan point	100.77E, 97.42N	70 cm	Devil Peak East	CA	Northwest Research	Roberts and Lyon 2011	
NY13013	145	Cottonwood Triangular point			Devil Peak West?	NV	Geochemical Research	R.E. Hughes	
CK7045		Flake		Surface	Devil's Peak West	CA	Geochemical Research	Winslow and Wedding 2008	
NY375	5-453-5	Cottonwood Leaf-Shaped point			Fish Springs, Owens Valley	CA	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0047	Cottonwood Triangular point			Fish Springs, Owens Valley	CA	Northwest Research	Haarklau et al. 2005	
NY1101	470	Great Basin Stemmed, Silver Lake point			Goldfield Hills	NV	Northwest Research	Haarklau et al. 2005	
AZ:A:12:136 (ASM)	7	Non-diagnostic tool or flake			Government Mountain	AZ	Northwest Research	Martin 2009	
CK1139	287-211	Unknown	Unknown	Unknown	Kane Springs	NV	Geochemical Research	Ahlstrom 2005	
CK1139	2774	Unknown	Unknown	Unknown	Kane Springs	NV	Geochemical Research	Ahlstrom 2005	
CK5686	5-1174-71-34	Rosegate Series point	Black Dog Cave	Level 1	Kane Springs	NV	Geochemical Research	Winslow 2009	
CK6139	46-1	Flake	100N, 110E	Surface	Kane Springs	NV	Northwest Research	Eskenazi and Ahlstrom 2011	
CK6139	46-2	Flake	100N, 110E	Surface	Kane Springs	NV	Northwest Research	Eskenazi and Ahlstrom 2011	
CK6139	46-3	Flake	100N, 110E	Surface	Kane Springs	NV	Northwest Research	Eskenazi and Ahlstrom 2011	
CK6139	46-4	Flake	100N, 110E	Surface	Kane Springs	NV	Northwest Research	Eskenazi and Ahlstrom 2011	
CK6445	A229-0659	Rose Spring point midsection			Kane Springs	NV	Geochemical Research	Lyneis Yamishita 2	
CK6445	A229-1722	Projectile point tip			Kane Springs	NV	Geochemical Research	Lyneis Yamishita 2	
CK6446	A230-2931	Untyped point			Kane Springs	NV	Geochemical Research	Lyneis Yamishita 3	
CK7045		Flake		Surface	Kane Springs	NV	Geochemical Research	Winslow and Wedding 2008	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
CK7045		Flake		Surface	Kane Springs	NV	Geochemical Research	Winslow and Wedding 2008	
NY13101	190	Pinto point			Kane Springs	NV	Geochemical Research	R.E. Hughes	
NY809	1248	unknown			Kane Springs	NV	Geochemical Research	Lyneis Bowman	
CK3130	1345	n/a			Kane Springs Wash Caldera Variety 1	NV	Geochemical Research	Myhrer and Lyneis 1985	A
CK3130	1875	n/a			Kane Springs Wash Caldera Variety 1	NV	Geochemical Research	Myhrer and Lyneis 1985	A
CK3130	1548	n/a			Kane Springs Wash Caldera Variety 1	NV	Geochemical Research	Myhrer and Lyneis 1985	A
CK3130	1747	n/a			Kane Springs Wash Caldera Variety 1	NV	Geochemical Research	Myhrer and Lyneis 1985	A
CK3130	1892	n/a			Kane Springs Wash Caldera Variety 1	NV	Geochemical Research	Myhrer and Lyneis 1985	A
CK3130	1586	n/a			Kane Springs Wash Caldera Variety 1	NV	Geochemical Research	Myhrer and Lyneis 1985	A
CK3130	1563	n/a			Kane Springs Wash Caldera Variety 1	NV	Geochemical Research	Myhrer and Lyneis 1985	A
CK3130	1424	n/a			Kane Springs Wash Caldera Variety 2	NV	Geochemical Research	Myhrer and Lyneis 1985	A
CK244	5273 498G3795	Pinto point			Kane Springs Wash Caldera, Variety 1	NV	Northwest Research	Haarklau et al. 2005	
CK5270	CK5270-0002	Great Basin Stemmed, Stanislaus point			Kane Springs Wash Caldera, Variety 1	NV	Northwest Research	Haarklau et al. 2005	
NY10850	NY10850-0005	Elko Corner-Notched point			Kane Springs Wash Caldera, Variety 1	NV	Northwest Research	Haarklau et al. 2005	
CK4856	CK4856-0120	Elko Corner-Notched point			Kane Springs Wash Caldera, Variety 2	NV	Northwest Research	Haarklau et al. 2005	
CK2605	412	Flake	SMU-8	20-30 cm	Kane Springs, Variety 1	NV	Northwest Research	Roberts and Lyon 2011	
CK2605	408	Flake	SMU-8	50-60 cm	Kane Springs, Variety 2	NV	Northwest Research	Roberts and Lyon 2011	
CK2605	409	Flake	SMU-8	10-20 cm	Kane Springs, Variety 2	NV	Northwest Research	Roberts and Lyon 2011	
CK2605	410	Flake	SMU-1	20-30 cm	Kane Springs, Variety 2	NV	Northwest Research	Roberts and Lyon 2011	
CK2605	411	Flake	SMU-10	60-200 cm	Kane Springs, Variety 2	NV	Northwest Research	Roberts and Lyon 2011	
CK2605	413	Flake	SMU 3.7	20-30 cm	Kane Springs, Variety 2	NV	Northwest Research	Roberts and Lyon 2011	
CK2605	414	Flake	SMU 3.2	Surface-10 cm	Kane Springs, Variety 2	NV	Northwest Research	Roberts and Lyon 2011	
CK2605	1209	Flake	M11	Surface-10 cm	Kane Springs, Variety 2	NV	Northwest Research	Roberts and Lyon 2011	
NY10942	NY10942-0074	Great Basin Stemmed, Lake Mohave point			Lookout Mountain, Casa Diablo	CA	Northwest Research	Haarklau et al. 2005	
NY809	1281	unknown			Modean/Panaca Summit	NV	Geochemical Research	Lyneis Bowman	
AZ:A:12:131 (BLM)	4	Non-diagnostic tool or flake			Modena/Panaca Summit	UT	Northwest Research	Martin 2009	
AZ:A:12:131 (BLM)	5	Non-diagnostic tool or flake			Modena/Panaca Summit	UT	Northwest Research	Martin 2009	
AZ:A:12:131 (BLM)	25	Non-diagnostic tool or flake			Modena/Panaca Summit	UT	Northwest Research	Martin 2009	
AZ:A:12:136 (ASM)	24	Non-diagnostic tool or flake			Modena/Panaca Summit	UT	Northwest Research	Martin 2009	
CK6139	46-5	Flake	100N, 110E	Surface	Modena/Panaca Summit	UT	Northwest Research	Eskenazi and Ahlstrom 2011	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
CK6139	110	Flake	95N, 110E	Surface	Modena/Panaca Summit	UT	Northwest Research	Eskenazi and Ahlstrom 2011	
CK6445	A229-3775	Desert Side-Notched point			Modena/Panaca Summit	NV	Geochemical Research	Lyneis Yamishita 2	
CK6445	A229-2118	Unidentified point fragment			Modena/Panaca Summit	NV	Geochemical Research	Lyneis Yamishita 2	
CK6446	A230-2993	Desert Side-Notched point			Modena/Panaca Summit	NV	Geochemical Research	Lyneis Yamishita 3	
CK6446	A230-2400	Projectile point fragment			Modena/Panaca Summit	NV	Geochemical Research	Lyneis Yamishita 3	
CK6913	15A	Desert Side-Notched point			Modena/Panaca Summit	UT	Northwest Research	King et al. 2006	
CK6913	15B	Point tip			Modena/Panaca Summit	UT	Northwest Research	King et al. 2006	
CK6913	15C	Flakes			Modena/Panaca Summit	UT	Northwest Research	King et al. 2006	
CK6913	24	Flakes			Modena/Panaca Summit	UT	Northwest Research	King et al. 2006	
CK6913	26	Flakes			Modena/Panaca Summit	UT	Northwest Research	King et al. 2006	
CK6913	46	Flakes			Modena/Panaca Summit	UT	Northwest Research	King et al. 2006	
NY1728	28	Large side-notched point			Modena/Panaca Summit	NV/UT	Geochemical Research	Lyon et al. 2008	
NY809	1282	unknown			Modena/Panaca Summit	NV	Geochemical Research	Lyneis Bowman	
NY10680	NY10680-00B1	Great Basin Stemmed, Silver Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0062	Great Basin Stemmed, Silver Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0040	Great Basin Stemmed, Silver Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10911	NY10911-0001	Great Basin Stemmed, Lake Mohave point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0189	Unknown shoulderless , concave-base point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0172	Unidentifiable point type			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0183	Unidentifiable point type			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0005	Pinto point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0208	Great Basin Fluted point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0181	Great Basin Stemmed, Borax Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0099	Great Basin Stemmed, Borax Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0053	Great Basin Stemmed, Borax Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0196	Great Basin Stemmed, Silver Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0027	Great Basin Stemmed, Silver Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0206	Great Basin Stemmed, Stanislaus point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0207	Great Basin Stemmed, Stanislaus point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0113	Elko Eared point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0152	Elko Eared point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0167	Gatecliff Split Stem point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0208	Great Basin Fluted point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
NY1101	251	Great Basin Stemmed, Lake Mohave point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY1101	200	Great Basin Stemmed, Lake Mohave point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY1101	211	Great Basin Stemmed, Lake Mohave point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY1101	222	Great Basin Stemmed, Lake Mohave point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY1101	244	Great Basin Stemmed, Silver Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY1101	224	Great Basin Stemmed, Silver Lake point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY1101	245	Great Basin Stemmed, Stanislaus point			Montezuma Range	NV	Northwest Research	Haarklau et al. 2005	
NY12938	82	Rose Spring Corner-Notched point			Montezuma Range	NV	Geochemical Research	R.E. Hughes	
NY10942	NY10942-0193	Great Basin Stemmed, Silver Lake point			Mount Hicks	NV	Northwest Research	Haarklau et al. 2005	
NY1101	471	Great Basin Stemmed, Lake Mohave point			Mount Hicks	NV	Northwest Research	Haarklau et al. 2005	
NY1101	231	Great Basin Stemmed, Lake Mohave point			Mount Hicks	NV	Northwest Research	Haarklau et al. 2005	
AZ:A:12:204 (BLM)	8	Non-diagnostic tool or flake			Mt. Hicks	UT	Northwest Research	Martin 2009	
NY12968	115	Humboldt point			N/A		Geochemical Research	R.E. Hughes	
NY13101	193	Pinto point			N/A		Geochemical Research	R.E. Hughes	
NY13081	166	Unidentified stemmed point base			North Obsidian Butte	NV	Geochemical Research	R.E. Hughes	
NY1717	18	Elko Eared point			North Obsidian Butte	NV	Geochemical Research	Lyon et al. 2008	
NY3	12-10 10	Parowan Basal–Notched point			Not done		Northwest Research	Haarklau et al. 2005	
NY3	12-10 64	Rosegate Series point			Not done		Northwest Research	Haarklau et al. 2005	
CK2605	1279	Flake	M19	50 cm	Oak Spring Butte	NV	Northwest Research	Roberts and Lyon 2011	
CK5522	CK5522-0124	Gatecliff Contracting Stem point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0019	Pinto point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0169	Great Basin Stemmed, Silver Lake point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY218	MCK-274	Cottonwood Triangular point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY218	MK074-268	Gatecliff Split Stem point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 59	Cottonwood Triangular point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 90	Parowan Basal-Notched point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 98	Rosegate Series point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 14	Rosegate Series point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 61	Elko Corner–Notched point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
NY3	12-10 68	Elko Corner-Notched point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 300	Elko Eared point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 100	Elko Eared point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 99	Large, side-notched, northern point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 11	Large, side-notched, northern point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 7	Unknown, shoulderless, concave-base point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY372	5-442-4	Humboldt point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY372	5-442-3	Parowan Basal Notched point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY376	5-440-15	Rosegate Series point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0042	Cottonwood Triangular point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0033	Gatecliff Split Stem point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY8	12-17-118	Humboldt point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY8	12-17-119	Rosegate Series point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY8	12-17-120	Cottonwood Triangular point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY8	12-17-117	Elko Corner-Notched point			Oak Spring Butte	NV	Northwest Research	Haarklau et al. 2005	
NY12787	51	Rose Spring Corner-Notched (Small Elko) point			Oak Spring Butte (Grouse Canyon)	NV	Geochemical Research	Lyon et al. 2008	
NY12954	109	Rose Spring Corner-Notched point			Oak Spring Butte (Grouse Canyon)	NV	Geochemical Research	R.E. Hughes	
NY13005	142	Elko Corner-Notched point			Oak Spring Butte (Grouse Canyon)	NV	Geochemical Research	R.E. Hughes	
NY13032	154	Rose Spring Corner-Notched point			Oak Spring Butte (Grouse Canyon)	NV	Geochemical Research	R.E. Hughes	
NY13071	163	Pinto/Gatecliff (Split Stem) point			Oak Spring Butte (Grouse Canyon)	NV	Geochemical Research	R.E. Hughes	
NY12925	62	Elko Eared point,small			Obsidian Butte	NV	Geochemical Research	Lyon et al. 2008	
NY13097	183	Large side-notched point			Obsidian Butte	NV	Geochemical Research	R.E. Hughes	
NY10657	NY10657-0002	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY10675	NY10675-0004	Great Basin Stemmed, Silver Lake point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY10844	NY10844-0005	Pinto point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0037	Unidentifiable point type			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0099	Pinto point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0091	Rosegate Series point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0041	Great Basin Stemmed, Borax Lake point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
NY10942	NY10942-0197	Humboldt point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0122	Rosegate Series point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY1101	212	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY1101	215	Great Basin Stemmed, Silver Lake point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY1492	NY1492-0033	Unidentifiable point type			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY1518	5-968-1	Great Basin Stemmed, Silver Lake point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 39	Cottonwood Triangular poin			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 26	Elko Eared point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY366	5-446-8	Rosegate Series point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0041	Humboldt point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0050	Rosegate Series point			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY5688	26NY5688	Unidentifiable point type			Obsidian Butte, Variety 2 (Airfield Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY10698	NY10698-0002	Parowan Basal–Notched point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY10723	NY10723-0001	Great Basin Stemmed, Silver Lake point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0064	Unidentifiable point type			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0069	Great Basin Stemmed, Silver Lake point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY10897	NY10897-0001	Elko Corner-Notched point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0143	Unidentifiable point type			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0025	Great Basin Stemmed, Borax Lake point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0035	Great Basin Stemmed, Borax Lake point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY1101	255	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY1101	239	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY1101	221	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY1101	220	Great Basin Stemmed, Silver Lake point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY1492	NY1492-0030	Unidentifiable point type			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 9	Rosegate Series point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY364	NY0364-0029	Unidentifiable point type			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
NY377	NY0377-0039	Parowan Basal-Notched point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0045	Cottonwood Triangular point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0040	Desert Side-Notched point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY9356	NY9356-0001	Elko Eared point			Obsidian Butte, Variety 3	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0055	Unidentifiable point type			Obsidian Butte, Variety 4	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0107	Pinto point			Obsidian Butte, Variety 4	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0135	Gatecliff Split Stem point			Obsidian Butte, Variety 4	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0135	Gatecliff Split Stem point			Obsidian Butte, Variety 4	NV	Northwest Research	Haarklau et al. 2005	
NY1101	467	Great Basin Stemmed, Borax Lake point			Obsidian Butte, Variety 4	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 37	Cottonwood Triangular point			Obsidian Butte, Variety 4	NV	Northwest Research	Haarklau et al. 2005	
NY376	5-440-16	Gatecliff point			Obsidian Butte, Variety 4	NV	Northwest Research	Haarklau et al. 2005	
NY10850	NY10850-0001	Humboldt point			Obsidian Butte, Variety 4/5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
CK6445	A229-0295	Projectile point tip			Obsidian Butte, Variety 5 (Unknown C)	NV	Geochemical Research	Lyneis Yamishita 2	
Isolate	75W-A-0001	Desert Side-Notched point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10625	NY10625-0006	Pinto point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10625	NY10625-0008	Great Basin Stemmed, Silver Lake point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10653	NY10653-0002	Pinto point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10701	NY10701-0003	Rosegate Series point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10845	NY10845-0006	Large, side-notched point nknown type			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10846	NY10846-0003	Great Basin Stemmed, Borax Lake point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0016	Large, side-notched point, unknown type			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0070	Pinto point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0067	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0002	Elko Corner-Notched point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0011	Gatecliff Split Stem point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10859	NY10859-0001	Humboldt point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10859	NY10859-0002	Elko Eared point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0166	Unknown shoulderless, concave-base point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
NY10942	NY10942-0010	Pinto point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0066	Pinto point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0125	Pinto point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0017	Great Basin Stemmed, Borax Lake point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0112	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0100	Elko Eared point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY1101	214	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY1101	466	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY1101	464	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY1101	468	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY1101	463	Great Basin Stemmed, Lake Mohave point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY1101	230	Great Basin Stemmed, Stanislaus point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY218	MK102-246	Great Basin Stemmed, Silver Lake point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
NY8	12-17-114	Elko Eared point			Obsidian Butte, Variety 5 (Unknown C)	NV	Northwest Research	Haarklau et al. 2005	
CK6445	A229-3775	Desert Side-Notched point			Panaca Summit	NV	Geochemical Research	R.E. Hughes	
CK6445	A229-2118	Unidentified point fragment			Panaca Summit	NV	Geochemical Research	R.E. Hughes	
CK6446	A230-2993	Desert Side-Notched point			Panaca Summit	NV	Geochemical Research	R.E. Hughes	
CK6446	A230-2400	Projectile point fragment			Panaca Summit	NV	Geochemical Research	R.E. Hughes	
NY809	1281	unknown			Panaca Summit	NV	Geochemical Research	R.E. Hughes	
NY809	1282	unknown			Panaca Summit	NV	Geochemical Research	R.E. Hughes	
NY13011	217	Drill fragment			Panaca Summit (Modena Area)	NV/UT	Geochemical Research	R.E. Hughes	
NY1728	28	Large side-notched point			Panaca Summit (Modena Area)	NV/UT	Geochemical Research	R.E. Hughes	
AZ:A:12:131 (BLM)	2	Non-diagnostic tool or flake			Partridge Creek (Round Mountain)	AZ	Northwest Research	Martin 2009	
AZ:A:12:136 (ASM)	23	Non-diagnostic tool or flake			Partridge Creek (Round Mountain)	AZ	Northwest Research	Martin 2009	
AZ:A:12:204 (ASM)	54	Non-diagnostic tool or flake			Partridge Creek (Round Mountain)	AZ	Northwest Research	Martin 2009	
AZ:A:12:30 (BLM)	11	Non-diagnostic tool or flake			Partridge Creek (Round Mountain)	AZ	Northwest Research	Martin 2009	
AZ:A:12:30 (BLM)	10	Non-diagnostic tool or flake			Partridge Creek (Round Mountain)	AZ	Northwest Research	Martin 2009	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
AZ:A:12:30 (BLM)	9	Non-diagnostic tool or flake			Partridge Creek (Round Mountain)	AZ	Northwest Research	Martin 2009	
AZ:A:12:30 (BLM)	26	Non-diagnostic tool or flake			Partridge Creek (Round Mountain)	AZ	Northwest Research	Martin 2009	
AZ:A:12:30 (BLM)	12	Non-diagnostic tool or flake			Partridge Creek (Round Mountain)	AZ	Northwest Research	Martin 2009	
AZ:A:12:52 (BLM)	28	Non-diagnostic tool or flake			Partridge Creek (Round Mountain)	AZ	Northwest Research	Martin 2009	
NY1723	21	Unidentified arrow point			Queen	CA	Geochemical Research	Lyon et al. 2008	
NY10643	NY10643-0003	Pinto point			Queen/Truman Meadows	CA/NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0024	Great Basin Stemmed, Silver Lake point			Queen/Truman Meadows	CA/NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0182	Great Basin Stemmed, Borax Lake point			Queen/Truman Meadows	CA/NV	Northwest Research	Haarklau et al. 2005	
NY1101	195	Great Basin Stemmed, Lake Mohave point			Queen/Truman Meadows	CA/NV	Northwest Research	Haarklau et al. 2005	
NY1101	253	Great Basin Stemmed, Lake Mohave point			Queen/Truman Meadows	CA/NV	Northwest Research	Haarklau et al. 2005	
NY1101	179	Great Basin Stemmed, Lake Mohave point			Queen/Truman Meadows	CA/NV	Northwest Research	Haarklau et al. 2005	
NY1101	472	Great Basin Stemmed, Lake Mohave point			Queen/Truman Meadows	CA/NV	Northwest Research	Haarklau et al. 2005	
NY12925	61	Rosegate Series point			Saline Range	CA	Geochemical Research	Lyon et al. 2008	
NY13066	161	Large side-notched point			Saline Range	CA	Geochemical Research	R.E. Hughes	
NY10836	NY10836-0002	Rosegate Series point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0036	Unknown, Rosegate Series-like point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY10849	NY10849-0002	Great Basin Stemmed, Lake Mohave point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0178	Unknown shoulderless, concave-base point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0192	Pinto point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0129	Pinto point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0133	Great Basin Stemmed, Lake Mohave point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0070	Elko Eared point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY1101	234	Great Basin Stemmed, Lake Mohave point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY1101	216	Great Basin Stemmed, Lake Mohave point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY1101	465	Great Basin Stemmed, Lake Mohave point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY3	12-10 51	Cottonwood Triangular point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	
NY5693	26NY5693 1-1	Great Basin Stemmed, Lake Mohave point			Saline Range, Variety 1 (Queen Imposter)	CA	Northwest Research	Haarklau et al. 2005	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
NY10704	NY10704-0001	Pinto point			Saline Range, Variety 2	CA	Northwest Research	Haarklau et al. 2005	
IO	7	Pinto preform, small			Saline Valley (Saline Range, Var. 3)	CA	Geochemical Research	R.E. Hughes	
NY12954	112	Unidentified arrow point			Saline Valley (Saline Range, Var. 3)	CA	Geochemical Research	R.E. Hughes	
NY1737	98	Dart point midsection			Saline Valley (Saline Range, Var. 3)	CA	Geochemical Research	R.E. Hughes	
CK2605	1278	Flake	M5	60-65 cm	Shoshone Mountain	NV	Northwest Research	Roberts and Lyon 2011	
CK3905	26CK3905-500-1	Elko Corner–Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
CK3906	CK3906-0001	Pinto point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
CK7045		Gatecliff point		Surface	Shoshone Mountain	NV	Geochemical Research	Winslow and Wedding 2008	
CK7045		Flake		Surface	Shoshone Mountain	NV	Geochemical Research	Winslow and Wedding 2008	
CK7045		Flake		Surface	Shoshone Mountain	NV	Geochemical Research	Winslow and Wedding 2008	
CK7045		Flake		Surface	Shoshone Mountain	NV	Geochemical Research	Winslow and Wedding 2008	
CK7045		Flake		Surface	Shoshone Mountain	NV	Geochemical Research	Winslow and Wedding 2008	
CK7045		Uniface		Surface	Shoshone Mountain	NV	Geochemical Research	Winslow and Wedding 2008	
IO	3	Elko Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
IO	4	Pinto point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
IO	9	Rose Spring Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
IO	218	Rose Spring Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY10680	NY10680-00D1	Great Basin Stemmed, Stanislaus point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10687	NY10687-0003&4	Gatecliff Contracting Stem point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10725	NY10725-0002	Great Basin Stemmed, Lake Mohave point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10728	NY10728-0001	Great Basin Stemmed, Borax Lake point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10844	NY10844-0006	Great Basin Stemmed, Lake Mohave point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10848	NY10848-0003	Elko Eared point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0044	Great Basin Stemmed, Silver Lake point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY12221	41	Rose Spring Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12221	42	Rose Spring Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12221	43	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12221	46	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12221	47	Elko Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12786	48	Desert Side-Notched point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12787	49	Unidentified arrow point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	

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NY12810	52	Desert Side-Notched point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12924	54	Unidentified arrow point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12924	55	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12924	56	Pinto/Gatecliff (Split Stem) point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12926	63	Desert Side-Notched point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12927	66	Gypsum point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12934	72	Elko Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12938	78	Eastgate Expanded-Stem point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY12938	85	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY12939	86	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY12948	101	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY12948	102	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY12948	104	Elko Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY12960	113	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY12973	121	Gypsum point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY12983	137	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13024	146	Elko Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13030	150	Elko Corner-Notched point, small			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13032	151	Pinto Eared point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13032	152	Desert Side-Notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13069	162	Humboldt point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13085	170	Desert Side-Notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13089	171	Elko Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13097	179	Elko Eared point, small			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13097	181	Large side-notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13097	187	Dart point base fragment			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13109	205	Eastgate Expanded-Stem point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY13114	211	Elko Corner-Notched point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY1717	14	Cottonwood Triangular point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY1717	16	Desert Side-Notched point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY1723	20	Eastgate Expanded-Stem point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY1724	22	Desert Side-Notched point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY1724	24	Unidentified arrow point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
NY1724	25	Eastgate Expanded-Stem point			Shoshone Mountain	NV	Geochemical Research	Lyon et al. 2008	
NY1737	95	Humboldt point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY1737	96	Humboldt point			Shoshone Mountain	NV	Geochemical Research	R.E. Hughes	
NY218	MK021-1476	Rosegate Series point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY218	MK073-1191	Elko Corner-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 16	Cottonwood Triangular point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 30	Cottonwood Triangular point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 17	Desert Side-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 83	Desert Side-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 70	Desert Side-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 74	Desert Side-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 56	Desert Side-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 66	Desert Side-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 29	Parowan Basal-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 65	Parowan Basal-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 89	Parowan Basal-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 6	Parowan Basal-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 93	Parowan Basal-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 41	Parowan Basal-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 15	Rosegate Series point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 53	Rosegate Series point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 43	Rosegate Series point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 2	Rosegate Series point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 92	Rosegate Series point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 23	Rosegate Series point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	\
NY3	12-10 295	Rosegate Series point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 49	Elko Corner-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 32	Elko Corner-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 97	Elko Corner-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 84	Elko Corner-Notched point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 20	Gatecliff Split Stem point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 22	Gatecliff Split Stem point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 105	Humboldt point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 79	Large, Side-Notched, Sudden point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	

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NY3	12-10 27	Pinto point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 24	Great Basin Stemmed, Borax Lake point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY8	12-17-73	Humboldt point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY8	12-17-116	Humboldt point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY809	1478	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	
NY809	1563	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	
NY809	1606	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	
NY809	1628	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	
NY809	202	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	
NY809	824B	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	
NY809	1108A	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	
NY809	1246	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	
NY809	1416	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	
NY8787	NY8787-0019	Great Basin Stemmed, Borax Lake point			Shoshone Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY809	1108A	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	A
NY809	731	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	A
NY809	710	unknown			Shoshone Mountain	NV	Geochemical Research	Lyneis Bowman	A
NY10848	NY10848-0066	Great Basin Stemmed, Borax Lake point			Silver Peak/Fish Lake Valley	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0109	Humboldt point			Silver Peak/Fish Lake Valley	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0156	Pinto point			Silver Peak/Fish Lake Valley	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0141	Gatecliff Split Stem point			Silver Peak/Fish Lake Valley	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0011	Gatecliff Contracting Stem point			Silver Peak/Fish Lake Valley	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0141	Gatecliff Split Stem point			Silver Peak/Fish Lake Valley	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 34	Elko Corner-Notched point			South Kawich Range	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 95	Humboldt point			South Kawich Range	NV	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0046	Gatecliff Contracting Stem point			South Kawich Range (Apache Tear Canyon)	NV	Northwest Research	Haarklau et al. 2005	
NY1717	10	Biface			Split Ridge (Silent Canyon)	NV	Geochemical Research	Lyon et al. 2008	
CK7045		Flake		Surface	Sugarloaf Mountain	CA	Geochemical Research	Winslow and Wedding 2008	
CK7045		Flake		Surface	Sugarloaf Mountain	CA	Geochemical Research	Winslow and Wedding 2008	
NY809	925	unknown			Sugarloaf Mountain, Coso Volcanic Field	CA	Geochemical Research	Lyneis Bowman	
NY809	1108B	unknown			Sugarloaf Mountain, Coso Volcanic Field	CA	Geochemical Research	Lyneis Bowman	
CK2605	1277	Flake	M12	40-50 cm	Tempiute Mountain	NV	Northwest Research	Roberts and Lyon 2011	
CK5814	65N-1:2-0002	Elko Corner-Notched point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
NY10679	NY10679-0008	Great Basin Stemmed, Silver Lake point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10680	NY10680-00A3	Great Basin Stemmed, Borax Lake point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10821	NY10821-0001	Great Basin Stemmed, Stanislaus point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10850	NY10850-0002	Elko Corner-Notched point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0145	Gatecliff Split Stem point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0051	Great Basin Stemmed, Silver Lake point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0145	Gatecliff Split Stemmed point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY1101	232	Great Basin Stemmed, Lake Mohave point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY1101	223	Great Basin Stemmed, Lake Mohave point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 1	Desert Side-Notched point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 82	Elko Corner-Notched point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY3	12-10 292	Large Side-Notched, Northern point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0049	Cottonwood Leaf-Shaped point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY382	5-414-4	Great Basin Stemmed, Borax Lake point			Tempiute Mountain	NV	Northwest Research	Haarklau et al. 2005	
NY809	174	unknown			Tubb Spring	NV	Geochemical Research	Lyneis Bowman	
NY809	1234	unknown			Tubb Spring	NV	Geochemical Research	Lyneis Bowman	
CK5686	5-1174-90-3	Unidentified arrow point	Black Dog Cave	Level 1	Tubb Springs	NV	Geochemical Research	Winslow 2009	
CK2041	A232-1184	Desert Side-Notched point			Unknown		Geochemical Research	Lyneis Yamishita 5N	
CK6445	A229-0467	Desert Side–notched point base			Unknown		Geochemical Research	Lyneis Yamishita 2	
CK6446	A230-2241	Cottonwood Triangular point			Unknown		Geochemical Research	Lyneis Yamishita 3	
CK6446	A230-1158	Rose Spring point			Unknown		Geochemical Research	Lyneis Yamishita 3	
NY809	200	unknown			Unknown		Geochemical Research	Lyneis Bowman	
NY809	1082	unknown			Unknown		Geochemical Research	Lyneis Bowman	
NY809	1239	unknown			Unknown		Geochemical Research	Lyneis Bowman	
NY10942	NY10942-0024	Great Basin Stemmed, Silver Lake point			Unknown - Unknown Variety G (Gatecliff Shelter Group 1) Gatecliff Shelter		Northwest Research	Haarklau et al. 2005	
NY10942	NY10942-0185	Great Basin Stemmed, Borax Lake point			Unknown 3		Northwest Research	Haarklau et al. 2005	
NY1101	172	Great Basin Stemmed, Borax Lake point			Unknown 3		Northwest Research	Haarklau et al. 2005	
NY3	12-10 463	Desert Side-Notched point			Unknown 6		Northwest Research	Haarklau et al. 2005	
CK5686	5-1174-35-2	Rosegate Series point	Black Dog Cave	Stratum 3	Unknown Variety 1 (Unknown A)		Geochemical Research	Winslow 2009	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
CK5686	5-1174-81-1	Rosegate Series point	Black Dog Cave	Floor	Unknown Variety 1 (Unknown A)		Geochemical Research	Winslow 2009	
CK5686	5-1174-90-2	Rosegate Series point	Black Dog Cave	Level 1	Unknown Variety 1 (Unknown A)		Geochemical Research	Winslow 2009	
CK5686	5-1174-101-3	Rosegate Series point	Black Dog Cave	Stratum 2	Unknown Variety 1 (Unknown A)		Geochemical Research	Winslow 2009	
CK5686	5-1174-101-4	Gatecliff Series point	Black Dog Cave	Stratum 2	Unknown Variety 1 (Unknown A)		Geochemical Research	Winslow 2009	
CK5686	5-1174-782-2	Rosegate Series point	Black Dog Cave	75-100 cm	Unknown Variety 1 (Unknown A)		Geochemical Research	Winslow 2009	
NY10942	NY10942-0069	Unknown, shoulderless concave-base point			Unknown Variety F		Northwest Research	Haarklau et al. 2005	
CK7045		Flake		Surface	W. Sugarloaf Mountain	CA	Geochemical Research	Winslow and Wedding 2008	
NY1717	13	Elko Eared point			West Sugarloaf, Coso Volcanic Field	CA	Geochemical Research	Lyon et al. 2008	
NY1717	17	Elko Corner-Notch point			West Sugarloaf, Coso Volcanic Field	CA	Geochemical Research	Lyon et al. 2008	
NY1735	37	Cottonwood Triangular point			West Sugarloaf, Coso Volcanic Field	CA	Geochemical Research	Lyon et al. 2008	
NY1737	92	Humboldt point			West Sugarloaf, Coso Volcanic Field	CA	Geochemical Research	R.E. Hughes	
NY809	824A	unknown			West Sugarloaf, Coso Volcanic Field	CA	Geochemical Research	Lyneis Bowman	
AZ:A:12:52 (BLM)	27	Non-diagnostic tool or flake			Wild Horse Canyon	UT	Northwest Research	Martin 2009	
CK1139	3757	Unknown	Unknown	Unknown	Wild Horse Canyon	UT	Geochemical Research	Ahlstrom 2005	
CK5686	5-1174-98-2	Rosegate Series point	Black Dog Cave	Level 1	Wild Horse Canyon	UT	Geochemical Research	Winslow 2009	
CK6139	37	Flake	100N, 105E	Surface	Wild Horse Canyon	UT	Northwest Research	Eskenazi and Ahlstrom 2011	
NY10680	NY10680-00B3	Great Basin Stemmed, Borax Lake point			Wild Horse Canyon, Mineral Mountains	UT	Northwest Research	Haarklau et al. 2005	
NY377	NY0377-0048	Cottonwood Triangular point			Wild Horse Canyon, Mineral Mountains	UT	Northwest Research	Haarklau et al. 2005	
CK5701		Biface			Modena/Panaca Summit	UT	Geochemical Research	Ahlstrom and Roberts 2001c	
CK4440	02-22-1	Flake	EU8	0-10	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4440	02-40-1	Flake	EU14	0-10	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4440	02-44-1	Flake	EU14	0-10	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4440	02-44-2	Flake	EU15	0-10	Pumice Hole Mine	UT	Steven Shackley	York et al. 1992	
CK4440	02-48-2	Flake	EU16	0-10	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4440	02-48-1	Flake	EU16	0-10	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4440	02-58-1	Flake	EU17	10-020	Pumice Hole Mine	UT	Steven Shackley	York et al. 1992	
CK4440	02-61-1	Flake	EU17	10-020	Pumice Hole Mine	UT	Steven Shackley	York et al. 1992	
CK4440	02-72-1	Flake	EU23	10-020	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	

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CK4440	02-74-1	Flake	EU24	0-10	Pumice Hole Mine	UT	Steven Shackley	York et al. 1992	
CK4440	01-19	Flake	EU1	0-10	Pumice Hole Mine	UT	Steven Shackley	York et al. 1992	
CK4440	01-49	Biface	EU11	10-020	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-131-1	Flake	EU4D	0-10	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-131-3	Flake	EU4D	0-10	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-132-1	Flake	EU4D	10-020	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-133-1	Flake	EU4D	10-020	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-133-3	Flake	EU4D	0-10	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-134-2	Flake	EU4D	30-40	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-135-1	Flake	EU4D	40-50	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-136-1	Flake	EU4D	50-60	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-141-1	Flake	EU2A	20-30	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-141-3	Flake	EU2A	20-30	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-141-2	Flake	EU2A	20-30	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-143-3	Flake	EU2A	30-40	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-150-2	Flake	EU2A	50-60	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-150-1	Flake	EU2A	50-60	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-150-3	Flake	EU2A	50-60	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-152-2	Flake	EU2A	60-70	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-152-3	Flake	EU2A	60-70	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4580	02-153-2	Flake	EU2A	70-80	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4581	S-4581-1	Flake	TS	0	Wild Horse Canyon, Mineral Mountains	UT	Steven Shackley	York et al. 1992	
CK4589	01-6	Projectile point	TS	0	Coso Volcanic Field	CA	Steven Shackley	York et al. 1992	
CK415	394-1	Humboldt point			Kane Springs	NV	Richard Hughes	Blair and Wedding 2001	
CK415	2601	Elko Corner-Notched point			Modena/Panaca Summit	UT	Richard Hughes	Blair and Wedding 2001	
CK415	3106	Elko Corner-Notched point			Kane Springs	NV	Richard Hughes	Blair and Wedding 2001	
CK415	20-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	

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CK415	291-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	
CK415	356-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	
CK415	394-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	
CK415	606-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	
CK415	789-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	
CK415	869-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	
CK415	1586-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	
CK415	2053-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	
CK415	2087-1	unknown			Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	Blair and Wedding 2001	
CK415	2165-1	unknown			Devil Peak West	NV	Richard Hughes	Blair and Wedding 2001	
CK415	2601-1	unknown			Panaca Summit (Modena Area)	NV	Richard Hughes	Blair and Wedding 2001	
CK415	3106-1	unknown			Kane Spring	NV	Richard Hughes	Blair and Wedding 2001	
CK1986	2	unknown	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK1987	5	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK1987	7	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK1987	8	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK1987	9	Flake	Surface	Surface	Wild Horse Canyon	UT	Richard Hughes	McGuire et al. 2010	
CK1987	10	Biface	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK1990	1	Biface	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK1990	2	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK1990	3	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK1990	4	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3068	5	Flake	TU	10-020	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3093	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3206	5	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3206	6	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3206	15	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3206	22	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3206	23	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3206	24	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3206	25	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3206	27	A Flake	TU	0-10	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3206	27	B Flake	TU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3206	32	Flake	TU	10-20	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3206	36	Flake	TU	20-30	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	

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CK3206	45	Flake	TU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3206	55	A Flake	TU	30-40	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3206	55	B Flake	TU	30-40	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3206	58	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3206	59	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3208	2	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3208	7	Side-notched dart point	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK6082	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6084	1	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK6084	10	Flake	Surface	Surface	Unknown X	NV	Richard Hughes	McGuire et al. 2010	
CK6085	1	Core	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK6672	1	Dart-sized point	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6698	15	A Flake	TU	20-30	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK6698	15	B Flake	TU	20-30	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7029	1	Biface	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7903	2	Core	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7904	1	Elko Series point	Surface	Surface	Unknown	NV	Richard Hughes	McGuire et al. 2010	
CK7904	3	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7904	4	Elko Series point	Surface	Surface	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK7905	3	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7907	2	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7915	1	Flake	Surface	Surface	Variety 2	NV	Richard Hughes	McGuire et al. 2010	
CK7917	2	Flake	TU	0-10	Obsidian Butte	NV	Richard Hughes	McGuire et al. 2010	
CK7921	1	Core	Surface	Surface	Variety 3	NV	Richard Hughes	McGuire et al. 2010	
CK7936	6	Flake	Surface	Surface	Wild Horse Canyon	UT	Richard Hughes	McGuire et al. 2010	
CK7936	8	Biface	TU	10-020	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7941	1	Dart-sized point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7963	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7963	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7966	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7966	5	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7966	21	Flake	TU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7973	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7973	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7978	1	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7983	3	Flake	Surface	Surface	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK7983	5	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7983	6	Flaked tool	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7983	7	Flake	TU	0-10	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7985	3	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7985	4	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	

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CK7986	1	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7987	1	Dart-sized point	Surface	Surface	Shoshone Mountain	NV	Richard Hughes	McGuire et al. 2010	
CK7987	2	Drill	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7987	3	Arrow-sized point	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7988	1	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7990	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7992	2	Flake	TU	0-10	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7992	7	Flake	TU	10-20	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7993	3	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8006	1	Flaked tool	Surface	Surface	Wild Horse Canyon	UT	Richard Hughes	McGuire et al. 2010	
CK8006	8	Biface	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8011	1	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8011	4	Elko Series point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8012	1	Flake	Surface	Surface	Unknown X	NV	Richard Hughes	McGuire et al. 2010	
CK8015	7	Flake	TU	30-40	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8016	1	Tool	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8016	2	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8018	3	Rosegate Series point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8018	4	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8019	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8020	1	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8020	2	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8021	1	Dart-sized point	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8023	1	Biface	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8024	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8039	1	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8058	1	Dart-sized point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8058	2	Pinto point	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8059	1	Dart-sized point	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8060	1	Biface	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8060	2	Humboldt point	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8061	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8063	1	A Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8063	1	B Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8063	1	C Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8063	2	A Flake	TU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8063	2	B Flake	TU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8063	4	Flake	TU	20-30	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8074	1	Rosegate Series point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8075	1	Elko Series point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8077	2	Stemmed Series point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	

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CK8077	4	Biface	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8077	5	Pinto point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8077	6	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8079	1	Biface	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8083	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8085	1	Biface	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8088	3	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8088	7	Dart-sized point	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8088	11	A Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8088	11	B Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8088	14	A Flake	TU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8088	14	B Flake	TU	0-10	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8088	24	Flake	TU	20-30	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8088	30	A Flake	TU	30-40	Unknown	NV	Richard Hughes	McGuire et al. 2010	
CK8088	30	B Flake	TU	30-40	Wild Horse Canyon	UT	Richard Hughes	McGuire et al. 2010	
CK8088	30	C Flake	TU	30-40	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8088	30	D Flake	TU	30-40	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8093	1	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8093	2	Flake	Surface	Surface	Timpahute Range	NV	Richard Hughes	McGuire et al. 2010	
CK8093	3	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8093	4	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8093	8	A Flake	TU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8093	8	B Flake	TU	0-10	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8093	13	Flake	TU	20-30	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8097	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8101	1	Dart-sized point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8101	2	Biface	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8103	2	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8105	3	Humboldt point	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8105	4	Rosegate Series point	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8105	6	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8107	1	Core	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8109	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8110	1	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8116	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8120	1	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8120	2	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8120	3	Flake	TU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8123	1	Biface	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8125	2	Flake	TU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8131	1	Pinto	Surface	Surface	Shoshone Mountain	NV	Richard Hughes	McGuire et al. 2010	

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CK8140	2	Biface	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8140	3	Flake	TU	0-10	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8140	22	Flake	TU	0-14	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8140	34	A Flake	TU	0-10	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8140	34	B Flake	TU	0-10	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8149	7	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8149	8	Flake	Surface	Surface	Shoshone Mountain	NV	Richard Hughes	McGuire et al. 2010	
CK8161	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8163	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8163	2	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8164	1	Flake	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8169	1	Elko Series point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8169	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8169	3	Elko Series point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8169	4	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8170	4	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8170	5	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8170	6	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8171	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8171	2	Flake	Surface	Surface	Black Tank	AZ	Richard Hughes	McGuire et al. 2010	
CK8176	1	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8192	15	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8192	16	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8193	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8219	1	Flake	TU	0-10	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8562	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8572	1	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8572	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8594	1	Humboldt point	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8594	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
Isolate	1	Elko Series point	Surface	Surface	Burro Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
Isolate	1	Stemmed Series point	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
Isolate	1	Rosegate Series point	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK1991	1	Elko Series point	Surface	Surface	Timpahute Range	NV	Richard Hughes	McGuire et al. 2010	
CK1991	8	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK1991	9	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK1991	10	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK1991	12	Dart-sized point	Surface	Surface	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK1991	15	Flake	TU	10-20	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	1	Flake	Surface	Surface	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	2	Biface	Surface	Surface	Government Mountain	AZ	Richard Hughes	McGuire et al. 2010	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
CK3201	3	Biface	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	119	A Flake	CU	80-90	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	119	B Flake	CU	80-90	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	119	C Flake	CU	80-90	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	119	D Flake	CU	80-90	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	119	E Flake	CU	80-90	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	A Flake	CU	90-100	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	B Flake	CU	90-100	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	C Flake	CU	90-100	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	D Flake	CU	90-100	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	E Flake	CU	90-100	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	F Flake	CU	90-100	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	G Flake	CU	90-100	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	H Flake	CU	90-100	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	I Flake	CU	90-100	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	J Flake	CU	90-100	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	K Flake	CU	90-100	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	L Flake	CU	90-100	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	M Flake	CU	90-100	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	126	N Flake	CU	90-100	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	129	Humboldt point	CU	90-100	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	154	A Flake	CU	120-130	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	1254	B Flake	CU	120-130	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	154	C Flake	CU	120-130	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	154	D Flake	CU	120-130	Shoshone Mountain	NV	Richard Hughes	McGuire et al. 2010	
CK3201	154	E Flake	CU	120-130	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	154	F Flake	CU	120-130	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	154	G Flake	CU	120-130	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	154	H Flake	CU	120-130	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	154	I Flake	CU	120-130	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	158	A Flake	CU	130-140	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	158	B Flake	CU	130-140	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	162	A Flake	CU	0-10	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK3201	162	B Flake	CU	0-10	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK3201	162	C Flake	CU	0-10	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK3201	162	D Flake	CU	0-10	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	162	E Flake	CU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	162	F Flake	CU	0-10	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	162	G Flake	CU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	162	H Flake	CU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	165	Desert Series point	CU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
CK3201	169	Core	CU	0-10	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK3201	177	A Flake	CU	10-020	Wild Horse Canyon	UT	Richard Hughes	McGuire et al. 2010	
CK3201	177	B Flake	CU	10-020	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	177	C Flake	CU	10-020	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	177	D Flake	CU	10-020	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	177	E Flake	CU	10-020	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	177	F Flake	CU	10-020	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	177	G Flake	CU	10-020	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	177	H Flake	CU	10-020	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	177	I Flake	CU	10-020	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	177	J Flake	CU	10-020	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	215	A Flake	CU	30-40	None		Richard Hughes	McGuire et al. 2010	
CK3201	215	B Flake	CU	30-40	None		Richard Hughes	McGuire et al. 2010	
CK3201	233	A Flake	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	233	B Flake	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	233	C Flake	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	233	D Flake	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	233	E Flake	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	233	F Flake	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	233	G Flake	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	233	H Flake	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	233	I Flake	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	238	Biface	CU	40-50	None		Richard Hughes	McGuire et al. 2010	
CK3201	334	A Flake	CU	120-130	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	334	B Flake	CU	120-130	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK3201	334	C Flake	CU	120-130	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	334	D Flake	CU	120-130	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK3201	334	E Flake	CU	120-130	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	337	Biface	CU	120-130	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK3201	342	Flake	CU	130-140	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK4891	53	Rosegate Series point	CU	003-13	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	2	Flake	Surface	Surface	Unknown X				
CK6080/6081	16	Flake	TU	0-10	Unknown				
CK6080/6081	86	Elko Series point	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	156	Desert Series point	CU	20-30	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK6080/6081	157	Desert Series point	CU	20-30	Black Tank	AZ	Richard Hughes	McGuire et al. 2010	
CK6080/6081	287	A Flake	CU	0-10	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK6080/6081	287	B Flake	CU	0-10	Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	287	C Flake	CU	0-10	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK6080/6081	287	D Flake	CU	0-10	Wild Horse Canyon	UT	Richard Hughes	McGuire et al. 2010	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
CK6080/6081	287	E Flake	CU	0-10	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	287	F Flake	CU	0-10	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	287	G Flake	CU	0-10	Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	312	A Flake	CU	10-020	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	312	B Flake	CU	10-020	Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	312	C Flake	CU	10-020	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	312	D Flake	CU	10-020	Kane Springs Wash Caldera Variety 1	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	312	E Flake	CU	10-020	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK6080/6081	312	F Flake	CU	10-020	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK6080/6081	339	A Flake	CU	20-30	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	339	B Flake	CU	20-30	Wild Horse Canyon	UT	Richard Hughes	McGuire et al. 2010	
CK6080/6081	339	C Flake	CU	20-30	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK6080/6081	339	D Flake	CU	20-30	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	374	Flake	CU	50-60	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK6080/6081	380	Flake	CU	60-70	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	433	Flake	CU	40-50	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK6080/6081	442	Flake	CU	50-60	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK6080/6081	452	Obsidian needle	CU	50-60	Partridge Creek, AZ	AZ	Richard Hughes	McGuire et al. 2010	
CK7994	2	Flake	Surface	Surface	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7994	81	A Flake	CU	50-60	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7994	81	B Flake	CU	50-60	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7994	81	C Flake	CU	50-60	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7994	81	D Flake	CU	50-60	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7994	81	E Flake	CU	50-60	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7994	87	A Flake	CU	60-70	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7994	87	B Flake	CU	60-70	Black Tank	AZ	Richard Hughes	McGuire et al. 2010	
CK7994	87	C Flake	CU	60-70	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7994	92	Flake	CU	70-80	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7994	97	A Flake	CU	80-90	Shoshone Mountain	NV	Richard Hughes	McGuire et al. 2010	
CK7994	97	B Flake	CU	80-90	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7994	129	A Flake	CU	20-30	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7994	129	B Flake	CU	20-30	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7994	129	C Flake	CU	20-30	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7994	129	D Flake	CU	20-30	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7994	129	E Flake	CU	20-30	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK7994	129	F Flake	CU	20-30	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7994	129	G Flake	CU	20-30	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7994	132	Elko Series point	CU	20-30	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7994	140	A Flake	CU	30-40	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	

Site No.	Catalog No.	Artifact Type	Provenience	Depth	Source	State	Lab	Reference	Comment
CK7994	140	B Flake	CU	30-40	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK7994	140	C Flake	CU	30-40	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK7994	149	Flake	CU	50-60	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8013	28	A Flake	CU	unknown	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8013	28	B Flake	CU	unknown	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	15	A Flake	CU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	15	B Flake	CU	0-10	Wild Horse Canyon	UT	Richard Hughes	McGuire et al. 2010	
CK8179	15	C Flake	CU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	15	D Flake	CU	0-10	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	25	Flake	CU	10-020	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	27	Elko Series point	CU	10-020	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8179	31	Flake	CU	20-30	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8179	36	Biface	CU	20-30	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8179	45	A Flake	CU	30-40	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8179	45	B Flake	CU	30-40	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	49	Biface	CU	30-40	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8179	124	A Flake	CU	50-60	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8179	124	B Flake	CU	50-60	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8179	124	C Flake	CU	50-60	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	124	D Flake	CU	50-60	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	136	A Flake	CU	60-70	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8179	136	B Flake	CU	60-70	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	136	C Flake	CU	60-70	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8179	149	A Flake	CU	70-80	Wild Horse Canyon	UT	Richard Hughes	McGuire et al. 2010	
CK8179	149	B Flake	CU	70-80	Modena/Panaca Summit	NV	Richard Hughes	McGuire et al. 2010	
CK8179	149	C Flake	CU	70-80	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	
CK8179	158	Flake	CU	90-100	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8179	162	A Flake	CU	100-110	Delamar Mountains	NV	Richard Hughes	McGuire et al. 2010	
CK8179	162	B Flake	CU	100-110	Kane Spring	NV	Richard Hughes	McGuire et al. 2010	

Comments: A=Measurements taken by R. Hughes, Geochemical Research. Source assignment determined by C. Skinner, Northwest Research

REFERENCES CITED

Ahlstrom, Richard V.N. (editor)
2005 *Desert Oasis. The Prehistory of Clark County Wetlands Park, Henderson, Nevada*. HRA Papers in Archaeology No. 4. Prepared for the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

Ahlstrom, Richard V.N., and Heidi Roberts
2001 *Archaeological Test Excavations at Sites 26CK1282 and 26CK1474, Clark County Wetlands Park, Southern Nevada*. HRA, Inc. Archaeological Report No. 00-07. Submitted to the Southern Nevada Water Authority, Las Vegas. HRA, Inc., Conservation Archaeology, Las Vegas.

Blair, Lynda M. and Jeffrey R. Wedding
2001 *Archaeological Excavations for the Apex Land Exchange, Clark County, Nevada*, Vol. 1, *Rockshelters 26CK415, 26CK3780, and 26CK4415.* USDI, Bureau of Land Management Report No. 5-2377(P), Las Vegas. Report No. 5-164-13. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Eskenazi, Suzanne, and Richard V.N. Ahlstrom
2011 *Data Recovery at 26CK6139, Clark County Wetlands Park, Clark County, Nevada*. Bureau of Reclamation Report LC-NV-09-17P. Archaeological Report 09-06. HRA, Inc. Conservation Archaeology, Las Vegas.

Haarklau, Lynn, Lynn Johnson, and David L. Wagner
2005 *Fingerprints in the Great Basin: The Nellis Air Force Base Regional Obsidian Sourcing Study*. Prepared for the U.S. Air Force, Air Combat Command, Contract No. DACA63-00-D-0006. Prewitt and Associates, Austin.

King, Jerome, Allika Ruby, and Amy Gilreath
2006 *Mitigation of Sites 26CK6907 and 26CK6913, Northern Las Vegas Valley, Clark County, Nevada.* BLM Report No. 5-2524. Far Western Anthropological Research Group, Davis, California.

Lyon, Jerry D. Heidi Roberts, Rick Ahlstrom, Christopher Harper, Suzanne Eskenazi, Robert Davide, Catherine Fowler, and Elizabeth von Till Warren
2008 *Shared Place: An Archaeological Survey of the Ash Meadows National Wildlife Refuge, Nye County, Nevada.* Archaeological Report No. 07-24, HRA Inc., Conservation Archaeology, Las Vegas.

Martin, Cheryl Marie
2009 Analysis of Flaked Stone Lithics from Virgin Anasazi Sites Near Mt. Trumbull, Arizona Strip. Masters Thesis for Department of Anthropology and Ethic Studies, University of Nevada, Las Vegas.

McGuire, Kelly, William Hildebrandt, Amy Gilreath, Jerome King, and John Berg
2010 *Final Research Results for the Gold Butte Study Area, Clark County, Nevada*, Vol. I, *Prehistoric Resources*. BLM Report No. 5-2617. Far Western Anthropological Research Group, Davis, California.

Myhrer, Keith, and Margaret M. Lyneis
1985 *The Bovine Bluff Site: An Early Puebloan Site in the Upper Moapa Valley*. Contributions to the Study of Cultural Resources Technical Report No. 15. USDI, Bureau of Land Management, Reno.

Roberts, Heidi, and Jerry Lyon
2011 *Archaeological Excavations at the Corn Creek National Register Site, Desert National Wildlife Refuge, Clark County, Nevada*. Draft Report Prepared for the U.S. Fish and Wildlife Service, Desert National Wildlife Refuge. Archaeological Report No. 08-22. HRA, Inc. Conservation Archaeology, Las Vegas.

Winslow, Diane L.
2009 *Pithouse Excavations, Locus 4. Mitigation, Black Dog Mesa Archaeological Complex (26CK5686/BML 53-7216)*, Vol. 3. BLM Report No. 5-2430(3), HRC Report No. 5-4-26(3). Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Winslow, Diane L. and Jeffrey R. Wedding
2008 Black Rocks from near Red Rock: Obsidian Study Results from Three Prehistoric Sites in Clark County, Nevada. In Proceedings of the 2007 Three Corners Conference, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl. Nevada Archaeological Association. Presented October 13, 2007.

York, Andrew L., Michael S. Kelly, and William Zukosky
1992 *Kern River Gas Transmission Company: Kern River Pipeline Cultural Resource Data Recovery Report, Nevada*. Dames & Moore, San Diego.

APPENDIX C
NVCRIS SITE DATA

Data Provided Electronically with CD:
See File CD/All_Sites_JoinedDataSet

APPENDIX D
A SYNOPSIS OF THE YAMASHITA SITES

Margaret M. Lyneis

A SYNOPSIS OF THE YAMASHITA SITES

Margaret M. Lyneis

The Yamashita sites (Figure D.1) were on the east side of the Lower Moapa Valley, southeast of Logandale. They were part of the Pueblo occupation of Sand Bench, which overlooks the floodplain of the Muddy River for about 2 miles. The bench is a 20- to 30-ft high terrace of Pleistocene gravels, topped with 50 to 80 cm of aeolian sand. Excavations of the Yamashita sites by UNLV Saturday field schools and volunteers trained in a Continuing Education program (Figure D.2) were focused on five of the nine sites on the property.

Most of the sites on Sand Bench have been destroyed by modern construction, and homes line its edge where prehistoric families once lived. Previously, these sites were only known through a welter of site records collected over the years; many of which are unreconciled duplications. The few excavations, such as Adam 2 (Lyneis et al. 1989) have focused on single sites, giving little understanding of the temporal composition of this linear zone of Pueblo occupation.

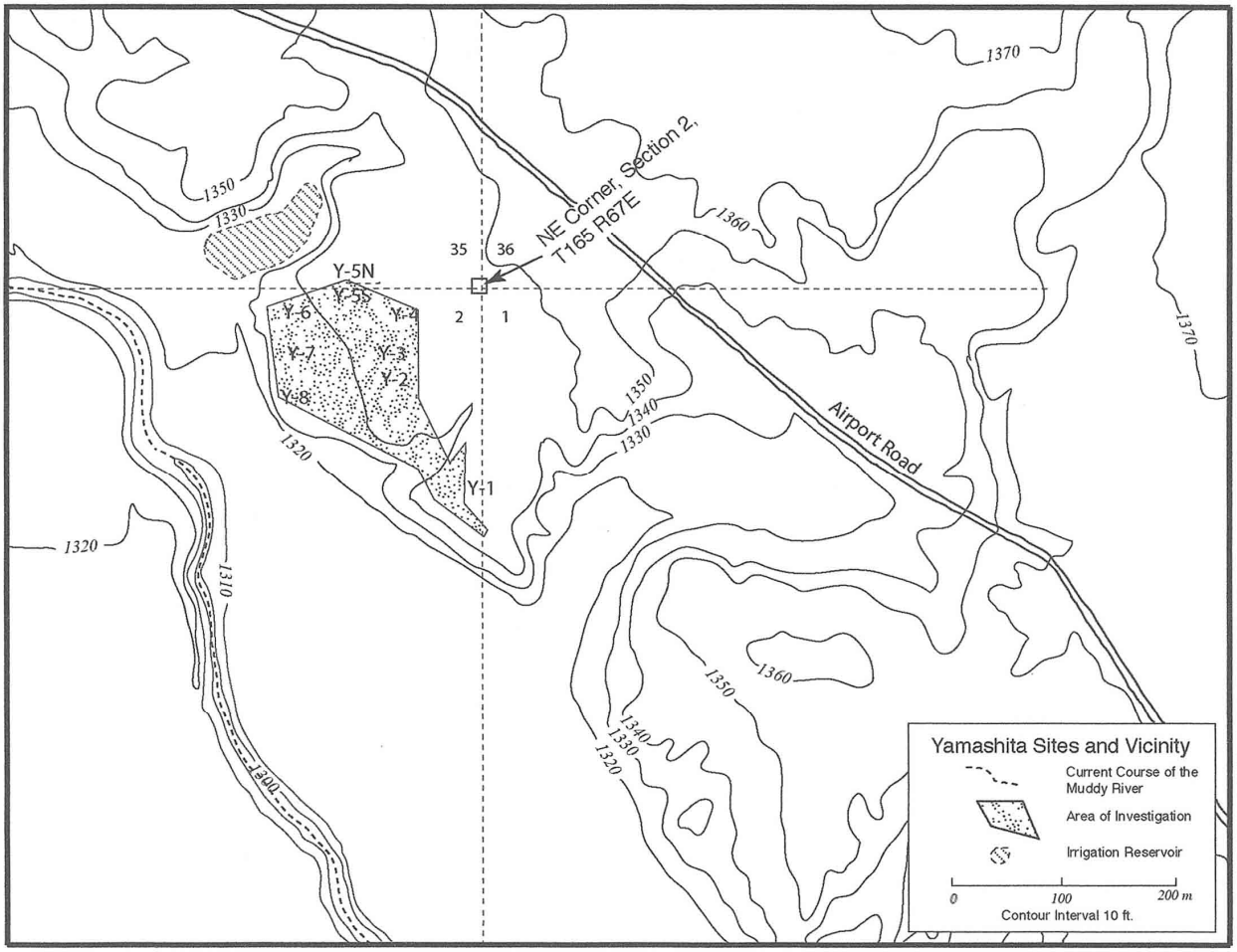

Figure D.1. The Yamashita sites and vicinity in the lower Moapa Valley.

Figure D.2. Continuing Education students sorting finds (Photo by Corrine Escobar).

The Yamashita sites are only a sample of the prehistoric occupations along the east edge of the Moapa Valley. Each site consists of a one- to two-family dwelling spatially separated from its neighbors. In comparison, the Main Ridge community 5.5 miles to the southeast was a settlement of about 32 families including about 100 people living as close to one another as the terrain allowed (Lyneis 1992:75). The Middle Pueblo II was dated by its ceramics and the results indicate it was approximately contemporary with Y-2 and Y-3.

To develop a strong chronology for the Pueblo settlements in southern Nevada (Table D.1), it was necessary to integrate radiocarbon dates and changes in white ware designs that can be cross-dated with San Juan and Kayenta ceramics from the east. Cultural changes on the Shivwits and Uinkaret plateaus are also important to consider, although information on those area is still limited. The period between about A.D. 1000 and 1100 one of rapid change in exchange networks, presenting difficulties in assessing whether and how the span should be divided into Early and Middle Pueblo II periods. The large pottery samples from Y-2 (26CK6445) and Y-3 (26CK6446) provide new understandings of these crucial times

The Yamashita property included more than 200 m of terrace edge with five occupations, spatially offset. From southeast to northwest, Y-1 (26CK6444) is a Late Basketmaker II occupation. Y-2 (26CK6445) is a Pueblo II household, badly damaged by looting. Y-3 (26CK6446) includes an unfinished Pueblo I pit structure with an associated line of storage bins and another Pueblo II household courtyard unit. Excavations at Y-5N (26CK2041) focused on yet another Pueblo II habitation room, and at Y-5S (26CK2042) the edge of a Pueblo III deposit was sampled. In addition, scattered across the property was a Southern Paiute occupation represented by about 450 sherds with dates beginning in the A.D. 1300s. Sites on the lower part of the terrace—Y-6 (26CK2043), Y-7 (26CK2039), and Y-8 (26CK2040)—were only investigated through surface collections. Light trash dumping from about 1860 to 1920 is not discussed here.

With large ceramic assemblages and 30 radiocarbon dates, complemented by luminescence dates, the Yamashita sites have refined the Pueblo pottery sequence. Nonlocal pottery is common, although utility wares appear to have been made locally (see Appendix I in this volume). The Y-1 pit structure and associated storage cists extend our understanding of the early horticultural settlements in the valley, previously known only from Black Dog Cave and Black Dog Mesa in the upper Moapa Valley.

Table D.1. Basketmaker-Pueblo Sequence in Southern Nevada with Approximate Dates, Based in Part on Allison 2010a, 2010b) with Key Ceramic Characteristics.

Late Pueblo II/ Pueblo III	A.D. 1200–1300s A.D. 1150–1200	Y-5N (26CK2042) at least 50% corrugated utility ware, Shinarump Red Ware
Middle Pueblo II/ Early Pueblo II	A.D. 1050–1150 To A.D. 1050	Y-5N (26CK2041) Y-3 (26CK6446) Tsegi Orange Ware, <10% corrugated Y-2 (26CK6445): San Juan Red Ware, <10% corrugated
Pueblo I	A.D. 800–1000	Abajo Polychrome (A.D. 775–825) at the Bonelli site (Lyneis 2000:61–62); missing at the Yamashita sites, rare in Moapa Valley
Basketmaker III	A.D. 500–800	bowls and jars at Black Dog Mesa Loci 4,10 (Winslow 2009:662–674); missing at the Yamashita sites;
Late Basketmaker II	A.D. 1–500	Preceramic: structures and maize from Black Dog Cave; structures from Black Dog Mesa. Yamashita cists, Y-1 pit structure (26CK6444)

ENVIRONMENT, PAST AND PRESENT

During Basketmaker and Pueblo times, Sand Bench looked much as it did when we began our excavations. A layer of aeolian sand covered underlying Pleistocene gravels, although it was not as deep 1500 years ago. The dominant vegetation was creosote bush and bursage, with cholla and prickly pear cactus.

The floodplain of the Muddy River is, however, much changed since Pueblo times. The drainage of the Muddy River was modified in historical times, first by Mormon settlers in the early 1860s, and in the late 1930s by the Civilian Conservation Corps (CCC). Both instances were to provide water for crops. In addition, the Muddy River became entrenched beginning in the 1880s. In Basketmaker and Pueblo times gardening would have taken place on parts of the valley floor. Lacking the resources to core the floodplain, archaeologists examined the adobe used in the structures at the Yamashita sites. The dirt used in making the adobe probably originated on the valley floor. Pollen, phytoliths, and mollusks recovered from the rubble of roof fall and wall collapse show that the valley floor supported riparian vegetation. According to Stuart (2011:5):

> In sum, vegetation appears to have consisted of a creosote bush–bursage association on the terrace with willow, cattail, grass, sedge, alder, cottonwood, and perhaps arrowweed, growing on the floodplain below.

General screening recovered an assemblage of tiny aquatic gastropods and bivalves that had weathered out of the structural adobe. Adding to the picture of the prehistoric, Sharpe (2011:5) explained:

> Taken together, however, the mollusks recovered provide a well-defined picture of the Muddy River environment near the Yamashita Sites. The presence of *Pisidium* through -30 cm in (Y-2) and to -60 cm in Y-3) strongly suggests that the Muddy River environment was hydrologically permanent and physically stable over this time frame. This species is a filter feeder and requires permanent, relatively fresh water and, therefore, is the most susceptible to hydrologic change compared to the other three species. *Pisidium* is limited to lower TDS levels, compared to the other species, suggesting that the Muddy River was a flow-through, and not ponded backwater, environment. Table 2 indicates that for all these species to coexist, waters were shallow with dense, emergent aquatic vegetation near the river bank. For vegetation to be thick, substrate was probably mud. The Muddy River likely had a TDS below 3,000 mg/L and had greater bicarbonate relative to calcium in river waters.

The mollusk evidence also indicates that the "adobe" used in the structures was simply transported mud.

> The preservation and condition of the shell material is excellent. Almost all of the shells in the samples are whole and have few chips or abrasions. For this remarkable preservation to occur, the shells had to have been gently transported to the Yamashita sites. It is likely the mollusks were transported to the sites while they were alive (or had not been dead very long) because the shells are in such good shape; the soft tissue may have provided support for the shell. The mollusks were not naturally water-transported (such as in a flood) onto the upper terrace or they would show wear and abrasions. They may have been transported inadvertently on vegetation or in water brought to the habitation sites. Alternately, they could have been collected along with mud from the lower floodplain, however, the mud was not likely stirred or mixed aggressively to build the structures, or the fragile shells would be chipped or crushed. If the shells were carried to the sites in floodplain mud to build structures, the mollusks were likely alive or recently dead, again because the shells were not degraded [Sharpe 2011:1].

SITES AND STRUCTURES

Each site number assigned to the property generally turned out to a structure or group of structures. The field numbers name the sites from the south end of the property to the north.

Y-1, 26CK6444

Excavation exposed about one-fourth to one-third of a Late Basketmaker II pit structure at Y-1. The structure was identified as a floor horizon in the wall cut of a gravel quarry that truncated the south end of the sites (Figure D.3). Excavation revealed an adobe floor laid directly on the surface of underlying Pleistocene gravels. Following the floor, excavators found the charred remnant of a cottonwood post, several sand-filled depressions, and a raised ridge at the floor's outer edge. The pit structure had only one post and no hearth, making it difficult to determine its size or even to assume it was circular.

The structure had burned, leaving a layer of charcoal over its floor and, in the fill just above the charcoal, three parallel burned pieces of arrowweed. Charcoal from near the base of the post and a sample of the arrowweed were dated, placing the structure in Late Basketmaker II times (Table D.2). There was no constructed wall at its perimeter and no layer of adobe rubble over the floor, raising the possibility that its superstructure was of perishable material.

Late Basketmaker II Cists

A series of cists excavated into the underlying Pleistocene gravels were scattered to the north of Y-1, falling in the areas of Y-2, Y-3, and Y-4. The first one was discovered when clearing the surface of the underlying Pleistocene gravels at the bottom of an excavation unit. The excavators initiated a probe survey using a 5-foot-long steel tile probe from Forestry Suppliers to determine the depth of sand above the underlying caliche-cemented gravels. Using a 2-meter-square grid, 11 anomalies were located that turned out to be cists. Two more were found at the base of other excavation units. They were filled with aeolian sand and several contained fragments of burned maize cobs (Table D.3). One cist also had a layer of fire-cracked rock and charcoal. These materials were contemporary with the Y-1 structure.

Y-2, 26CK6445

Y-2 included two Late Pueblo II habitation rooms, but it is not clear how they were related (Figures D.4 and D.5). Y-2 Structure 1 (Figure D.6) had an eroded remnant of attached storerooms that began at its north wall but only a little more than 2 meters remained. Its center had been destroyed by looters who had removed a burial, presumably destroying a central hearth. The habitation had not burned, but, unique among the habitation rooms, its adobe floor had a layer of light-colored clay plaster. The only date for it is PRI-10-164-2182 (Cal. A.D. 1070–1160), taken from a *Salix* twig found in adobe rubble. The date is close to that of the fill from Structure 4's fire hearth (Table D.4).

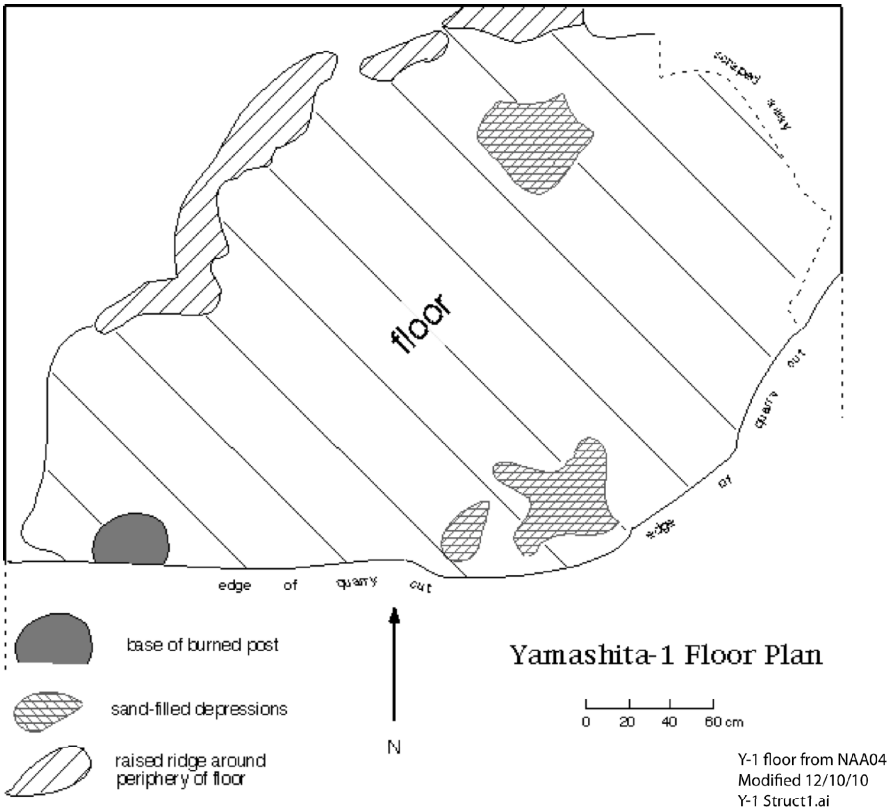

Figure D.3. Plan of structure at Y-1.

Table D.2. Radiocarbon Dates from Y-1 Structure

Catalog No., Date No.	Location	Material	Conventional Radiocarbon Age	2-Sigma ranges
A228-0159 / Beta-186614	Structure 1,TU#9, SS#2 44 cm bd	charred arrowweed, *Pluchea sericea*	1780±30 B.P.	Cal A.D. 150–340
A228-0085/-0001 Beta-162563	Structure 1	Charcoal chunks on floor adjacent to burned cottonwood post	1810±40* B.P.	Cal A.D. 110–330

Table D.3. Dates from Cist Fill Materials

Catalog No., Date No.	Location	Material	Conventional Radiocarbon Age	2-Sigma ranges
A229-3423 Beta-170578	Cist 5/198N82W/ 150–160 cm	Burned maize fragment,	1780±40 B.P.	Cal A.D. 135–365
A229-2173 Beta-170575	Cist 6/220N84W/ 170–180 cm	Burned maize cob	1800±40 B.P.	Cal A.D. 120–340
A230-3507/3508 Beta-172541	Cist 8/ 223N70W/ 145–155 cm	From charcoal layer	1750±60 B.P.	Cal A.D. 130–420

Table D.4. Dates from Y-2 Structures

Catalog No., Date No.	Location	Material	Conventional Radiocarbon Age	2-Sigma ranges
A229-4186	Structure 4	Ashy fill from hearth	930±40 B.P.	Cal A.D. 1015–1205
Beta-170579				Cal A.D. 1023–1187
calibrated 6.0				Cal A.D. 1023–1187
A229-2182 (not Beta) PRI-10-164-2182	Structure 1/ 202N74W 30–floor	*Salix* twig from adobe rubble overlying floor	950+/15 B.P.	Cal A.D. 1020–1060 Cal A.D. 1070–1160

Y-2 Structure 4 could have been a stand-alone habitation room or it might have been a curved complex of rooms connecting it to Y-2 Structure 1. The complex probably would not have opened to the south. It had an unusually thick mass of adobe rubble overlying its floor, which prevented looters from reaching much of that level. There was virtually no sand between the floor and the overlying rubble, making it difficult to expose the floor. The hearth was unusual, situated in the center of the room and bowl-shaped, but lacking a rim. Another unique aspect of this structure was the presence of a few utility ware sherds scattered on the floor and in the fill of the hearth.

Just to its west was a small structure (Y-2 Structure 2), represented by a floor and a wall remnant. Its size suggests a storeroom. The area between it and Y-2 Structure 4 was so damaged by pot holes that we could not tell if they were connected, but the floors were at the same level. On Y-2 Structure 2's floor was a scoop made from a large rim sherd of a St. George Black-on-gray bowl.

Y-3, 26CK6446

In comparison to the disturbances at Y-2, Y-3 had two sets of relatively well-preserved structures (Figure D.7). In the southern part of the site (Y-3 South) were Y-3 Structure 2, an alignment of storerooms, and Y-3 Structure 3, an unfinished pit structure. They may date to Pueblo I times. Immediately north of Structure 2 is Y-3 Structure 1, a fully formed habitation unit, It is comprised of a curve of storerooms with a habitation room on each end, framing a courtyard (Y-3 Courtyard) that is open on the south.

Y-3 South Structure 2 is on the south side of Structure 1's courtyard. It and Y-3 Structure 3 (Figure D.8) may never have been used, and are undated.

There was no indication of the pit structure (Y-3 Structure 3) on the surface of the site, but it showed up as an anomaly during the probe survey. A trench running W-NW from its western edge was revealed in cross-section during excavation (Figure D.9). Overlain by about 20 cm of aeolian sand, the occupation layer was 15 to 25 cm thick. Another 15 to 20 cm of sand lay below them, resting on caliche-cemented gravels. The walls of the pit structure were formed by the poorly cemented gravels, and the floor was another 50 cm below that. Structure 3's floor lay 60 to 75 cm below its surface of origin as indicated by the collar of gravels. Excavation showed that the walls had begun to collapse very soon after it was dug out, a factor that might have led to its abandonment. Like the cists, it gradually filled with wind-blown sand. The structure contained a burned maize cob from 50 to 60 cm above its floor (Table D.5). Its date is similar to the PII structures at Y-2 and Y-3 rather than the Late Basketmaker II dates on the maize from cists. Scattered sherds were found as much as 20 cm deeper than the cob.

At the level of the top of the gravels, the structure was 4 meters wide. The floor had two areas of thin, fragile plaster, and two subpits excavated into it. One subpit that was centered in the floor may have been intended to be a hearth, but it was left unfinished. The other was only roughed out.

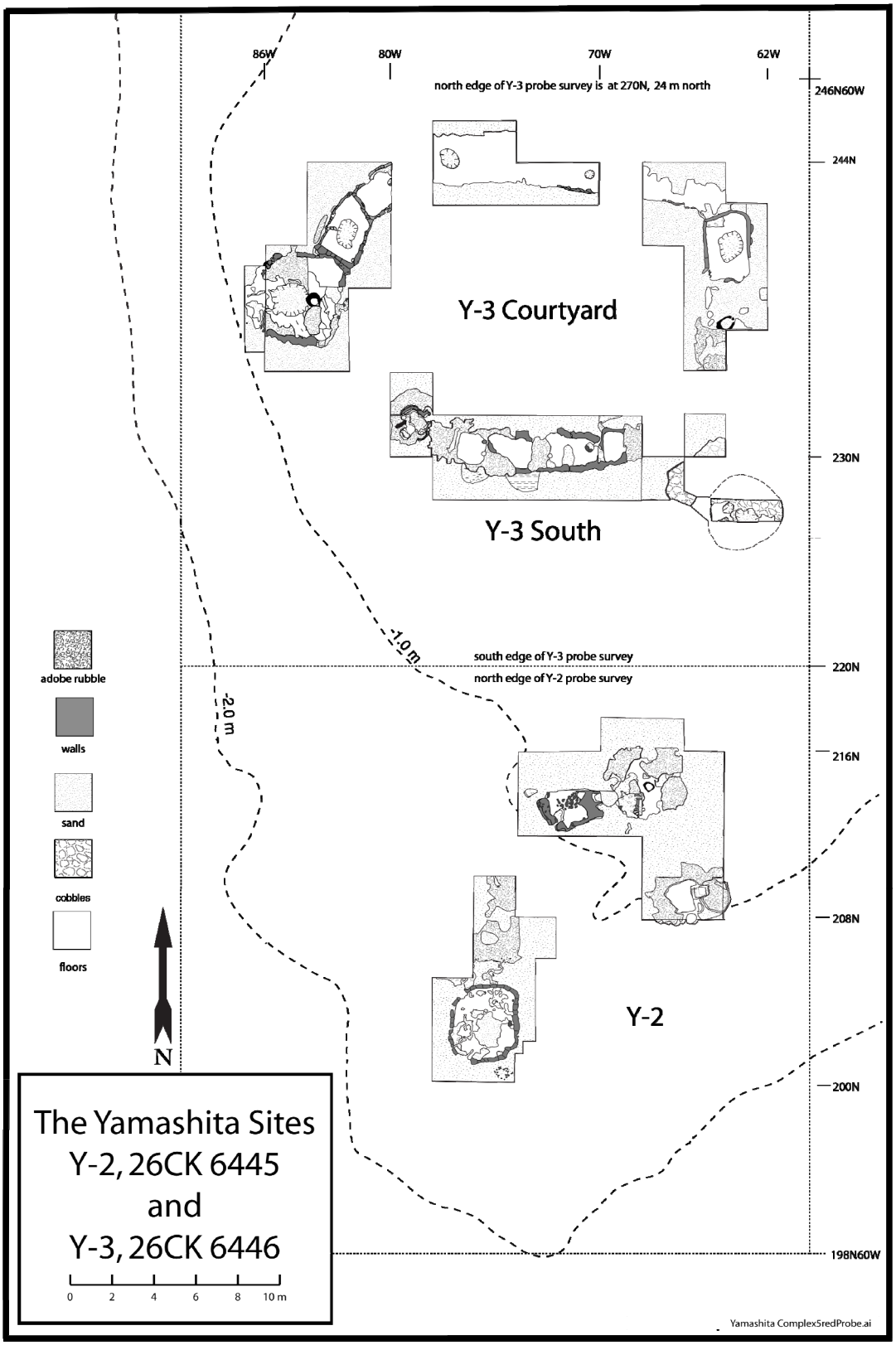

Figure D.4. The central Yamashita sites, Y-2, 26CK6445, and Y-3, 26CK6446.

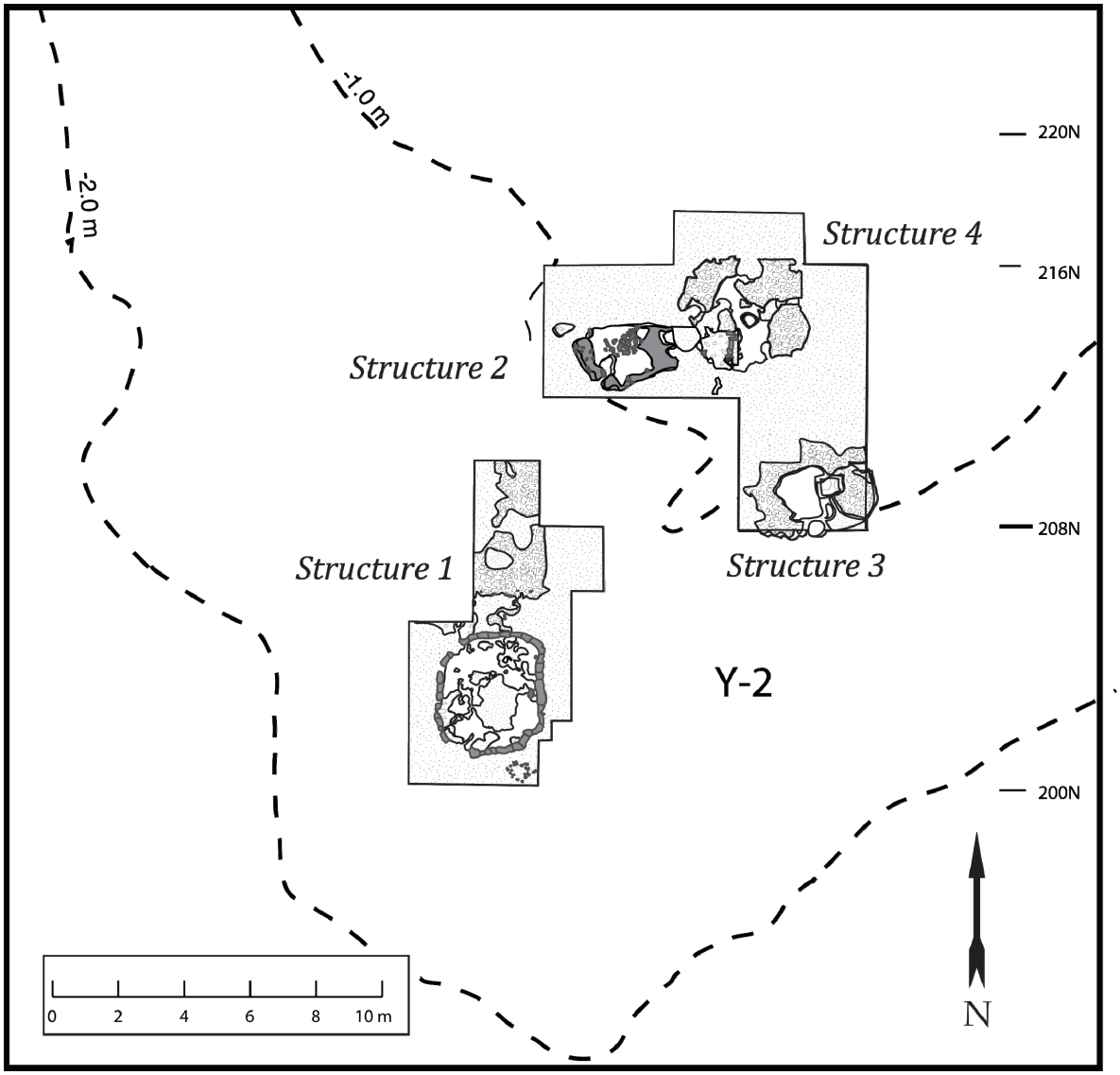

Figure D.5. Structures at Y-2, 26CK6445.

Table D.5. Date, Burned Maize from the Pit Structure, Y-3 Structure 3

Catalog No., Date No.	Location	Material	Conventional Radiocarbon Age	2-Sigma ranges
A230-3690 Beta-172542	Pit structure Y-3 Str 3	Burned maize cob fragment from fill, 100–110cm	990±40 B.P.	Cal A.D. 990–1160

Figure D.6. Excavated habitation room Y-2 Structure 1 with patches of plastered floor visible.

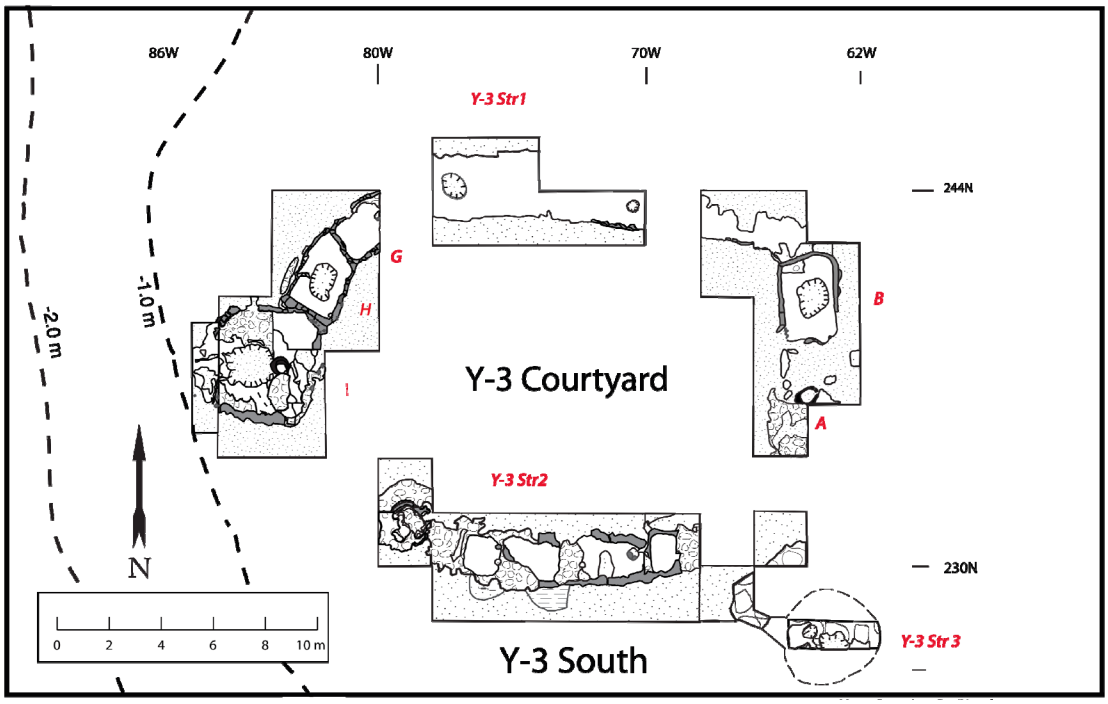

Figure D.7. Structures at Y-3, 26CK6446.

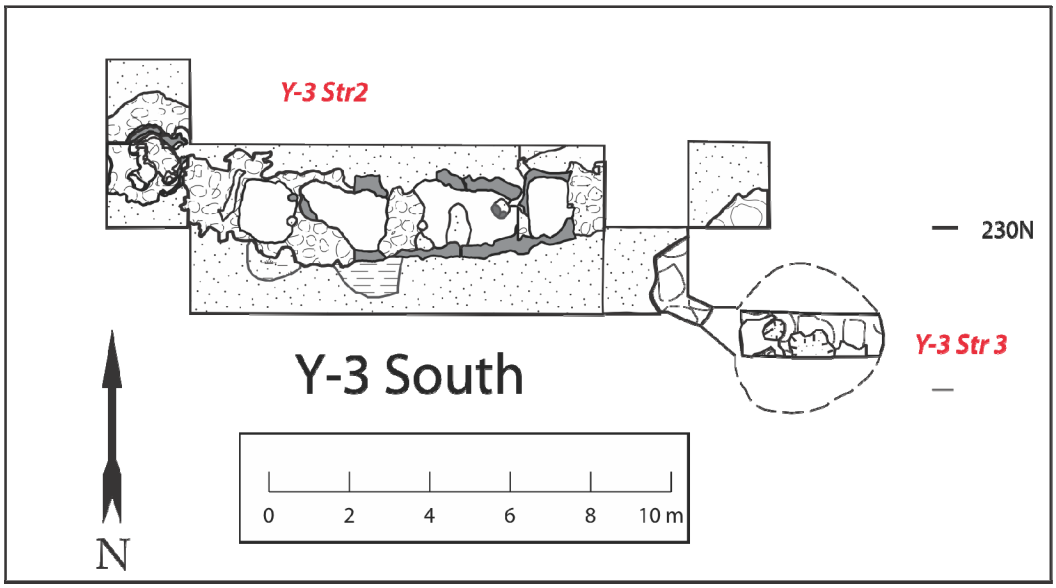

Figure D.8. Detail of the structures at Y-3 South.

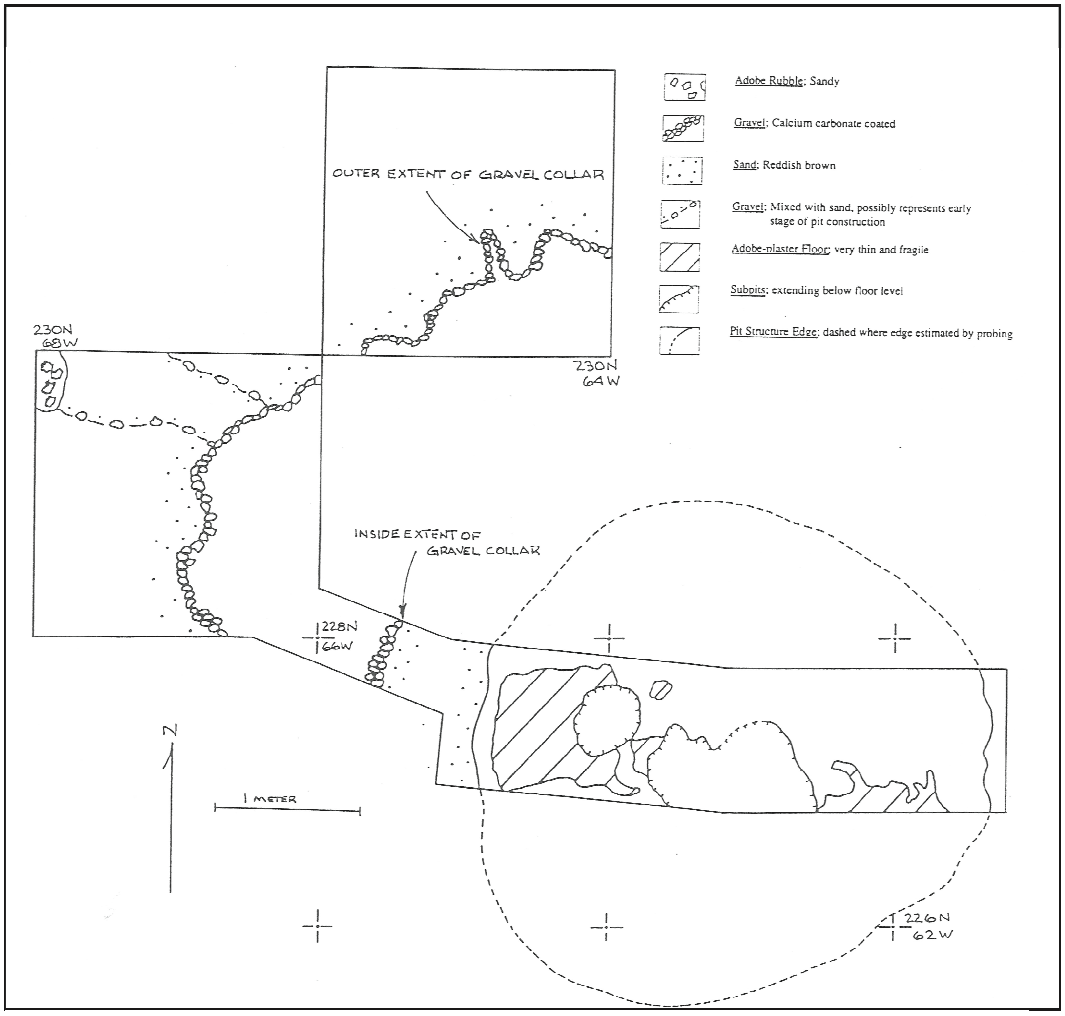

Figure D.9. Plan of pit structure excavation, Y-3 Structure 3.

To the pit structure's west was a line of storage structures, Y-3 Structure 2. As their tops were exposed, each had a sand-filled aperture, that, when brushed out, showed the central part of the room's floor. They were apparently designed to be reach-in bins that were accessed from the top. No lids were found for them; either they were perishable, or, if they were to be of stone, hadn't been procured before the structure was abandoned. Late sites like Mesa House and Adam 2 sometimes had small outdoor bins attached to the exterior side of their walls, and at Adam 2 a hatch cover laid next to the bin (Lyneis et al. 1989:Figure 9).

When Structure 2 was left to weather, it collapsed. Because the floor had not been prepared and no layer of sand had come into the bins, the roof and floor fused together over time. We could not follow their floors back any distance from the aperture edges, resulting in very poor definition of the bins' interior.

The combination of a pit structure and small bins is reminiscent of Pueblo I site layouts, although neither Structure 2 or Structure 3 have been dated. The sherds and flakes overlying the features are similar to the deposit in the Pueblo II period Y-3 Structure 1 Courtyard Unit to the north.

Y-3 Structure 1, the Courtyard Unit. This is a classic PII habitation unit with a habitation room on each end, linked by a curve of storerooms (Figure D.10). In addition, this unit had a second large room attached to the south end of the east habitation unit, Room A.

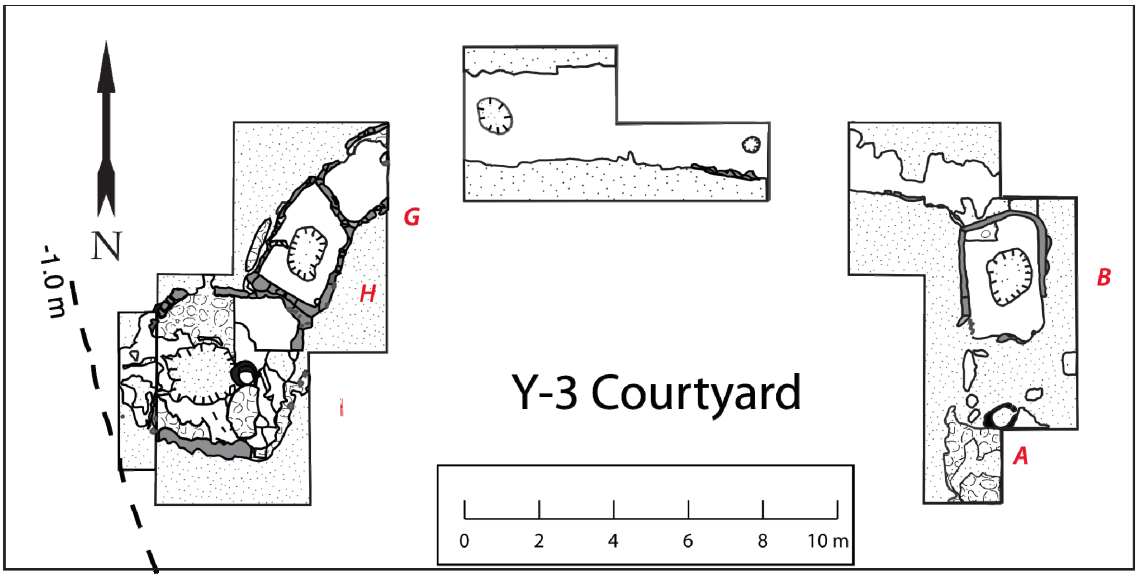

Figure D.10. Structures in the north part of Y-3 courtyard, 26CK6446.

Room A had little adobe rubble above its floor, as though it was not a fully walled room. The floor was in poor condition, but it had a clay-rimmed fire hearth that yielded a radiocarbon date (Beta-253361). Room B to its north had been burned, and a burial removed from its center. Charcoal from the floor of Room B was radiocarbon dated (Beta-162561). The adjoining storerooms to its west were severely eroded and no walls remained. At its west end we excavated two storerooms, G and H (Figure D.11), and the habitation room, I. The central room, Room H, had a concentration of rock and charcoal at the base of its east wall that yielded date Beta-71293 (Table D.6). After this photo was taken, the pit from a looted burial was found in the central part of Room H. The west habitation unit, Room I, was burned after a burial had been placed below its floor.

Figure D.11. Storerooms in Y-3 Str 1, looking south. From lower left to upper right, Rooms G, H, and the north end of I, the habitation room.

Table D.6. Dates from Y-3, Structure 1.

Catalog No., Date No.	Location	Material	Conventional Radiocarbon Age	2-Sigma ranges
A230-1982/-1983 Beta-162562 Calibrated 6.0	Room I	Charcoal from floor of burned room	1000±60* B.P.	Cal A.D. 910–920 Cal A.D. 960–1180 Cal A.D. 895–925 Cal A.D. 937–1172
A230-2050 Beta-253382	Room I	Ashy fill from clay-lined hearth	880±40 B.P.	Cal A.D. 1040–1240
A230-0628 Beta-71293 Calibrated 6.0	Room H; 240N80W 40–44	Charcoal from an informal fireplace with fire-cracked rock on floor of Y-3 store room Structure 1 Room H	1040±70 B.P.	Cal A.D. 783–787 Cal A.D. 816–843 Cal A.D. 589–1163 Cal A.D. 783–787 Cal A.D. 816–843 Cal A.D. 859–1163
A230-1150/-0002 Beta-162561 Calibrated 6.0	Room B	Charcoal from floor, burned room	990±60* B.P.	Cal A.D. 960–1180 Cal A.D. 898–920 Cal A.D. 946–1185 Cal A.D. 1202–1205
A230-1109 / Beta-253381	Room A	Ashy fill from clay-lined hearth	930±40 B.P.	Cal A.D. 1020–1210

Y-5N (26CK2041)

Smaller-scale excavations took place at the two sites at the north edge of the property, Y-5N (26CK2041) and Y-5S (26CK2042). At Y-5N, a test unit came down through about 50 cm of loose sand in the center of a habitation room (Figure D.12). The adobe rubble overlying the floor had been partly removed. The room had not burned, and no burial was found. The clay-rimmed fire hearth remained undisturbed under adobe rubble. Its ashy fill yielded a radiocarbon date (Beta-162564: Table D.7), making it roughly contemporary with the structures at Y-2 and Y-3.

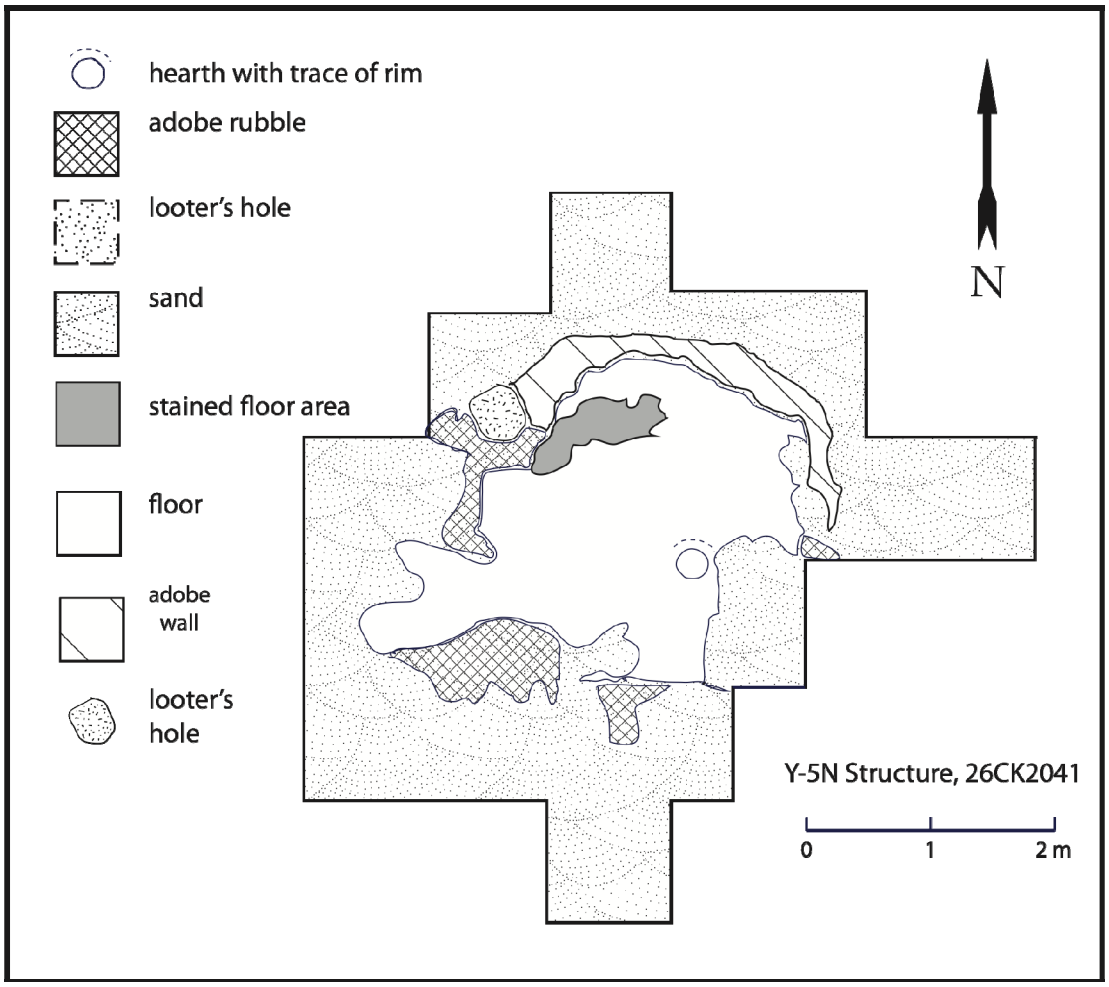

Figure D.12. Plan of Structure Y-5N.

Table D.7. Date from Y-5N Structure Hearth

Catalog No., Date No.	Location	Material	Conventional Radiocarbon Age	2-Sigma ranges
A232N-0607/-0002 Beta-162564	Hearth, Structure 1	Ashy fill of clay-lined hearth	960±40 B.P.	Cal A.D. 1000–1180

Y-5S (26CK2042)

Y-5S was more east than south of Y-5N. In our surface collections, it was the only area that showed a high frequency of corrugated pottery. The excavation did not encounter any structures, but there was a rich deposit of trash, suggesting there had been a structure to the east. The excavations finished before this possibility could be explored.

The deposits were 40 to 50 cm deep from the surface to the underlying caliche-cemented gravels. This contrasts with Y-2 and Y-3, where most of the pottery was in an intermediate layer with sand below. One unit at Y-5S yielded 201 sherds. A high frequency of corrugated pottery was found.

At the base of the deposit in unit 288N104W, there was an area of dark, stained sand that included a few burned rocks. Next to it was a face-down, flat milling stone and several large corrugated sherds. The dark sand yielded a radiocarbon date (Beta-172548), placing the deposit significantly later than Y-2 and Y-3 (Table D.8). The late date for the deposit was confirmed by a luminescence date on a corrugated sherd from a nearby unit at a comparable level (Table D.9).

Table D.8. Radiocarbon Date from the Basal Deposits at Y-5S

Catalog No., Date No.	Location	Material	Conventional Radiocarbon Age	2-Sigma ranges
A232S-1027 Beta-172548	228N104W 56 cm	Charcoal flecks and chunks with corrugated pottery from feature on caliche	600±40 B.P.	Cal A.D. 1290–1420 *(Correct, single interval only)*

Table D.9. Luminescence Date, Corrugated Sherd from the Basal Deposits at Y-5N.

Sample and artifact no.	Item Dated	Date
UW1074, A232-0781	Sherd, Local Pueblo Brown-	A.D. 1274±58

ROOM SIZES

At Main Ridge, room sizes varied greatly. To distinguish habitation rooms from storerooms, I used floor size and the presence of formal fireplaces. There was an association between the larger habitation rooms and formal fireplaces. The size cut-off between the habitation rooms and store rooms was about 4.5 m^2 (Lyneis 1992:13–22).

Four Pueblo II rooms at the Yamashita sites were complete enough to yield measurements. By Main Ridge standards, Y-3 Room H is at the high end for storeroom size at about 5.0 m^2. Y-3 Room B, at 6.3 m^2, is at the low end for habitation rooms. Y-3 Room I, 18 m^2, is about 2.5 m^2 larger than the largest habitation rooms at Main Ridge. Y-2 Structure 2 is a medium-sized habitation room enclosing about 12.9 m^2 of floor space.

With two minor exceptions at Y-2, none of the structures had floor assemblages. Otherwise, all the rooms appear to have been cleaned out, as though the residents had taken their belongings to their next homes. The habitation room, Structure 4, had a small scatter of utility wares sherds from several vessels, and the storage room had a scoop made from a large rim sherd of a black-on-gray bowl.

MATERIALS

Adobe was the principle building material for the structures. It was used to form structure floors and walls. Except for the cottonwood post in the Y-1 pit structure, we found no postholes that would suggest that upright posts helped support the roofs. From the charcoal on the floor of the burned Pueblo II rooms, they were spanned by poles or beams and covered with adobe. The only use of rock was as subflooring in some of the rooms. At sites built directly on cobble terraces such as Mesa House and the Steve Perkins site, cobbles were sometimes set to form the base level of a wall.

Adobe walls seem to have been the most common type used in the area. Layers of adobe can be seen at House 46 room 4 of Pueblo Grande de Nevada (Shutler 1961:Plate31B). Less common are walls with single layers of rock interspersed between adobe layers such as a room 7 at House 47 (Shutler 1961:Plate 33b).

The dependence on adobe should be considered in the context of local geology in which slab-forming rocks are rare to absent. Their Pueblo neighbors to the east used slabs as a fundamental material whenever they were available.

INTERIOR HEARTHS

The hearths in habitation rooms were the only constructed interior features. The four habitation rooms where the central areas were not destroyed had built-in hearths in their center: Y-2 Structure 4, Y-3 Courtyard, Structure Room A and Room I. Y-5N had a similar hearth, although it does not look to be centered (see Figure D.12).

All were bowl-shaped, clay-lined depressions dug through the floor to depths of about 15 cm. Three had raised rims that overlapped the floor, making a total depth of 20 cm or more. The fourth, Y-2 Structure 4, lacked a rim.

The fill in all of them was similar. Under the microscope, it was essentially sand, the same size and rounding as the sand outdoors, but with a grayish cast. It contained enough tiny chunks of charcoal to provide dates. It is not at all clear how they functioned. They were full almost to the brim with sand and their linings were not reddened. Their sandy fill might have served to seat a pot, but it does not seem like that they held cooking fires sufficient to boil a meal.

OUTDOOR FEATURES

In addition to excavations to expose the structures just described, we excavated large parts of the outdoor areas, seeking evidence of outdoor activities. At Y-3, we excavated about 60 percent of the courtyard area. At Y-2 we excavated between the structures and to their southeast and west.

The only evidence of outdoor activity was trash dumping. As indicated by sherds, trash was deposited as sheet middens at Y-2 and Y-3, perhaps to help stabilize the sand. The Y-2 deposit included an unusual concentration of trash downslope and southeast of the structures. Several 10-cm levels in 2- x-2 m units in this area yielded field counts of 300 to 400 sherds. Sherd densities were lower at Y-3. Only a few levels had more than 100 sherds, and the level with the highest field count was 293. Excavation of units between Y-2 and Y-3 yielded relative few sherds, consistent with the interpretation that each of these sites had its own trash deposits.

THE SOUTHERN PAIUTE OCCUPATION

The presence of Southern Paiutes is marked by about 450 sherds scattered across the property, without any concentration. In addition, Desert Side-Notched and Cottonwood Triangular points were also observed in association (T. Menocal, personal communication May 27, 2011).

Microscopic examination of the sherds at 15 showed that they all had a similar suite of inclusions. The large grains were angular chunks of quartz or feldspar, frequently comprised of intergrown crystals of the two. They seemed to be accompanied by a limited suite of accessory minerals: coppery mica, hornblende, and, rarely, garnet. A judgmental sample of 12 sherds was selected for thin section, including 1 that displayed garnet in the 15 x examination. Garnet proved to be much more common than expected. Including the one selected for garnet inclusions, 6 of the 12 sherds proved to have garnets. In the region that includes the Yamashita sites, the combination of rock fragments and minerals in these sherds can be matched with partly disaggregated granitic or crystalline metamorphic rocks, materials found no closer than the Virgin Mountains to the east, more than 15 km distant (Lyneis 1998).

Volborth has described the gneisses and schists of the South Virgin Mountains; they are not different from that in the Virgin Mountains proper. He says,

> Several types of gneisses and schists occur in the area. The gneisses are dominant, with schists represented by a few variable narrow bands within the gneiss bodies. The major varieties of gneiss are garnet gneiss, garnet-cordierite-sillimanite gneiss, biotite-garnet gneiss, biotite gneiss, hornblende gneiss, migmatic gneiss, and charnockite gneiss…
>
> Brownish, bluish-gray, and black- to light-colored, banded garnet gneiss, garnet-cordierite gneiss, and biotite-garnet gneiss are the most abundant types [Volborth 1962: 821].

The mineralogy of the gneisses provides explicit matches to the inclusions in the Yamashita Southern Paiute pottery. The pottery was most likely made in the vicinity of the material sources and transported it to the Moapa Valley, strongly suggesting a bi-local residence pattern as recorded for mobile southwestern people such as the Papago (Castetter et al. 1938:48). The Virgin and South Virgin Mountains contain abundant stands of *Agave utahensis* at elevations of 4,000 to 6,000 feet in the lower portion of the piñon-juniper zone. (Castetter et al. 1938:13). Agave prefers limestone slopes and ridges (Holland et al. 1979:35), like Lime Ridge, Tramp Ridge, and Bitter Ridge, which link the Virgin and South Virgin Mountains. Mesquite, available from late spring to summer, may have brought them to the valley (Fowler 1986:67; Kelly and Fowler 1986:370).

One context suggests use of collapsed Pueblo structures by the Southern Paiute, a feature overlying Y-2, Structure 4, where a mix of charcoal, fire-cracked rock and Southern Paiute sherds was found. Radiocarbon and luminescence dates, along with the Southern Paiute pottery, suggest that this makeshift hearth was used in the A.D. 1300s (Tables D.10 and D.11).

A mix of charcoal and fire-cracked rock was found along the south edge of Y-2 Structure 1, as though a fire was built there to shelter from the north wind. Based on its radiocarbon date (Table D.10, Beta-71292), it is several hundred years younger than the feature overlying Y-2 Structure 4.

Table D.10. Radiocarbon Dates with Possible Southern Paiute Associations

Catalog No., Date No.	Location	Material	Conventional Radiocarbon Age	2-Sigma ranges
A229-3766/-3777 Beta-172539	Overlying Y-2 Structure 4	Charcoal chunks from scatter of fire-cracked rock, charcoal, and Southern Paiute brown ware sherds	420±100* B.P.	Cal A.D. 1310–1360 Cal A.D. 1390–1660
A229-0830 Beta-71292	200N74W -45 -60; next to south wall of Y-2 Structure 1	Charcoal from extra-mural hearth	220±70 B.P.	Cal A.D. 1510–1600 Cal A.D. 1620–1950

Table D.11. Luminescence Date, Southern Paiute Sherd Associated with Radiocarbon Date Beta-172539.

Sample and artifact no.	Item Dated	Date
UW1076 / A229-3722	Southern Paiute sherd from scatter of fire-cracked rock and charcoal overlying Y-2 Str 4.	A.D. 1312±77

SUMMARY

The earliest occupation of the Yamashita sites was during the late Basketmaker II period, as evidenced by a partial pit structure at Y-1 and blown-in burned maize cobs in cists to its north/northwest. The dates from the pit structure, the cobs, and a layer of fire-cracked charcoal and rock are so close that they are clearly from a single occupation. The layer of fire-cracked rock and charcoal n Cist 8, probably from cleaning out a fire hearth, had about 10 cm of sand under it.

The line of storage bins and the associated unfinished pit structure in the southern part of Y-3 are undated, but resemble Pueblo I sites elsewhere. Pueblo I utility ware is not likely to be distinguished in the assemblage from Y-3, so unless there are distinctive Pueblo I black-on-gray sherds present, evidence of the presence of the people who built them will remain invisible.

Three sets of remains of classic Pueblo II structures, Y-2, the courtyard at Y-3, and Y-5N, are dated by a number of radiocarbon dates. Judging by their dates, they may be contemporary. The large sherd samples from Y-2 and Y-3 show instead that Y-2 is earlier than Y-3. Their contrasts reveal Pueblo II changes in the dynamics of ceramic acquisition from the western Colorado Plateaus and the Kayenta and San Juan peoples farther east. (see Appendix I in this volume).

A high frequency of corrugated pottery in the deposits at Y-5S indicates a Late Pueblo II-Pueblo III placement for the site, confirmed by one radiocarbon and one luminescence date (Tables D.8 and D.9).

The Southern Paiute occupation began very shortly after this latest Pueblo occupation, as evidenced by the feature overlying Y-2 Structure 4. One radiocarbon and one luminescence date (Tables D.10 and D.11) from that feature place it in the A.D. 1300s. These dates overlap the range of the radiocarbon and luminescence dates from Y-5N (Tables D.8 and D.9).

REFERENCES CITED

Allison, James R.

2010a The BYU Archaeological Field Schools on the Shivwits Plateau. Paper presented at the Kaibab-Vermillion Cliffs Heritage Alliance symposium "Discovering the Archaeology of the Arizona Strip Region," Page, Arizona.

2010b The End of Farming in the "Northern Periphery" of the Southwest. In *Leaving Mesa Verde: Peril and Change in the Thirteenth Century Southwest*, edited by Timothy M. Kohler, Mark Varien, and Aron M. Wright, pp.128–155. University of Arizona Press, Tucson.

Castetter, Edward, Willis H. Bell, and Alvin R. Grove

1938 *The Early Utilization and the Distribution of Agave In the American Southwest. Ethnobiological Studies in the American Southwest*. Vol. VI. The University of New Mexico Bulletin, Biological Series 5(4). Albuquerque, New Mexico.

Fowler, Catherine S.

1986 Subsistence. In *Great Basin*. edited by Warren L. D'Azevado, pp. 64-97. Handbook of North American Indians, Vol. 11, William C. Sturtevant, general editor. Smithsonian Institution, Washington. D.C.

Holland, James S., Wesley E. Niles, and Patrick J. Leary

1979 *Vascular Plants of the Lake Mead National Recreation Area*. LAME Technical Report No. 3. National Park Service, University of Nevada, Las Vegas.

Kelly, Isabel T., and Catherine S. Fowler

1986 Southern Paiute. In *Great Basin*, edited by Warren d'Azevedo, pp. 368-397. Handbook of North American Indians, Vol. 11, Williams C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.

Lyneis, Margaret M.

1992 *The Main Ridge Community at Lost City: Virgin Anasazi Architecture, Ceramics, and Burials.* Anthropological Papers No. 117. University of Utah Press, Salt Lake City.

1998 A Transported Brown Ware Assemblage from Southern Nevada. Presented at the twenty-sixth Great Basin Anthropological Conference, October 9, Bend, Oregon.

2000 Life at the Edge: Pueblo Settlements in Southern Nevada. In *The Archaeology of Regional Interaction*, edited by Michelle Hegmon, pp. 257–274. University Press of Colorado, Boulder.

Lyneis, Margaret M., Mary K. Rusco, and Keith Myhrer

1989 *Investigations at Adam 2 (26Ck-2059), A Mesa House Phase Site in the Moapa Valley, Nevada*. Anthropological Papers No. 22. Nevada State Museum, Carson City.

Sharpe, Saxon

2011 Yamashita Mollusk Report, submitted April 28, 2011. A report prepared for Margaret Lyneis, Flagstaff, Arizona May 2011.

Shutler, R., Jr.

1961 *Lost City: Pueblo Grande de Nevada*. Anthropological Papers No.5. Nevada State Museum, Carson City.

Stuart, Glenn S. L.
2011 Pollen Analysis of the Yamashita Sites Part II. Manuscript in possession of Margaret Lyneis.

Volborth, A.
1962 Rapakivi-Type Granites in the Precambrian Complex of Gold Butte, Clark County. *Geological Society of America Bulletin* 73:813–831.

Winslow, Diane L.
2009 *Mitigation Black Dog Mesa Archaeological Complex (26CK5658/BLM 53-7216),*. Prepared for Bureau of Land Management, Las Vegas District Office and NV Energy by the Cultural Resources Program, Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

APPENDIX E
LOST CITY HOUSE DESCRIPTIONS

Suzanne Eskenazi

LOST CITY HOUSE DESCRIPTIONS

Suzanne Eskenazi

The following is a summary of one section of the *Lost City Finder's Guide* produced by Dr. Karen Harry (professor of Anthropology at UNLV) and Steve Daron, archaeologist with the National Park Service at Lake Mead National Recreation Area. The guide was produced after a two year research effort focused on locating and organizing items related to the Lost City project, which was undertaken by a variety of individuals and agencies between 1924 and 1941. As a result of the project, Harry et al (2008) documented more than 3,600 accessioned items, 91 sets of human remains, 3,048 photographs, 100 reports and publications, 45 newspaper articles, and 267 pieces of correspondence (Harry et al. 2008:i).

Lost City is composed of group of large habitations, called "houses" by archaeologists. The Houses are numbered 1–42, 43–69, 72–118, 120, and 121. A portion of these houses, the Main Ridge community (houses 1–42, 44 and 45), have previously been discussed in detail elsewhere by Margaret Lyneis (1992) and will not be included in this overview. Although the *Finder's Guide* has descriptions, maps, and photos of many of the houses, there are still a lot of gaps remaining in the data. Over the years, the records that described many of these homes were shuffled among numerous museums and organizations, and then ultimately lost. It is also possible that nothing was recorded for these sites or the houses were not excavated despite being numbered. Descriptions were not located for the following houses: 43, 46, 48, 49, 51–66, 73, 76, 78, 82, 84, 86, 88, 90, 92, 94, 95, 97, 100, and 118. The descriptions of the remaining houses are arranged here in numerical order.

The Lost City House descriptions were taken from Fay Perkins and Willis Evans. *The Lost City Finder's Guide* (Harry et al. 2008) contains a spreadsheet that references all of the authors and their respective notes and whether or not the original or transcribed versions were available. Table E.1 uses some of that information to indicate the author of the excavation notes for each house.

Table E.1. Lost City House Excavators.

Author of Notes, Book	House Excavated
Evans Book A	47, 68, 72, 77, 79, 80, 81, 83, 85
Evans Book B	67 and 70
Evans Book C	69, 71, 74,
Evans Book D	72 and 72A
Harrington's 1924–5 Notebook	1–6, 16, 20, 21, 27, 40–45
Harrington's 1925–6 Notebook	21, 29, 46, 47, 50, 56-59, 64, 65
Perkins Book II	103–105 and 107–115
Perkins Book III	50
Perkins Book IV	117
Perkins Book V	102
Perkins Book X	77, 120, 121
Perkins Diary, 1936–1937	47, 50, 77, 101–104, 106, 108–120
Perkins Field Notes, Unknown date, Part I	101–107, 109–114
Perkins Field Notes, Unknown date, Part II	12, 50, 87, 89, 91, 93, 96, 98, 99, 101–115

Exact dates of excavation are unknown for many of the houses. Fay Perkins was the foreman of excavations between 1933 and 1939 (Harry et al. 2008:4). Willis Evans, a Pitt River Indian whose notes contain many of the excavation descriptions, worked as foreman in 1933 and 1934 and, like Fay Perkins, he was part of the project from its inception in 1924.

House 47 (NV DD:7:12)

Three rooms were described in Evans' notes regarding House 47 (Figures E.1 and E.2), which was excavated during the 1925–1926 field season (Harrington) and again during the 1936–1937 field season (Evans and Perkins). Room 90 contained a hearth, a burial (the number is not provided in the notes) and plain, painted, and corrugated ceramics. Room 91 contained a hearth, corrugated, and plain ceramics. Room 9 contained a hearth, Burial 80, and plain, painted, and corrugated ceramics. House 47 was rectangular in shape. Nonlocal ceramics found in House 47 included Medicine and Tusayan Black-on-red (both of which date to Pueblo II) and Citadel Polychrome (an early Pueblo III type; Shutler1961:23, 28). Southern Paiute Brown ware ceramics were also present.

House 50 (NV DD:7:16)

Perkins' notes list a total of 42 rooms and seven associated storage bins in this house. Two of the rooms were excavated by Harrington in 1926. The rooms were constructed using adobe-plastered earthen walls and varied in size. Many of the rooms had been vandalized by the time they were recorded. Mark Harrington excavated two of the rooms in 1926 (described as Room A and Room B). Ceramic artifacts included plain, painted, corrugated (Figure E.3), and Southern Paiute brown wares. Nonlocal ceramic types included Medicine and Tusayan Black-on-red and Citadel Polychrome (which date from Pueblo II to early Pueblo III times). Pothunters had removed burials from Rooms 6, 7A, and 19, and other identified burials were numbers 102, 103, 114, 115, 134, and 173. From the notes, this seems to be one of the more extensive houses identified at Lost City. Hearths (described as either fire bowls or fireplaces) were present in Rooms 4, 7, 7A, 9, (A, 10-14, 17, and 22-29. No map is available for this house.

House 67 (NV DD:11:98)

House 67, written up by Evans, includes seven rooms. Rooms 1 and 6 both contain hearths. Plain and painted ceramic sherds were collected from all seven rooms, and corrugated sherds were collected from Rooms 2, 3, and 4 (Figure E.4). The house was constructed with adobe and sandstone. No map of House 67 is available.

House 68 (NV DD:11:99)

Six rooms were identified in House 68, which was excavated by Evans. Rooms 3 and 4 contained corrugated sherds along with plain and painted wares. Non-local ceramics included Medicine and Tusayan Black-on-red (both Pueblo II types). Southern Paiute Brown ware was also present (Shutler 1961:24). Rooms 1 and 2 contained plain and painted wares, and Room 2 also contained a burial and a hearth. Only plain sherds were collected from Room 6, and Room 5 yielded no artifacts at all. No map or photos are available of this house.

House 69 (NV DD:11:100)

House 69 contained only one room. The ceramic artifacts associated with this room were exclusively plainwares. No photos or maps are available of this house, which was written up by Evans.

House 70

House 70, as described by Evans, contained only two rooms that produced both plain and painted ceramics. No corrugated sherds were noted. No photos or maps are available for this house.

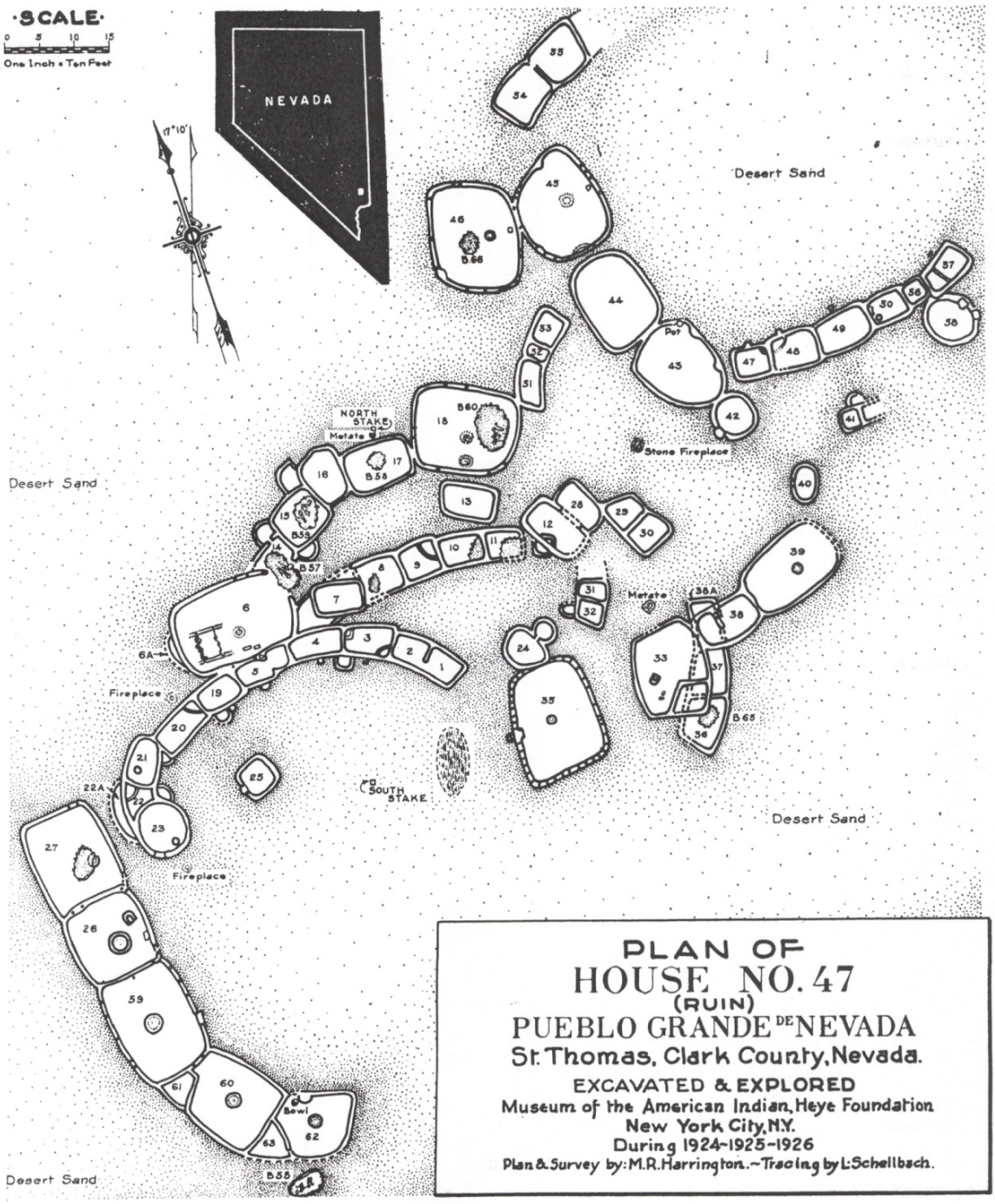

Figure E.1. Plan map of House 47 (from Shutler 1961, Plate 30).

Figure E.2. "No. 14. Metates in place, House 47, Lost City, Nevada. CCC boys uncovering some rooms the 95 room house, Lost City. In foreground are ancient grinding stones for milling corn, by MR Harrington" (Southwest Museum photo).

Figure E.3. Photo 10.14.029. LAME 9848; jar, Ash Deposit. Washington Corrugated jar. (Shutler 1961: Plate 51 c).

Figure E.4. Photo 10.01.098: Canteen and plain bowls, 1934 [House 67]. (Southwest Museum photo P23120).

House 71

House 71 contained six rooms with a ceramic assemblage that included plain (Figure E.5), painted, and Southern Paiute Brown wares, but no corrugated sherds. Nonlocal ceramics were represented by Medicine Black-on-red, which was intrusive to the area in Pueblo II times. A hearth was excavated from Room 3. Walls and floors of the house were made with adobe and sandstone. Nothing remained of Room 6 but a floor of adobe plastered over rock. No map is available for this house. The description of this house was provided in Evans' notes.

House 72, 72A (NV DD:11:101)

Houses 72 and 72A are described separately by Evans, but their numbers are consecutive. Evans' notes indicate that there were 31 rooms, although not all were described. All of the rooms were made with adobe and stone, and many missing walls. A few of the rooms had been damage by pot hunters. Rooms 2 and 6 had storage bins and Rooms 10, 15, 22, and 26 each had a hearth. Room 14 had an unidentifiable feature that contained either a storage bin or a hearth in it as well. Ceramic artifacts identified in the houses included plain and painted wares (Figure E.6), and nonlocal types were represented by Medicine, Middleton, and Tusayan Black-on-red (Pueblo II types). Southern Paiute Brown ware was also present. No corrugated ceramics were noted.

House 74 (NV DD:11:103)

House 74 contained seven rooms. Evans' notes describe a burial, which was associated with 13 projectile points, two ollas, and two lumps of yellow iron oxide, in Room 6. Hearths were identified in Rooms 5 and 6. Ceramic artifacts identified in each of the rooms included plain and painted wares, and nonlocal ceramics were represented by Medicine and Tusayan Black-on-red (Pueblo II types). No corrugated sherds were present. No maps or photographs are available for this house.

Figure E.5. Item # LAME 9960. “Scoop; Plain Ware/Gray Ware? Oval, Shallow, No Wear Evident But Rim Is Chipped.<Cr>Length=3 3/4 Inches. Cup" Reconstructable". Room 1 And Room 2, Between Walls” [House 71].

Figure E.6. Photo 10.1.083; typed on back is: "No 29. Small pot as found in House 72 with finders (Parker and Nelson).” (Southwest Museum photo).

House 75 (NV DD:11:104)

Thirteen rooms were described in House 75, which was constructed with adobe and sandstone slabs. Room 4 contained a burial. No corrugated pottery was identified in the house, but plain and painted wares were. Nonlocal pottery types included Medicine, Tusayan, and Middleton Black-on-red, all of which date to the Pueblo II period. Southern Paiute Brown ware was also collected (Figure E.7). No map is available of this house.

Figure E.7. Photo 10.1.091; description on back says "#32; Burial 83, Room 3, House 75. Showing large canteen and small broken pots. Lost City, Nevada, 1934. By MR Harrington." (Southwest Museum photo).

House 77 (NV DD:11:105)

There are nine rooms in House 77, which was excavated by Perkins in 1937 (Figures E.8 and E.9). Like the others, the house was constructed with adobe and sandstone slabs. Ceramic artifacts identified in the house included plain and painted wares. Nonlocal ceramics included Medicine and Tusayan Black-on-red, which date to the Pueblo II period. Southern Paiute Brown wares were also noted. No corrugated ceramics were recovered. Rooms 4, 5, and 9 appeared to have been burned, and corncobs were collected from Room 9. The map for this house has not been located, although it was mentioned as being present in the WAC archives in 1981.

House 79 (NV DD:11:18)

This house, excavated by Evans, contained six rooms, all of which were formed with adobe and plaster. One of the rooms contained a burial (Room 3, Burial 87), and one room (Room 5) contained a hearth (Figure E.10). Plain pottery was identified in Rooms 1-4 and Room 6. Painted pottery was identified in Rooms 2, 3, and 5. The only room to contain corrugated pottery was Room 4. No map is available of this house.

Figure E.8. WACC Negative #1097A: Panorama of site. December 1937.

Figure E.9. Photo No. 10.14.143. WACC Negative No. 1099. Adobe wall, December 1937. (House 77).

Figure E.10. Photo 10.01.81: Excavators at Room 5, House 79. (Southwest Museum photo).

House 80 (NV DD:7:58)

This room contained 11 rooms. It had similar construction to the houses previously described. Evans' notes indicated that Rooms 9 through 11 were all washed out before excavations commenced. Room 8 contained a small hearth at its east end. Evans also noted the presence of a fireplace in the center of the plaza between Rooms 9 and 11. Room 11 contained a storage bin in the northwest corner. All of the rooms contained plain, painted, and corrugated ceramics. Nonlocal ceramics included Medicine and Tusayan Black-on-red, which have been dated to the Pueblo II period. Ground stone artifacts were also present (Figure E.11).

House 81 (NV DD:7:50)

This house contained eight rooms, all of which were constructed with adobe and sandstone slabs. Evans' notes describe plain and corrugated ceramics, which were found in Rooms 1, 2, 4, 5, 6, and 7. Room 8 contained no ceramics at all, and the notes contain no information about Room 3. Non-local ceramics included Medicine and Tusayan Black-on red, both of which date to the Pueblo II period. One Southern Paiute Brown ware sherd was also identified. No maps or photos are available.

House 83 (NV DD:11:127)

Evans' notes describe two rooms in this house, both of which had adobe and rock walls and floors. Both rooms contained plain and corrugated ceramics (Figure E.12). No map is available of this house.

Houses 85 and 85A (NV DD:11:107)

House 85 contained a baby burial and no artifacts. No photos or map is available. House 85A had three rooms made of adobe. Ceramic artifacts were plain and painted wares. No photos or maps are available. Descriptions of these houses were provided in Willis Evans' notes.

Figure E.11. Cache of manos, House 80, with finder Boone Wilson, Lost City, Overton, Nevada, March 1934 (Photo 64 taken by M. R. Harrington, Southwest Museum).

House 87 (NV DD:11:26)

House 87 contained 14 rooms with adobe floors and walls made of a combination of rock and adobe. Room 7 contained a hearth. A number of the rooms had been vandalized and looted by pothunters. Ceramic artifacts included plain, painted, and corrugated wares. Nonlocal ceramics included Tusayan Black-on-red (which dates to Pueblo II times), and Southern Paiute Brown ware was also collected. No photos or maps of this house are available. The description of this house was in Perkins' undated field notes.

Figure E.12. Photo 10.01.116. "No. 54; Pottery with Burial 92, House 83, with finders, Sprague and Barnum. Lost City, Overton. March 1934. by MR Harrington." (Southwest Museum photo)

House 89 (NV DD:11:112)

Fifty-one rooms were identified in House 89, along with one storage bin. The walls were constructed with rock and adobe or using wattle and daub, and the floors were adobe. Ceramic artifacts included plain, painted, and corrugated wares (Figure E.13). Nonlocal ceramics included Medicine, Tusayan, and Middleton Black-on-red, along with Citadel Polychrome. These types indicate use during Pueblo II and early Pueblo III times. Southern Paiute Brown ware was also present, suggesting later use. No maps or photos of the house are available. The house was recorded by Fay Perkins.

House 91 (NV DD:7:2)

This house, recorded by Perkins, contained 12 rooms and two small storage bins. Room 9 contained a hearth. The floors and the walls were made of rock and adobe, and ceramic artifacts included plain, painted, and corrugated wares. Nonlocal pottery was present in the form of Citadel Polychrome (Shutler 1961:22). No maps or photos of this house are available.

House 93 (NV DD:7:114)

Five rooms were identified in House 93, which was recorded by Perkins. The walls and floors were made of rock and adobe. Ceramic artifacts include plain, painted, and corrugated wares. No maps or photos of this house are available.

Figure E.13. Photo 10.14.069. UNLV photo, LAME 10258. Corrugated pot found in House 89.

House 96 (NV DD:7:115)

House 96 contained three rooms. Large limestone cobbles were set into the red adobe to form the walls, and the floors were adobe plastered over the gravel. Pothunters had badly vandalized this house, and a burial identified in Room 3 was too dismantled to determine the orientation. Room 1 contained a hearth. Ceramic artifacts included a few plain and painted sherds. No corrugated sherds were present. No maps or photos of this house are available. This house was recorded by Perkins.

House 98 (NV DD:11:126)

Ten rooms were identified in House 98, which was recorded by Perkins. The rooms were constructed of rock and adobe, although some of the adobe had fallen away. The floors were plastered with adobe, and Room 10 contained a hearth. Burials 123 and 126 were identified in this house. Ceramic artifacts included plain and painted wares. No corrugated wares were present. No maps or photos of this house are available.

House 99 (NV DD:11:128)

House 99 had five rooms. The floors were all natural gravel plastered with adobe, and the floors were adobe as well. Ceramic artifacts included plain and painted wares. Non-local ceramics included Pyramid Gray. No photos or maps of this house are available. It was recorded by Perkins.

House 101 (NV DD:11:110)

House 101 was recorded by Fay Perkins. The house contained four adobe rooms and a few storage bins (Figures E.14 and E.15). Rooms 1 and 4 both contained hearths. Four burials (247, 250, 262, and 263) were also found in this house. Rooms 1 and 4 each contained a hearth. Ceramic artifacts included plain and painted wares. No corrugated sherds were identified. Shutler (1961:14) dated this house to the Basketmaker III period.

Figure E.14. WACC Neg. No 538. House 101 partially excavated, March 1937.

House 102 (DD:11:111)

This house (Figures E.16 and E.17), which was recorded by Fay Perkins, contained 39 rooms, 17 storage bins, and 125 burials (Nos. 143-268). Walls of the rooms were formed using adobe-plastered earth and gravel, and floors were typically adobe. Rooms were generally circular or oval and were dug into the ground. Rooms 1, 4, 7A, 23, 25, 27, 31, and 33 contained hearths. Ceramic artifacts included plain and painted wares. Pyramid Gray, a nonlocal type, was also identified in this house.

House 103 (NV DD:11:112)

This house, described in Perkins' notes, contained four rooms and nine storage bins. Hearths were identified in Rooms 1 and 3. The walls, when present, were made of gravel and earth plastered over with adobe, and the floors were also adobe. Ceramic artifacts consisted solely of plain wares. Also present was Burial No. 270, which was an infant. No photos of this house are available.

House 104 (NV DD:11:113)

Perkins described five rooms in this house, all of which were made of gravel and earth plastered with adobe. Also present were two storage bins, two hearths (in Rooms 1 and 3) and two burials (Burial Nos. 269 and 271). Ceramic artifacts included plain wares only. No painted or corrugated wares were noted. No photos of the house are available, although there are photos of the burials that are not included here.

House 105 (NV DD:11:114)

House 105 contained a single circular room, made of gravel, earth, and adobe. The house contained a hearth, and ceramic artifacts consisted of plain wares only. Shutler (1961:14) dated this house to the Basketmaker III period. No photos are available of House 105, which was recorded by Perkins.

House 106 (NV DD:11:115)

This house had five rooms, all of which were made of gravel and earth plastered with adobe. Room 3 contained a hearth, and plain and painted ceramics composed the ceramic assemblage. Shutler placed this site in the Basketmaker III period. No corrugated wares were identified. No photos of this house are available. This house was recorded in Fay Perkins' undated field notes.

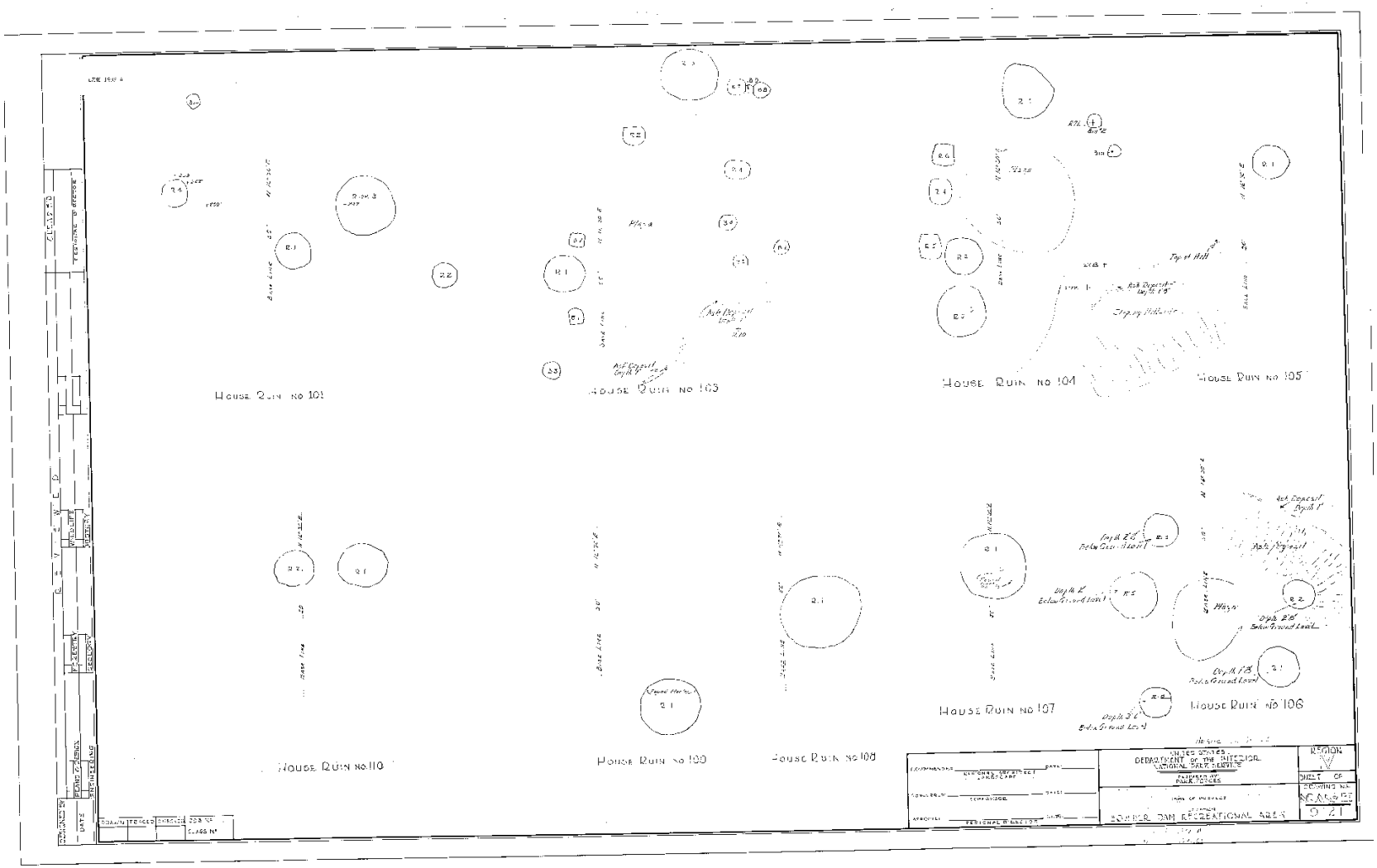

Figure E.15. Map on file at WACC labeled NRANe-BD-9121A, on file under 1932A-001-001. The map shows plan views of Houses 101 and 103–110.

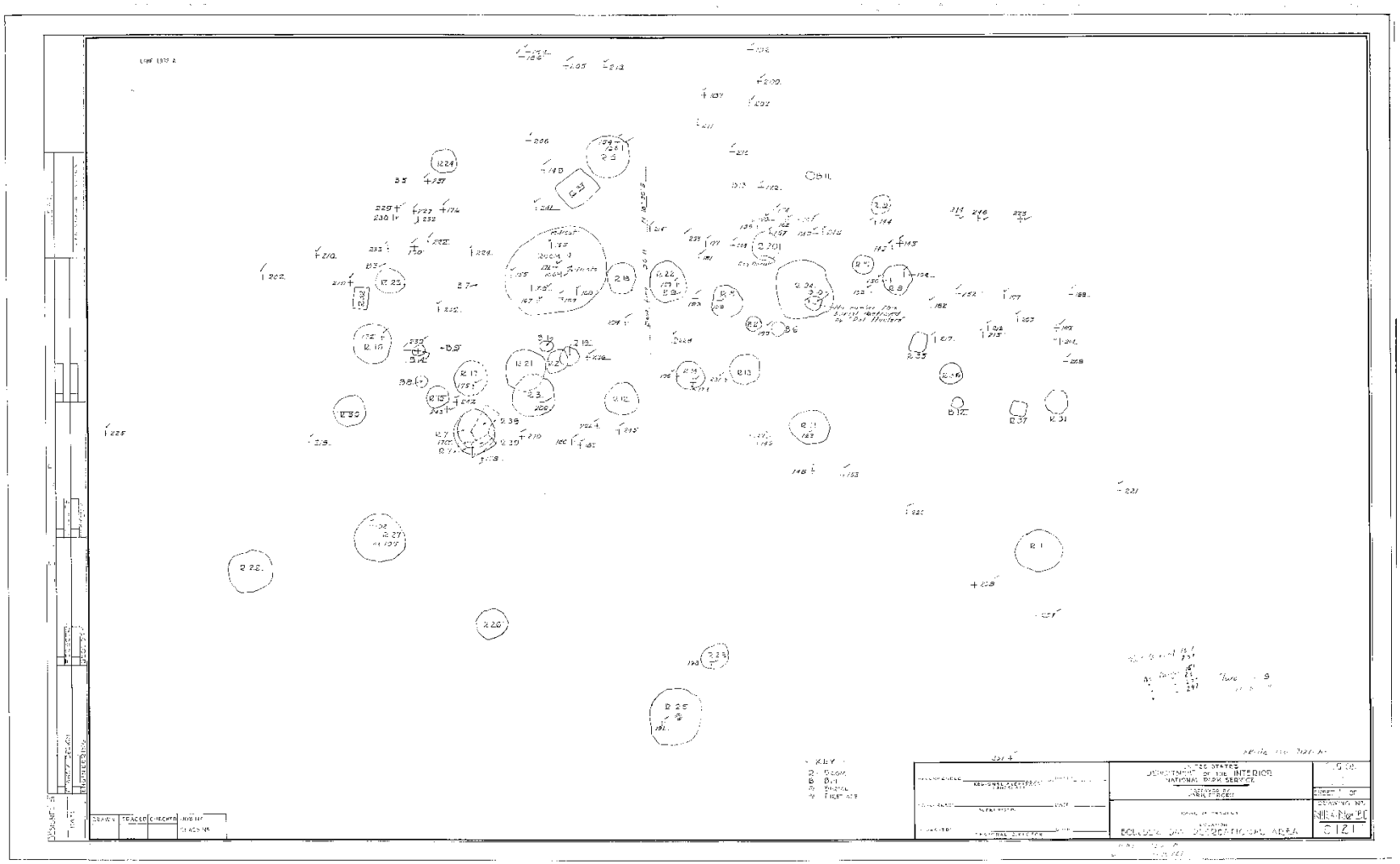

Figure E.16. Plan map of House 102. Map on file at WACC (NRANe-BD-91219A).

Figure E.17. (SWM Photo 10.01.017) The back of this photo is labeled: "Neg# 9364 Copy#22; Foundation of pit in House 102, the largest room thus far found in Lost City ruin. This was 27'x20'. It contained eight human skeletons. Fig#11 Mr. Harrington's report to N.P.S. September, 1936. Non-glass negative."

House 107 (NV DD:11:116)

One room is described in the notes for this house, and it is noted as a "Basketmaker III – pit type" house in Perkins' Book 2. The floor was made using adobe, and the walls were gravel and earth. The single room contained a hearth. No ceramic artifacts were identified with the ruin. Shutler (1961:13) noted that Harrington (1937b) identified this house as a pithouse on a mesa 20 feet above the riverbed at the junction of the Muddy and Virgin Rivers, along with Houses 108, 109, and 110, all of which were also described as pithouses. No photos of this house are available.

House 108 (NV DD:11:117)

This house is described in the notes as a "Basketmaker II or I" ruin in Perkins' Book 2. The house had single room constructed using adobe, gravel, and earth materials, which contained a hearth (Figure E.18). Shutler noted (1961:13) that this house was identified by Harrington as a pithouse. No ceramics were present in the house.

House 109 (NV DD:11:118)

This house contained a single round room (Figure E.19), similar in type and construction to the room in House 108. House 109 also contained a hearth. No ceramic artifacts were identified in the house. Shutler (1961:13) indicated that Harrington's notes identified this house as a pithouse. Perkins' notes (Book II) date it to the Basketmaker I or II period.

Figure E.18. Photo No. 10.13.201. WACC Negative No. 516C. Stone Fireplace in Room 1, House 108. September 1936.

Figure E.19. Photo No. 10.13.202. WACC Negative No. 503. Floor of Room 1 in House 109. September 1936.

House 110 (NV DD:11:29)

This house, written up by Perkins, contained two rooms. They were both oval-shaped, and the walls of Room 2 were no longer present above ground. Floors were made with adobe, and the walls of Room 1 were made with gravel, and natural earth. Both of these rooms were considered pithouses by Harrington, according to Shutler (1961:13). No ceramic artifacts were identified in this house. No photos are available for this house.

House 111 (NV DD:11:119)

House 111 contained ten rooms and 11 storage bins (Figure E.20). The rooms were constructed using adobe, gravel, and earth. Hearths were identified in Rooms 1, 2, 5, and 10. Ceramic artifacts consisted of plain and painted wares. No maps are available of this house. The description of this house was in Perkins' notes.

Figure E.20. WACC Negative No. 510. Photo No. 10.13.206. Room 2 [House 111] showing hatch cover as found, men not identified, Sept. 1936.

House 112 (NV DD:11:120)

Only one room is present in House 112, which was written up by Perkins. The floor was adobe, and the remaining walls were rock and adobe. The room contained a hearth (Figure E.21), and ceramic artifacts were plain and painted. Non-local ceramics included two Pyramid Gray sherds. No corrugated ceramics were present. No map is available for this house.

House 113 (NV DD:11:121)

There were seven rooms in this house, which was described in the notes as dating to the "Pueblo 2 Period" (Perkins Book II). The floors of the rooms were made with adobe, and the walls were made with adobe and stone. Also present was one storage bin. A hearth was present in Room 1, Ceramic artifacts identified in the house were all plain or painted wares. No corrugated ceramics were present. No map is available for this house.

House 114 (NV DD:11:59)

There are four rooms in House 114, one of which (Room 1) contained a hearth. The rooms are all made of gravel, rock, and adobe, and ceramic artifacts were all plain and painted wares. No corrugated ceramics were present. No photographs are available for this house. A hand-drawn map is provided in Shutler's volume (Shutler 1961:Plate 29), but it was copied from notes and does not contain a scale. Shutler (1961:15) noted that the house had contiguous rooms in a straight line and rooms that were "jammed together in a haphazard fashion." The house was dated to the Lost City Phase, or between Basketmaker III and Pueblo II times. This house was written up by Perkins.

Figure E.21. WACC Negative No. 449. Photo No. 10.13.213. Hearth in House 112. July 1936.

House 115 (NV DD:11:122)

This house was written up by Perkins. Four rooms were identified. The floors were made with adobe, and the walls, when still present, were made with rock and earth plastered with adobe. Burial No. 258 was identified in Room 1. The burial was an adult found under the floor. Also identified were one storage bin and a hearth (the latter in Room 3). Ceramics were all painted or plain wares. Non-local ceramics included Pyramid Gray wares, and no corrugated wares were present. No photographs or maps of the house are available.

House 117 (NV DD:11:123)

There are four rooms in this house, and all were dug into the ground, with adobe, gravel, and earthen floors and walls. The remains of charred beams and posts were identified in Rooms 3 and 4 (Figure E.22). A hearth was identified in Room 4. Ceramic artifacts consisted of solely plain gray wares, and Perkins noted that he felt the house dated to the Basketmaker III period. Shutler (1961:14) also placed the house in that period.

House 120

This house was excavated by Fay Perkins in 1937, and the description of the house was taken from Van Dellen's transcription. The notes do not give a count of how many rooms there were in this house. The description of Room 1 is the only room description, and it notes that the room was located in the south and east part of the house ruin (Perkins Book X, Las Van Dellen:5). House construction was adobe plastered sandstone. One hearth was also identified in the house. Perkins' notes indicated the presence of corrugated wares, along with plain, painted, and red wares. Shutler (1961:23) did not mention corrugated ceramics, but it did list intrusive ceramics (Medicine and Tusayan Black-on-red and Pyramid Gray) along with plain and local painted wares. No photos are available of this house.

House 121 (DD:11:17)

This house was excavated in 1938 by Fay Perkins; his notes were transcribed by Van Dellen. House 121 was situated on a sand dune that was littered with ceramic artifacts, fallen rock, and adobe. There were 11 rooms and one hearth described in Perkins' notes, and pothunters had destroyed most of the rooms on the north side of the ruin. The rooms were constructed with two rows of upright sandstone slabs filled with adobe in between. Floors were sand and gravel covered with adobe. Ceramic artifacts

included plain, painted, and corrugated wares. No nonlocal sherds were identified. Burial No. 289 was identified under the floor of Room 10. Perkins' notes (Perkins Book X, Last Van Dellen:43) also note the presence of a bin between Rooms 4 and 5. No photos or maps of this house are available.

Figure E.22. Photo 10.13.216, WACC Neg. No. 407. Faye Perkins pointing to charred wood in Room 4, House 117.

REFERENCES CITED

Harry, Karen G., Cheryl Gregory, and Leilani Espinda
2008 Lost City Archival Project Finder's Guide, Version 1.0. Document submitted to the Lake Mead National Recreation Area, National Park Service, by the Department of Anthropology & Ethnic Studies and the Public Lands Institute of the University of Nevada Las Vegas. Great Basin Cooperative Ecosystems Studies Unit, Cooperative Agreement No. H8R0801001 and Task Agreement No. J8R07050006. Document on file, Lake Mead National Recreation Area, Boulder City, Nev.

Lyneis, Margaret M.
1992 *The Main Ridge Community at Lost City: Virgin Anasazi Architecture, Ceramics, and Burials.* Anthropological Papers No. 117. University of Utah Press, Salt Lake City.

Shutler, Richard Jr.
1961 *Lost City: Pueblo Grande de Nevada.* Anthropological Papers No. 5. Nevada State Museum, Carson City.

APPENDIX F
ANALYTICAL SITE INFORMATION

ANALYTICAL SITE INFORMATION

Gnomon Inc.

EXPLANATION OF DELIVERED DATA

The final data for this project includes three access databases, one that stores all the GIS data and two that store associated site information. The GIS data, stored within Master_GDB.mdb, was created by merging shapefiles from several different sources and combining fields to provide standard formatting. To obtain the specific site information that the team of researchers was interested in visualizing or displaying, the GIS was used in concert (joined) with attribute information extracted from thousands of site records and stored in related access databases. A series of tables have been compiled to provide a detailed summary of GIS feature class description and use (Master_GDB.mdb), as well as the associated assemblage table joined to the GIS (NVCRIS_FE2K.mdb and NVCRIS_BE.mdb).

GIS Data (Master_GDB.mdb)

Table F.1 provides a summary of the feature classes stored within the Master_GDB.mdb including feature class type, a description of their use within the project, attributes used, pertinent attribute definitions, the source of the data, and their derivations of original GIS (i.e., what GIS source the feature class originates from).

Table F.2 provides a detailed summary of the attributes within the analytical dataset used for this project (All_Sites_Nbr_Centroid). It should be noted that most of the source GIS was provided as a polygon feature class but in order to integrate sources such as Gold Butte (provided only as UTM coordinates), it was necessary to calculate and display all site data as a point feature class (centroid). In addition, point data was preferred for display purposes due to the small scale of figures used in the project.

In addition, hundreds of duplicates were identified (both spatial duplicates and site number duplicates) when the source GIS was merged. Some of these duplicates already existed within the source GIS and some were created from the merging process of several sources. Initially, Gnomon undertook the tedious process of identifying and eliminating duplicates, but due to the sheer number and time investment involved, the task was abandoned because it was determined not to be a goal of the project. See the GIS attribute "Plot" in Table F.2 for information regarding the resolution of this problem for the project.

Site Data (NVCRIS_FE2K.mdb and NVCRIS_BE.mdb)

Table F.3 provides a summary of attribute descriptions within the Southern Nevada Context Assemblage Table (snc_Composite_Assemblage). Table F.3 also calls attention to the associated related tables from which the assemblage table attributes derive their values. This table, found within NVCRIS_FE2K.mdb, is implemented by joining to the GIS data on the field, SiteNbr.

The table includes dozens of site attribute fields displayed with a binary format: "Null" for the absence of an attribute or a number (generally "1") for the presence of that attribute. For example, 43 sites within the analytical dataset were encoded as having a pithouse (one site had three); the rest of the sites have a "Null" value for the pithouse attribute. In GIS, the binary format of the site attributes enabled efficient creation of figures with various combinations of attributes with the use of definition queries. For example, one figure used in the report called for sites in the project area that have Desert Side-Notched points or Brown Ware pottery with mortars or pestles and ground stone. The definition query used to select the specified attributes is:

- All_Sites_Nbr_Centroid.Plot = 'Y' AND (snc_CompositeAssemblage.Brown_Ware >0 OR snc_CompositeAssemblage.DesertSideNotched >0) AND snc_CompositeAssemblage.Groundstone >0.

SNC ASSEMBLAGE TABLE CREATION PROCESS

This section provided a bulleted instruction manual that details the creation of the final assemblage table (snc_CompositeAssemblage) within NVCRIS_FE2k.mdb, which is used to join to the GIS site data.

Storage Notes

- NVCRIS_FE2K.mdb holds all the interim tables and queries used to create the final snc_CompositeAssemblage table.
    - Originally this front end database was just used for entry into tblEncode, which holds all the site specific information excavated from IMACS site forms.
    - Most of the linked tables in the front end originate in the back end (NVCRIS_BE.mdb).

Base Tables/Condensed values

- Tables:
    - tblkPArchiTy — Architecture Types
    - tblkPArtTy — Artifact Types
    - tblkPCrmTy — Ceramic Types
    - tblkPFeatTy — Feature Types
    - tblkPToolTy — Tool Types
    - C14_20110628 — Ahlstrom's compiled radiocarbon table
- These tables contain the IMACS code and associated attribute value of the code, which are later linked back to tblEncode to populate what each site contains according to the IMACS forms
- The field called SNCType contains the agreed upon condensed attributes.
- These tables form the foundation in the series of queries leading up to the final composite assemblage table.
    - If values need to be changed, then they must take place here first so that corresponding queries will update values.
        - An example: if someone from the SNC team decides that isolates are important and need to be accounted for, then the SNCType value for Isolate Artifact needs to be changed from drop_artifact to "whatever."

Query Group 1: AllSites

- Queries:
    - qry_AllSiteArchitectureTypes
    - qry_AllSiteArtifactTypes
    - qry_AllSiteCeramicTypes
    - qry_AllSiteFeatureTypes
    - qry_AllSiteToolTypes
- These queries link to tblEncode and populate the SNCType for each site.
    - Note that there may be multiple entries for a site because more than one coded value was entered.

Query Group 2: Crosstabs

- Queries
    - qry_AllSiteArchitectureTypes_Crosstab
    - qry_AllSiteArtifactTypes_Crosstab
    - qry_AllSiteCeramicTypes_Crosstab
    - qry_AllSiteFeatureTypes_Crosstab
    - qry_AllSiteToolTypes_Crosstab
    - qry_C14_Crosstab
- These queries construct a crosstab for each functional category type so that single or multiple values for each site are calculated. This essentially creates a presence/absence for each value per site per functional category; however, note that sites with no entry in that particular functional category do not show up in the associated crosstab.

Query Group 3: Make table queries of the crosstabs.

- It was discovered that to process the crosstabs further with additional queries was very time consuming so the compromise was to make a table for each crosstab.
    - These are direct copies of the crosstabs but are now tables not queries
    - IMPORTANT!! These tables will have to be recreated if any values or functional categories are changed.
- Queries:
    - qry_snc_ArchitectureTypes
    - qry_snc_ArtifactTypes
    - qry_snc_CeramicTypes
    - qry_snc_FeatureTypes
    - qry_snc_ToolTypes
    - qry_snc_C14
- Resulting Tables:
    - snc_ArchitectureTypes
    - snc_ArtifactTypes
    - snc_CeramicTypes
    - snc_FeatureTypes
    - snc_ToolTypes
    - snc_C14

Query Group 4: Composite Assemblage

- qry_snc_CompositeAssemblage
- A query named qry_AllSiteAssemblage, is essentially tblEncode with only the Site. Numbers (SiteNbr) displayed so that it can be linked with SiteNbr in all the snc tables from above.
- This query grabs all the values from each functional category and puts them into a single table. In addition a blank column for each age (Protohistoric, Puebloan, Terminal Late Archaic, Late Archaic, Middle Archaic, Early Archaic, Paleoindian) is created so that it can be populated in the step below.

Query Group 5: Make Table of qry_snc_CompositeAssemblage

- This table needs to be created so that all of the functional category values plus the blank age fields are placed into a single table (quite large).
    - The make table query is called qry_snc_CompAssem_mktbl,
- The resulting table is called snc_CompositeAssemblage.

Query Group 6: Update Queries for Each Time Period

- Queries:
  - qry_update_snc_CompositeAssemblage_Protohistoric
  - qry_update_snc_CompositeAssemblage_Puebloan
  - qry_update_snc_CompositeAssemblage_TermLateArchaic
  - qry_update_snc_CompositeAssemblage_LateArchaic
  - qry_update_snc_CompositeAssemblage_MiddleArchaic
  - qry_update_snc_CompositeAssemblage_EarlyArchaic
  - qry_update_snc_CompositeAssemblage_Paleoindian
- Look at the SQL expression in design view for each of these time period update queries.
  - When the query is run it is updating one of the age columns in the snc_CompositeAssemblage table according to the presence of a value that is determined to be part of a particular time period.
- If values are added or subtracted from consideration of a particular time period, make the changes from these update queries. Also, it will likely be simpler to make a change in the sql view rather than the design view.

Macro: CompositeAssemblage_Update

- A macro called CompositeAssemblage_Update has been built to run all the make table queries and update queries that are needed to update the final table (snc_CompositeAssemblage).
  - Now all that is required when a value changes from the Base Tables is that this macro is run.
  - The Warnings On action (SetWarnings) is set to No, so that all the dialog windows that popup are disabled.

SUGGESTED SHPO INTEGRATION OF DATA INTO NVCRIS

Unfortunately this project was not budgeted to resolve the several hundred duplicates identified in the creation of the analytical dataset; however, duplicates that were initially removed were preserved and can now be used to update NVCRIS to a cleaner state. Before proceeding, please have a clear understanding of information provided in Tables F.1 and F.2—not all fields are pertinent to SHPO but several are important. The two feature classes most useful for identifying and removing duplicates within NVCRIS are Dupes_Removed and UnknownMisplots_Removed, both located within the Data_Removed feature dataset within the Master_GDB.mdb. We suggest proceeding as follows:

- Open the table of attributes and identify the GIS_Source. If the source is either "Random_Site," "Design_Site," or "C14_FromSHPO_Cut," then the shapes originate from NVCRIS. If you would like to obtain the original data of these duplicates, use the SourceLink field to link back to the Archaeology_Sites feature class located in the FromSHPO feature dataset.
- We suggest identifying and removing the duplicate shapes in NVCRIS by running a select by location using the spatial selection method "Target layer(s) features are identical to the Source layer feature" (ArcMap 10), where the target layer is NVCRIS and the source layer is Dupes_Removed. Once these shapes are identified in NVCRIS, they can be deleted or flagged or what-have-you.

There are a little over a dozen additional sites that were retained within the analytical dataset (All_Sites_Nbr_Centroid) that can used to update site attribute data within NVCRIS. Because you are likely only interested in the polygons from which the centroids were created, you can link back to the original polygon layer with the SourceLink field. Within the All_Sites_Centroid feature class, look for entries in the NVCRIS_Update field to identify sites whose attributes have been modified or updated. For

example, four sites have the comment "Site num change," which indicates the original site number has been changed or another number has been added to it. For these sites, see the Comments field to identify what was added or changed. Please note that the comment "Do not give to SHPO" refers to sites that we did not receive polygons for and as such, should not be used to update NVCRIS.

How to Proceed with Duplicate Resolution

Recall from Table F.2 that all of the spatial duplicates with identical numbers were removed. Sites with a "1" still in the Spatial_Dupes field have a corresponding comment in Dupe_Comment outlining why the spatial dupe is okay. Approximately 1,500 number duplicates remain within the dataset, designated with a "1" in the Nbr_Dupe field. A "0" in the Nbr_Dupe field indicates the duplicate is resolved. We suggest resolving these duplicates the same way we did: zoom to the duplicate pair (or more), look up the site map from the site record, then eliminate the incorrect shape(s).

Table F.1. Data Stored within the Master Geodatabase

Feature Dataset	Feature Class	Type	Description	Attribute(s) Used	Attribute Definition	Data Source	GIS Source in GDB
-	All_Sites_Nbr	Poly	Initial analytical dataset (polygon) derived from several sources. After centroids were created from this shape (All_Sites_Nbr_Centroid), it was no longer used as the authoratative analytical dataset	see All_Sites_Nbr_ Centroid	See All_Sites_Nbr_Centroid	NVCRIS, HRA, NPS	Features classes within ArchSources feature dataset
-	All_Sites_Nbr_Centroid	Point	Complete analytical dataset (point) derived from several sources (beyond the poly layer)	Multiple - see Appendix F, Table 2	see Appendix F, Table 2	NVCRIS, HRA, NPS	Features classes within ArchSources feature dataset
-	Annotation	Anno	Base map annotation layer for report figures	n/a	n/a	n/a	n/a
-	Annotation_Eckerle	Anno	Annotation layer used for Eckerle's figures	n/a	n/a	Eckerle	n/a
-	Raster: HistoricCultureArea	Img	Georegistered image of historic Indian territories drawn by H. Roberts	n/a	n/a	Annotated map from H. Roberts	n/a
-	Raster: NV_GeographicRegions	Img	Georegistered image of general culture regions and ecological zones drawn by H. Roberts	n/a	n/a	Annotated map from H. Roberts	n/a
-	Raster: PA_ShadedRelief	Img	Background image used for report figures	n/a	n/a	ESRI	n/a
ArchSources	ArrowCnyn_HRA	Poly	Sites from the Arrow Canyon inventory. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	HRA	n/a
ArchSources	AshMeadows_HRA	Poly	Sites from the Ash Meadows inventory. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	HRA	n/a
ArchSources	C14_FromSHPOcut	Poly	Sites with C14 dates (acquired from R. Ahlstrom) extracted from the original NVCRIS data cut. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	NVCRIS	- vector: FromSHPO\Archaeology_Sites
ArchSources	DesignSite	Poly	A sample of sites extracted from the NVCRIS dataset based on their distribution within hydrographic regions (HUC_Names). Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	NVCRIS	- vector: FromSHPO\Archaeology_Sites
ArchSources	FWARG_Sites_UTMs	Point	Sites from the Gold Butte inventory. UTM coordinates used from acquired database to plot centroids. Merged into All_Sites_Nbr_Centroid.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	FWARG	n/a
ArchSources	LAME	Poly	Sites from the Lake Meade National Recreation Area. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	HRA	n/a
ArchSources	LostCabinNRHP_HRA	Poly	Sites from the Lost Cabin Complex. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	HRA	n/a
ArchSources	Lvsynth_Pts_Buffer	Poly	Buffered site points from the Las Vegas Synthesis dataset. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	HRA	n/a
ArchSources	Random_Site	Poly	Randomly selected sites from the NVCRIS dataset. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	NVCRIS	- vector: FromSHPO\Archaeology_Sites

Feature Dataset	Feature Class	Type	Description	Attribute(s) Used	Attribute Definition	Data Source	GIS Source in GDB
ArchSources	SMNRA_HRA	Poly	Sites from the Spring Mountain National Recreation Area. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	NPS	n/a
ArchSources	SNMRA_PA_HRA	Poly	Sites from the Southern Nevada Military Resource Area (Preserve America) dataset. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	NPS	n/a
ArchSources	WarmSpRanch_HRA	Poly	Sites from the Warm Springs Ranch Inventory. Merged into All_Sites_Nbr.	Variation of site #	All attributes merged into All_Sites_Nbr then centroid exported into All_Sites_Nbr_Centroid	HRA	n/a
BaseLayers	EcoRegions	Poly	Reclassified southern Nevada ecoregions based on 2003 EPA map (annotated by H. Roberts) roughly correlated with GIS attribute "US_L4NAME".	SNC_Label	- Arid Slopes = US_L4NAME keywords (low ranges, playas) - Basins = US_L4NAME keywords (valleys, deserts, basins) - Mountain Woodlands = US_L4NAME keywords (mountain)	EPA; Annotated map from H. Roberts	- raster: NV_GeographicRegions
BaseLayers	Geographic_Regions	Poly	Culture regions based on H. Roberts annotated map of southern Nevada	Region	Central, Eastern, Southern, Western	Annotated map from H. Roberts	- raster: NV_GeographicRegions
BaseLayers	Historic_CultureAres	Poly	General territories of Native Americans within southern Nevada	Culture_Area	Las Vegas Band Southern Paiute, Moapa Band Southern Paiute, Mojave, Chemeheevi	Annotated map from H. Roberts	- raster: HistoricCultureAreas
BaseLayers	HUC_Names	Poly	Hydrographic regions of southern Nevada	Label	13 hydrographic regions in southern Nevada	Publically available dataset	n/a
BaseLayers	HUC_Names_Clip	Poly	Hydrographic regions of southern Nevada clipped to the project area	Label	13 hydrographic regions in southern Nevada	Publically available dataset	n/a
BaseLayers	Lakes	Poly	Perennial lakes of southern Nevada	LAKE_NAME	Lake Meade, Lake Mohave	Publically available dataset	n/a
BaseLayers	Landowner	Poly	Land jurisdiction of southern Nevada (clipped to project area)	Label	10 land jurisdictions in southern Nevada	Publically available dataset	n/a
BaseLayers	NVEconomicPlants	Poly	Prehistoric edible plants of southern Nevada. Much of the northern portion of the project area is excluded.	EdblePlnts	12 classifications based on Eckerle's classifications of NRCS soils	Dataset aquired from Eckerle	n/a
BaseLayers	Plant_Boundary	Poly	Outline of the extent of NVEconomicPlants	n/a	n/a	n/a	n/a
BaseLayers	Rivers	Line	Rivers of southern Nevada. Las Vegas Wash added.	River	Muddy River, Virgin River, Colorada River, Las Vegas Wash	Publically available dataset	n/a
BaseLayers	States	Poly	Nevada and states surrounding the project area	STATE_NAME	Nevada, Utah, California, Arizona	Publically available dataset	n/a
Data_Removed	Dupes_Removed	Poly	Duplicates removed from the All_Sites_Nbr feature class. This feature class is incomplete given a re-evaluation of how long it would take to complete.	- Nbr_Dupe - Spatial_Dupes - Dupe_Comment	- Nbr_Dupe: Duplicate "SiteNbr" value = 1 - Spatial_Dupe: Duplicate "Coordinates" value = 1 - Dupe_Comment: Action take to resolve duplicate shape	n/a	- vector: All_Sites_Nbr
Data_Removed	HistoricSites_Removed	Poly	Historic sites identified and removed from the SMNRA_HRA dataset.	n/a	n/a	HRA	- vector: ArchSources\SMNRA_HRA
Data_Removed	UnknownMisplots_Removed	Poly	Misplotted according to site map. Removed from All_Sites_Nbr.	n/a	n/a	NVCRIS	- vector: FromSHPO\Archaeology_Sites

Feature Dataset	Feature Class	Type	Description	Attribute(s) Used	Attribute Definition	Data Source	GIS Source in GDB
FromSHPO	Archaeology_Inven	Poly	Inventories from NVCRIS (n=7217).	n/a	n/a	SHPO	n/a
FromSHPO	Archaeology_Inven_Clip	Poly	Inventories from NVCRIS (n=7217) clipped to the project area.	n/a	n/a	SHPO	n/a
FromSHPO	Archaeology_Sites	Poly	Sites from NVCRIS (n=9461). A sample of this dataset (DesignSite, Random_Site) were used for analytical dataset (All_Sites_Nbr)	n/a	n/a	SHPO	n/a
Obsidian	Obsidian_Sources	Point	Obsidian sources around the project area.	SOURCE_GRO	Name of the source location/group	Northwest Obsidian Labs	n/a
Obsidian	SiteToObsidSrce	Line	Line from a site to its obsidian source (area) with the age of the site	- Source - Period	- Source: Name of the obsidian source - Period: Time period of the site based on "ArtifactTy"	n/a	- vector: All_Sites_Nbr
Obsidian	SiteWithObsidSrce	Poly	Sites that have an obsidian source. Not all sites in this shape are in the analytical dataset because the obsidian information was provided after the analytical dataset was created.	Source	Name of the source location/group	n/a	- vector: All_Sites_Nbr
Project_Area	PA_Counties	Poly	Project area counties	NAME	County name	Publically available dataset	n/a
Project_Area	PA_Quads	Poly	Project area USGS 7.5' quadrangle boundaries	NAME	Quad name	Publically available dataset	n/a
Project_Area	PA_Sections	Poly	Project area sections	SEC	Section number	Publically available dataset	n/a
Project_Area	PA_Townships	Poly	Project area townships	LABEL	Township and range designation	Publically available dataset	n/a
Project_Area	Project_Area	Poly	Project area boundary	n/a	n/a	n/a	n/a
Project_Area	Project_Area_Ln	Line	Project area boundary (as a line)	n/a	n/a	n/a	n/a
Record_Search	Ariz_RS	Poly	Arizona record search (1 mile buffer)	n/a	n/a	n/a	n/a
Record_Search	EIC_RS	Poly	California Eastern Information Center record search (1 mile buffer)	n/a	n/a	n/a	n/a
Record_Search	EICquads	Poly	California Eastern Information Center record search quads	n/a	n/a	Publically available dataset	n/a
Record_Search	SBr_RS	Poly	California San Bernardino Information Center record search (1 mile buffer)	n/a	n/a	n/a	n/a
Record_Search	Sbrquads	Poly	California San Bernardino Information Center record search quads	n/a	n/a	Publically available dataset	n/a

Table F.2. Analytical Dataset (All_Sites_Nbr_Centroid) Attribute Descriptions

GIS Attribute	Description	Comment
OBJECTID	Auto-generated number from GIS	n/a
Shape	Feature class type	Point, Line, or Polygon
SiteNbr	Trinomial site number	This field corresponds to GISLABEL in NVCRIS. The suffix 26 was not used - if it was present in one of the source GIS shapefiles, it was excluded for the analytical dataset.
SiteNbr2	Addition triomial if provided	Some of the additional numbers were discovered when comparing identical (or nearly) identical shapes from different GIS sources and then confirmed by viewing the site record.
FS_Nbr	Forest Service site number if provided	n/a
FS_Nbr2	Additional FS site number if provided	Some of the additional numbers were discovered when comparing identical (or nearly) identical shapes from different GIS sources and then confirmed by viewing the site record.
BLM_Nbr	BLM site site number if provided	n/a
BLM_Nbr2	Additional BLM site number if provided	Some of the additional numbers were discovered when comparing identical (or nearly) identical shapes from different GIS sources and then confirmed by viewing the site record.
Site_Type	General site type if provided	e.g., lithic scatter, rock shelter, etc.
Component	Age if provided	Prehistoric, Historic, Both, Unknown
Comments	Miscellaneous comments	e.g., site status, missing information, origin of shape. Some of the information in this field is important because it states whether a site record is missing, if the site corresponds to another site with a different number, or how the shape was generated.
GIS_Source	The shapefile source	All source shapefiles are located within the ArchSources feature dataset within the Master_GDB.mdb. Ten shapes with analytical information were digitized because they were missing all available data.
SourceLink	Unique ID number that can be used to join back to the source data	Intended use is for backup purposes
NVCRIS_Update	Comment field for SHPO use	Alerts SHPO to actions taken during the dupe check or data merging phases: - Shapes merged: single-part shapes of the same site merged together - Shape added: an additional shape was digitized for the site according to the site record map - No SiteNbr previously: Tracked down a previously missing site number - Moved to location described on site record: Site record depicted shape in different location, so it was moved - Do not give to SHPO: This comment does not appear in the All_Sites_Nbr polygon shape because it only refers to the All_Sites_Nbr_Centroid point shape. Sites with this comment were plotted using UTMs - we did not receive a polygon shapefile for these sites - Site num change: A site number was added or a typo was fixed
Nbr_Dupe	Trinomial site number duplicates	This was the second duplicate check performed on the analytical dataset. All site number duplicates were identified with a 1. As duplicates were evaluated, the site record was consulted and the misplotted shape was removed from the analytical dataset and added to the Dupes_Removed feature class. The 1 was then changed to 0 for the shape left within the analytical dataset. This process was only partially complete because it was determined unnecessary to address the objectives of the project. Shapes with a 1 in the analytical dataset have not been evaluated. See Dupe_Comment for specific actions taken.
AnalyticSite		
X_coord	UTM Easting centroid coordinate (NAD83, Zone 11)	Used in tandem with Y_coord in the concatenated field Coordinates to identify spatial duplicates
Y_coord	UTM Northing centroid coordinate (NAD83, Zone 11)	Used in tandem with X_coord in the concatenated field Coordinates to identify spatial duplicates

GIS Attribute	Description	Comment
Coordinates	Concatinated X and Y coordinates used to identify spatial duplicates	The same process was used on this field as the duplicate check for site numbers. All spatial duplicates (represented by centroids with identical coordinates) received a 1 (initially) in the Spatial_Dupes field.
Spatial_Dupes	Spatial duplicates identified from identical X and Y coordinates	This was the first of two duplicates checks performed on the analytical dataset with the goal of quickly eliminating real duplicates (i.e., same shape, same number). Unlike the Nbr_Dupe check, this process was completed. All spatial duplicates were identified with a 1. As duplicates were evaluated, appropriate fixes were applied (e.g., identical shapes with the same site number were removed from the analytical dataset and moved to the Dupes_Removed feature class; identical shapes with different numbers were marked as such and left alone unless it could be resolved with the site records). If the duplicate was resolved, the 1 was changed to a 0; however, if the spatial dupe was deemed okay (two identical shapes with different site numbers), the 1 was left in place to specify that a spatial dupe still exists in the dataset. See Dupe_Comment for specific actions taken.
Dupe_Comment	Action taken to resolve duplicate sites (numbers and spatial duplicates)	- Dup removed / Spatially diff / No site map: Unresolved Nbr_Dupe issue where the site had an identical shape and number that was removed with another shape with the same number that was spatially different and the site record did not have a map to resolve the issue. - Dupe OK, temp site nbr: Refers to the Lost Cabin Complex (site number not tracked down). - Duplicate removed: Identical shapes with the same number or different shapes with the same number removed after consulting the site record. - Duplicate removed / Spatial dupe OK, diff #s: Multiple duplicate issue where one or more shapes were removed and put in the Dupes_Removed feature class and the shape also contains a spatial dupe with a different number. - *merged: Single part shapes were merged after consulting the site record. - Spatial dupe OK, different numbers: Identical shapes with different site numbers. - Spatially diff / No site map: Nbr_Dupe issue where a site has duplicate numbers but the shapes are spatially different and the site record does not contain a site map. These were not resolved.
Encoded	Encoding status (presence/absence)	- 1: The site has been encoded and is present on the snc_CompositeAssemblage table (master table of encoded entries and attributes used for this project).
C14	Radiocarbon status (presence/absence)	- 1: The site has one or more radiocarbon dates and corresponds to an entry on the C14_20110628 table (compiled by R. Ahlstrom).
Obsidian	Obsidian status (presence/absence)	- 1: The site has an obsidian source.
Legacy_Description	Miscellaneous descriptions preserved from the source GIS	e.g,. site type, associated artifacts, site name.
Nbr_Followup		
AllSites_Link	All_Sites_Nbr_Centroid (complete working analytical dataset [point]) link back to All_Sites_Nbr (initial analytical dataset [poly])	To preserve attributes from the most up-to-date.
Plot	Plot status of All_Sites_Nbr_Centroid	After it was determined to halt the duplicate resolution process, this field was used to visually remove duplicates from being plotted on report figures with a definition query. Because of the scale used for report figures, it was determined that absolute accuracy of site location was not essential (e.g., misplots derived from 7.5' and 15' shape digitizing). - Y: Shape used for plotting on report figures. This designation does not correlate with site location spatial accuracy. - N: Shape excluded from report figures.

Table F.3. Description of the Assemblage Table (snc_Composite_Assemblage)

SNC Assemblage Attribute	Associated Table in NVCRIS_FE	Description
SiteNbr	tblEncode	GIS link value
Cave	tblEncode	Additional checkbox value used on encoding form (appears as a 0 or 1 in snc_CompositeAssemblage table)
Open	tblEncode	Additional checkbox value used on encoding form (appears as a 0 or 1 in snc_CompositeAssemblage table)
OpenShelter	tblEncode	Additional checkbox value used on encoding form (appears as a 0 or 1 in snc_CompositeAssemblage table)
Shelter	tblEncode	Additional checkbox value used on encoding form (appears as a 0 or 1 in snc_CompositeAssemblage table)
drop_architecture	tblkPArchiTy	Architectural values from IMACS not used for this project: - Cairn, Corral, Fence, Hogan, Kiva, Lean-to, Lodge-Vertical Pole, None, Other, Slab-Lined Milling Bin, Sweathouse, Tower, Unknown, Wall, War Lodge
Pithouse	tblkPArchiTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Pithouse
Room	tblkPArchiTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Single-Room Structure
RoomBlock	tblkPArchiTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Multiroom Structure
snc_ArchitectureTypes_ StorageFeature	tblkPArchiTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Attribute includes Cistern, Granary, and Storage bin.
WikiupRamada	tblkPArchiTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Wikiups-Ramadas
drop_artifact	tblkPArtTy	Artifact types from IMACS not used for this project: - Figurine-Non Ceramic, Isolate Artifact, Jacal Fragments, Native-Manufactured Beads, No Information, Other, Pendants, Pipes-Smoking, Rubble/Shaped Stone, Steatite Vessels, Turquoise Sources, Unfired Ceramic Objects, Unknown Artifact, Vegetation/Organic Remains, Vesicular Basalt Scatter
snc_ArtifactType_ BurnedRock	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Attribute includes Charcoal &/or Burned Bone Scatter, Charcoal Scatter, Scatter Burned Stone/Firecracked Rock Scatter
CeramicScatter	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Ceramic Scatter/Concentration
Groundstone	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Ground/Pecked Stone Scatter
IncisedStone	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table)
LithicScatter	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Lithic Scatter/Concentration
LithicSource	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Attribute includes Lithic Sources-Basalt, Chalcedony, Chert, Fossilized Wood, General, Ignimbrite, Nonvolcanic Glass, Obsidian, Porcelanite, Quartzite, Rhyolite, Siltstone
Mortar	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Bedrock Mortar, metate, Combination of Both
Organics	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Attribute includes Basketry/Textiles, Bone Scatter, Bone Tools, Corn Cobs, Horn/Antler Artifacts, Leather/Fur/Hide Remains, Shell, Wood Artifacts
StoneTool	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table)

SNC Assemblage Attribute	Associated Table in NVCRIS_FE	Description
		- Original value is Hammerstone
TradeBeads	tblkPArtTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Trade Beads
drop_ceramic	tblkPCrmTy	Artifact types from IMACS not used for this project: - Abajo Polychrome, Abajo Red-on-orange, Archaic Figurine, Basketmaker Figurine, Big Spring Black-on-gray, Black Mesa, Black Mesa Black-on-white, Bluff Black-on-red, Boulder Black-on-gray, Boysag Black-on-gray, Buckskin Corrugated, Cameron Polychrome, Ceramic Pipe, Chapin Black-on-white, Chapin Gray, Chapin Gray, Fugitive Red, Citadel, Polychrome, Coconino Gray, Coiled, Cortez Black-on-white, Cottonwood Black-on-gray, Deadmans Black-on-red, Dogoszhi Black-on-white, Dogoszhi Style, Dolores Corrugated, Emery Gray Ware, Fern Glen Black-on-gray, Flagstaff Black-on-white, Fremont figurine, Garfield Black-on-white, Great Salt Lake Gray Ware, Hildale Black-on-gray, Ivie Creek Black-on-white, Kana'a Black-on-gray, Kana'a Black-on-white, Kana'a Gray, Kayenta Affiliated Corrugated, Kayenta Affiliate Gray Ware, Kayenta Affiliated Red Ware, Kayenta Black-on-white, Kayenta Polychrome, Kiet Siel Black-on-red (L Pueblo III), Kiet Siel Polychrome (L Pueblo III), Kiet Siel Gray (dates after Moenkopi Corrug), Lino Black-on-gray, Lino Black-on-white, Lino Fugitive Red, Mancos Black-on-white, Mancos Corrugated, Mancos Gray, Mancos/McElmo Black-on-white, McElmo Black-on-white, McElmo/Mesa Verde Black-on-white, , Mesa Verde Black-on-white, Mesa Verde Black-on-white, Mesa Verde Corrugated, Mesa Verde Corrugated, Mesa Verde Gray ware/corrugated body sherd, Mesa Verde Gray ware/plain body sherd, Mesa Verde Red Ware, Mesquite Black-on-gray, Middleton Black-on-red, Middleton Polychrome, Middleton Red, Moapa Corrugated, Moccasin Gray, Moenkopi Gray, Mt. Carmel Black-on-gray, Mummy Lake Gray, Navajo Figurine, Navajo Polychrome, Navajo Utility Ware, No Information, None Present, North Creek Fugitive Red, Orderville Black-on-gray, Other Fremont, Parashant Black-on-gray, Parogonah Coiled, Piedra Black-on-white, Pipe Spring Black-on-gray, Poverty Mtn Black-on-gray, Promontory Gray Ware, Pueblo Figurine, Rainbow Gray (M-L Pueblo III), red-on-brown, Sevier Gray Ware, Shanub Black-on-gray, Shoshone Ware, Shoshoni figurine, Shoshoni Ware/Inter-Mtn Trd, Slide Mtn Black-on-gray, Snake Valley Black-On-Gray, Snake Valley Corrugated, Snake Valley Gray Ware, So Piute Crude Ware, Sosi Black-on-white, Sosi Style, Southern Paiute utility ware, Spindle Whorl, St. George Black-on-gray, Toquerville Black-on-gray, Toroweap Black-on-gray, Tsegi Polychrome, Tsegi Red-On-Orange, Tusayan Black-On-White, Tusayan Polychrome, Uinta Gray Ware, Undetermined Fremont, Undetermined Mesa Verde, Undetermined Numic, Undetermined Virgin Series, Unknown Figurine, Unknown Other Ceramic, Unspecified Ceramics, Upper Republican Tradition, Vermillion Black-on-gray, Virgin Series White ware, Wahweap Black-on-gray, Whitmore Black-on-gray, Woodland Tradition, Wygaret Black-on-gray
Brown_Ware	tblkPCrmTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Attributes include Brown ware, Tizon Brown Ware.
Buff_Ware	tblkPCrmTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table). - Original value is Lower Colorado Buff Ware..
Gray_Ware	tblkPCrmTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table). - Attributes include Black-on-gray, Black-on-white, Boulder Gray, Flagstaff Style, Glendale Black-on-gray, Gray ware, Hurricane Black-on-gray, Kayenta Unknown, Lino Gray, Medicine Gray, Mesa Verde Gray Ware, Mesquite Gray, Moapa Black-on-gray, Moapa Brown, North Creek Gray, Shinarump Gray, Truball Black-on-gray, , Tuckup Black-on-gray, Virgin Series Gra Ware/Plain, Washington Black-on-gray.
Gray_Ware_Corrugated	tblkPCrmTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Attributes include Clayhole Corrugated, Corrugated, North Creek Corrugated, Shinarump Corrugated, Tusayan Corrugated, Virgin Series Gray Ware/Corrugated, Washington Corrugated
Red_Ware	tblkPCrmTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Attributes include Black-on-red, Medicine Black-on-red, Polychrome, Redon-orange, Red ware, San Juan Red, Tsegi Black-on-orange (L Pueblo III), Tsegi Orange, Tusayan Black-on-red
Corrugated	tblEncode	Additional checkbox value used on encoding form (appears as a 0 or 1 in snc_CompositeAssemblage table)
drop_feature	tblkPFeatTy	Feature types from IMACS not used for this project: - Agricultural Terrace, Burial, Corrals/Drivelines, Depression, Earthen Mound, Earthen Ring, Hunting Blind, Medicine Wheel, No Information, Other, Prepared Floor, Rock Alignment, Rock Concentration, Roof Beam Rubble Mound, Sharpening Grooves, Smoke Blackening, Stained Soil/Generic, Step, Talus Pit, Tinaja, Water control (irrigation)

SNC Assemblage Attribute	Associated Table in NVCRIS_FE	Description
snc_FeatureTypes_BurnedRock	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Burned Stone/Firecracked Rock Concentration
Hearth	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Hearth/Firepit
Intaglio	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Effigy Figures/Intaglio
LithicProcurement	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Quarry
Midden	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Midden
RoastingPit	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Roasting Pit
Petroglyph	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Petroglyph-Pecked/Cut
Pictograph	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Pictograph/Painted
StoneCircle	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Attributes include Stone Circle, Stone Circle With Depression
snc_FeatureTypes_ StorageFeature	tblkPFeatTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Cache
drop_tool	tblkPToolTy	Tool types from IMACS not used for this project: - Agate Basin, Alberta, Allen, Anasazi/Other, Anvil, Anzick, Arrow Point, Avonlea, Bear River Side-Notched, Besant, Birch Creek, Black Rock Concave Base, Blackwater Side-Notched, Bull Creek Points, Cascade, Cody Knife, Colby, Columbia Valley, Concave Base, Core, Corner-Notched, Daphne Creek Side-Notched, Dart Point, Duncan, Edge-Ground Cobble, Farson Tri-Notched, Flaked Cobble, Gatecliff, Hammerstone, Hanna, Harder Series, Haskett, Hawken Side-Notched, Hell Gap, Humboldt Concave Base, Kings Beach, Laddie Creek, Large Contracting Stem, Large Corner-Notched, Large Lanceolate, Large Other Type, Large Side-Notched, Large Square Stem, Large Triangular, Lookingbill, Mallory, Maul, Mckean Lanceolate, Medicine Lodge-Lanceolate, Medicine Lodge-Round Base, Medicine Lodge-Split Base, Midland Unfluted, Misc Abrading Implements, More Than 3 Types, Nawthis Side-Notched, No Information, None Present, Northern Side-Notched, Other, Other Archaic, Other Late Period, Other Paleoindian, Pahaska Side-Notched, Pecking Stone, Pelican Lake, Plains Side-Notched, Plainview, Polishing Stone, Pounding Stone, Prairie Side-Notched, Projectile Point Type Not-Known, Pryor Stemmed, Rocker Side-Notched, San Rafael Side-Notched, Scottsbluff II, Scottsbluff/Eden, Side-Notched, Small Contracting Stem, Small Corner-Notched, Small Lanceolate, Small Other Type, Small Side-Notched, Small Square Stem, Small Stemmed, Small Triangular, Steamboat, Sudden Side-Notched, Surprise Vly Split Stem, Triangular Unnotched, Tucannon, Uinta Side-Notched, Undetermined Anasazi, Undetermined Archaic, Undetermined Historic Period, Undetermined Late Period, Undetermined Non-Diagnostic, Undetermined Paleoindian, Undetermined/Non-Diagnostic, Unknown Concave Base, Ute/Piute Side-Notched, Wallowa, Wapiti Corner-Notched, Wedding of the Waters, Windust, Yonkee
BullCreek	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Bull Creek
Clovis	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Clovis
Cottonwood	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Cottonwood
DesertSideNotched	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Desert Side-Notched

SNC Assemblage Attribute	Associated Table in NVCRIS_FE	Description
EastgateSeries	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Eastgate Series (or Meadow Canyon)
ElkoSeries	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Elko Series (or Fremont)
FlakedStoneTool	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Attributes include Axe, Biface, Blade, Burin, Chopper, Drill, General Serrated, Graver, Knife, Scraper, Shaft-Straightener/Grooved Stone, Uniface (Undetermined Function), Utilized Core, Utilized Flakes
Folsom	tblkPToolTy	Encoded value - presence/absence on site form - Original value is Folsom
GreatBasinStemmed	tblkPToolTy	Encoded value - presence/absence on site form - Original value is Great Basin Stemmed
GreatBasinTransverse	tblkPToolTy	Encoded value - presence/absence on site form - Original value is Great Basin Transverse
Gypsum	tblkPToolTy	Encoded value - presence/absence on site form - Original value is Gypsum
LargeStemmed	tblkPToolTy	Encoded value - presence/absence on site form - Original value is Large Stemmed
Martis	tblkPToolTy	Encoded value - presence/absence on site form - Original value is Martis
MortarPestle	tblkPToolTy	Encoded value - presence/absence on site form - Attributes include Bedrock Mortar/Metate, Hopper Mortar, Pestle
OtherGroundstone	tblkPToolTy	Encoded value - presence/absence on site form - Attributes include Basin Milling Stone-Non Portable, Basin Milling Stone-Portable, Grinding Stones-Upper/Other, Mano/Single-Handed, Mano/Two-Handed, Slab Milling Stone-Non Portable, Slab Milling Stone-Portable, Trough Metate-Non Portable, Trough Metate-Portable, Unknown Grinding Stone, Unknown Ground Stone-Not ? Lower, Unknown Handstone
ParowanBasalNotched	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Parowan Basal-Notched
PintoSeries	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Pinto Series
RoseSpringSeries	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Rose Series Series
Stemmed	tblkPToolTy	Encoded value - presence/absence on site form (appears as a 0 or 1 in snc_CompositeAssemblage table) - Original value is Stemmed
C14_EarlyArch	snc_C14	Classification of time period based on mean C14 value in C14_20110628 table (appears as a 0 or 1 in snc_CompositeAssemblage table)
C14_LateArch	snc_C14	Classification of time period based on mean C14 value in C14_20110628 table (appears as a 0 or 1 in snc_CompositeAssemblage table)
C14_MidArch	snc_C14	Classification of time period based on mean C14 value in C14_20110628 table (appears as a 0 or 1 in snc_CompositeAssemblage table)
C14_Protohistoric (aka Post Puebloan)	snc_C14	Classification of time period based on mean C14 value in C14_20110628 table (appears as a 0 or 1 in snc_CompositeAssemblage table)
C14_Puebloan	snc_C14	Classification of time period based on mean C14 value in C14_20110628 table (appears as a 0 or 1 in snc_CompositeAssemblage table)
C14_Puebloan_Proto	snc_C14	Classification of time period based on mean C14 value in C14_20110628 table (appears as a 0 or 1 in snc_CompositeAssemblage table). Sites with this value have overlap between Puebloan and Post Puebloan periods.
C14_TermLateArch	snc_C14	Classification of time period based on mean C14 value in C14_20110628 table (appears as a 0 or 1 in snc_CompositeAssemblage table)

SNC Assemblage Attribute	Associated Table in NVCRIS_FE	Description
C14_Blue	snc_C14_RBG	Reclasssification of time period based on H. Roberts request (appears as a 0 or 1 in snc_CompositeAssemblage table) - Blue: Sites with C14 dates between A.D. 1600-1800
C14_Green	snc_C14_RBG	Reclasssification of time period based on H. Roberts request (appears as a 0 or 1 in snc_CompositeAssemblage table) - Green: Sites with C14 dates between A.D. 1400-1600
C14_Red	snc_C14_RBG	Reclasssification of time period based on H. Roberts request (appears as a 0 or 1 in snc_CompositeAssemblage table) - Red: Sites with C14 dates between A.D. 1200-1400
CompAge_Protohistoric (aka Post Puebloan)	n/a	Update query for the snc_Composite_Assemblage table derived from time period specific attributes (appears as a 0 or 1 in snc_CompositeAssemblage table) - see qry_update_snc_CompositeAssemblage_Protohistoric
CompAge_Puebloan	n/a	Update query for the snc_Composite_Assemblage table derived from time period specific attributes (appears as a 0 or 1 in snc_CompositeAssemblage table) - see qry_update_snc_CompositeAssemblage_Puebloan
CompAgeTerm_LateArchaic	n/a	Update query for the snc_Composite_Assemblage table derived from time period specific attributes (appears as a 0 or 1 in snc_CompositeAssemblage table) - qry_update_snc_CompositeAssemblage_TermLateArchaic
CompAge_LateArchaic	n/a	Update query for the snc_Composite_Assemblage table derived from time period specific attributes (appears as a 0 or 1 in snc_CompositeAssemblage table) - qry_update_snc_CompositeAssemblage_LateArchaic
CompAge_MiddleArchaic	n/a	Update query for the snc_Composite_Assemblage table derived from time period specific attributes (appears as a 0 or 1 in snc_CompositeAssemblage table) - qry_update_snc_CompositeAssemblage_MiddleArchaic
CompAge_EarlyArchaic	n/a	Update query for the snc_Composite_Assemblage table derived from time period specific attributes (appears as a 0 or 1 in snc_CompositeAssemblage table) - qry_update_snc_CompositeAssemblage_EarlyArchaic
CompAge_Paleoindian	n/a	Update query for the snc_Composite_Assemblage table derived from time period specific attributes (appears as a 0 or 1 in snc_CompositeAssemblage table) - qry_update_snc_CompositeAssemblage_Paleoindian

APPENDIX G
ENVIRONMENTAL DATA SETS

Data Provided Electronically on Report CD

APPENDIX H
POST-PUEBLOAN SITE DESCRIPTIONS

Heidi Roberts

POST-PUEBLOAN SITE DESCRIPTIONS

Heidi Roberts

WESTERN REGION

Barnett Site (26CK1769)

The Barnett site, located near the Crystal Pool spring in the Ash Meadows National Wildlife Refuge was investigated in the 1970s by Mehringer and Warren (1976). The site was located in an area of sand dunes that were being leveled by the land owner. Mehringer and Warren excavated human remains associated with the Terminal Archaic period from the site, as well as a ceramic component containing Virgin Puebloan sherds and a date of A.D. 575 to 985.

A third component, located southwest of the human remains consisted of a hearth associated with Paiute pottery. A calibrated date range of A.D. 1150 to 1955 was obtained from this hearth and from a midden area located 400 m to the west (Lyon et al. 2008). In a recent study of pottery collected from archaeological sites throughout the Ash Meadows Refuge Lyneis (2011a) and Thomas Hoisch (2011) discovered that both the gray and brown ware pottery was locally made and contained temper obtained from the Funeral Mountains, which are located 36 km to the northwest of Ash Meadows.

Sever Tanks (26NY1964)

This open camp and rockshelter site lies next to one of the most reliable water sources in the Yucca Mountain area, which is located north of Lathrop Wells and approximately 15 miles east of Beatty. Sever Tanks was investigated by DRI as part of the Yucca Mountain Nuclear Waste storage project in the late 1980s. Radiocarbon dates and artifacts suggest the site was occupied from the Terminal Archaic to the Post-Puebloan or even the Historic period (Pippin 1986).

Several 1- x 2-m test units were excavated in three areas of the site. A calibrated radiocarbon date of A.D. 1280 to 1630 was obtained from a charcoal lens in Stratum C (Feature B-1). This lense was identified in a test unit (Test Pit 1-Units A and B) excavated next to a cliff face. Stratum C was a 2- to 8-cm deep cultural level buried at a depth of 10 to 50 cm. Artifacts collected from this stratum included 1 mano, 1 millingstone, 1 obsidian Rose Springs arrow point, 2 arrow point fragments, 1 chert core, and 15 pieces of debitage. A second unit, Test Pit 2 (Units C and D), was excavated 5 m downslope from unit 1 and contained 133 flakes, an incised stone, 2 incised brown ware sherds, and a plain brown ware. The sherds were collected 10 cm below the ground surface and were believed to be from the same stratum as the radiocarbon date (Stratum C). The incised brown ware sherd contained the same designs as the incised stone. Other pottery collected from this site included three smeared corrugated brown ware sherds, a Snake Valley Gray, and two plain brown ware sherds. The brown ware sherds from the site were made with coil and scrape methods and thickness varied from 4 to 8 mm.

In 1994 David Rhode reported thermoluminescence dates on brown ware sherds from the Sever Tanks site. Although the proveniences of the dated sherds were not given, one sherd (UWTL-64) with "partially obliterated coil finger-impressed corrugations" yielded a date of A.D. 1081±100 and a second brown ware sherd yielded a date of A.D. 1812±14 (Rhode 1994:127).

Fairbanks Spring (26NY1729)

This site is a large artifact scatter surrounding Fairbanks Spring on the Ash Meadows National Wildlife Refuge in the Amargosa Desert in Nye County. The site was tested excavated by HRA in 2009 as part of a spring restoration project (Eskenazi and Roberts 2011). One excavation unit (EU-9) contained a charcoal and ash-stained feature that was identified as a possible occupation surface (Feature 09-10). A flotation sample processed from the feature contained a charred prickly pear seed fragment and a charred thornberry seed, which yielded a calibrated date range of A.D. 1410–1460. Artifacts recovered from this unit included three pieces of ground stone, 1,433 pieces of debitage, and several bifaces.

26NY8004

Site 26NY8004 is a rockshelter that was investigated during the Yucca Mountain Cultural Resource investigations (Buck et al. 1998, IMACS site form 26NY8004). A basket "resembling a Paiute winnowing tray" was recovered from the surface of this rockshelter and radiocarbon dated with a calibrated date range of A.D. 1525 to 1955. The site was likely a cache location. Other items found in the small shelter included a curved and de-barked wooden artifact that may represent a basket frame, a millingstone, several untied bunches of grasses (possibly basketry material), and a rust-red pumice manuport.

Alice Hill (26CK1011) and 26NY8438

Two radiocarbon dates with a calibrated range of A.D. 1670 to 1950 were obtained from these two sites in the Yucca Mountain project area (Buck et al. 1998: Table 1-3). Buck and his coauthor (1998:79) s thought that the subsurface charcoal and fire-cracked rock used for dating these sites originated from brush fires or other natural means. These dates are not applicable to archaeological research and will receive no further attention in this report.

SOUTHERN REGION

Willow Beach

Willow Beach is an open campsite located on the terrace of Colorado River in Black Canyon, approximately 15 miles south of Hoover Dam. The site is a deeply stratified camp that was occupied sporadically from Archaic times to the Post-Puebloan period. The site was excavated three times, first in 1936 by Mark Raymond Harrington with the Civil Conservation Corps and the National Park Service, then between 1947 and 1948 by Gordon C. Baldwin and the National Park Service, and lastly in 1950 by Albert Schroeder. No radiocarbon dates have been processed from artifacts recovered during these excavations. The chronological reconstructions undertaken by Schroeder using these data are based entirely on stratigraphic relationships between diagnostic artifacts such as projectile points and pottery types.

Here I focus on the upper strata, identified as Layers A, A-B, and B (Schroeder 1961). The earliest ceramic horizon (Layer C) was dominated by Lino Gray and Boulder Gray, but also included quantities of Cerbat and Aquarius Brown. Layers B through A were dominated by local pottery type Pyramid Gray, which increased from 86 percent in Layers B to 92 percent in A-B, then it decreased in Layer A to 75. In this uppermost layer the quantity of Cerbat Brown increased to 25 percent. Paiute wares were found only in Level B and Level A-B, and they represented less than 2 percent of the assemblages from these levels.

Projectile point types are primarily Desert Side-Notched in Level A; in Level B they are Parowan/Eastgate and Rose Springs types; and in Level C they are Elko Corner-Notched, Rose Springs and Gypsum points (Schroeder 1961: Figure 12). Other artifacts of interest are incised stones, which were found in the uppermost preceramic level with stemmed dart points.

The 1936 excavation notes for Willow Beach report finding a burned hut approximately 15 cm below the surface. The oval-shaped structure measured roughly 3 by 4 m in diameter and contained a central, shallow, informal hearth. The hut had burned and an analysis of the plant remains suggested it was made out of willow. Artifacts recovered from the structure included a tortoise shell with drilled holes, *Olivella* shell beads, a flat notched bone, an obsidian scraper, hematite, turquoise fragments, cotton cloth (plain-weave, single ply, twisted in a counter-clockwise or Z-twist direction), basket splints, a possible pine resin-coated basket, yucca cordage (two-ply, counter clock-wise or A-twist), small animal bones, a broken metate, and pottery consisting of two Pyramid Gray, a Moapa Black-on Gray, and a Tusayan White Ware sherd. Harrington labeled this feature a Paiute Indian brush hut; however, he likely based this on stratigraphic relationships and architecture rather than on artifact associations.

Six burials were excavated during the 1936 excavations and most were from the ceramic levels. Of special interest is an infant burial that was interred with over 833 large shell beads, eight arrow points, and pottery of an unknown variety. The other burials were adults that were placed in a flexed position (one was associated with a dog), and most burials included shell beads, pottery, and turquoise beads or fragments. Two burials were also recovered by a resident of Willow Beach including a child burial with a shell gorget and polished and unpolished turquoise bits and an adult with a Deadmans Black-on-gray bowl. It is not clear if any of these burials were associated with the dominant late Pyramid Gray ware or with other varieties.

Catclaw Cave

In 1954 Barton Wright reported on his excavation of Catclaw Cave for his Master's thesis at the University of Arizona (Wright 1954). The site was located on the east terrace of the Colorado River in Black Canyon a few miles north of Eldorado Canyon. It was chosen for excavation because it was thought it would be inundated by the construction of Davis Dam; however, the site is above the water line. Human use of the cave was confined to a single upper level and the deeper levels lacked evidence of cultural use. Excavations identified a small habitation structure, five roasting pits (pit hearth) and several smaller pit hearths and ash deposits, numerous pits, and four grass-lined cache pits. One of the cache pits contained 15 to 20 lumps of hematite stored in a grass bundle. The structure consisted of a slightly concave depression, semi-rectangular with rounded sides measuring 85 cm by 1 m. There were shallow postholes in each corner and some were rock-lined. The floor contained depressions with fish bones and willow string and the northern edge of the floor was plastered. A yucca pod and sherd of Pyramid Gray lay on the plastered area of the floor.

Projectile point styles (Wright 1954: Figure 8) are predominantly Rose Spring and Parowan/Eastgate types and the pottery suggest an occupation range of A.D. 500 to 1150 for the site. The pottery types are fairly consistent with those reported by Schroeder for Willow Beach late components: they consist of Pyramid Gray (83 percent), Cerbat Brown (5 percent), Parker Buff (4.5 percent), Aquarius Black-on-gray (2.6 percent), and Boulder Gray, Aquarius Brown, North Creek Gray and Sand Brown (3 percent for the four types). The lack of Desert Side-Notched points indicates abandonment before A.D. 1200; however, radiocarbon dates could support a different occupation range.

Other artifacts collected consist of two specimens of turquoise (one incomplete bead and one unworked fragment), numerous bone and stone tools, bone tinklers on a fringed belt, hoof tinklers, a few *Olivella* beads, six clay figurines, unfired miniature pottery (some decorated with incising and painting on the exterior), yucca fiber, cotton (two-strand clockwise twist), hair string (two-strand), and a coiled basket that contained an awl, a piece of buckskin, a twisted strip of willow bark, and a single sherd of Pyramid Gray. The basket consisted of grass and cane bundles stitched with wide strips of bark resembling O'odham baskets. Other basket fragments included foundations of four split rods and an uninterlocking stitch, one with pitch covering, the other with a foundation of five split rods and interlocking split stitch. Two fragments of figure-8 sandals made of yucca were recovered that resembled those from Etna Cave.

Faunal remains included a bison horn core, fish (humpback sucker, Colorado River squawfish, and humpback chub), and many other animal remains that were not evaluated for burning or other evidence of consumption. Plant food recovered included gourds and maize.

Recently Gilreath (2012: Table 17) radiocarbon-dated 10 items from Catclaw Cave including cordage, basketry, plants in daub, a sandal, and charcoal from Hearth 1. The median calibrated dates ranged from A.D. 1305 to 1647 on eight of the items; the sandal yielded a median date of A.D. 938, and the charcoal from the hearth was the oldest date of A.D. 71.

CENTRAL REGION

Mended Basket Rockshelter (26CK4038)

This small and fairly shallow rockshelter site was located 3 miles north of Sloan, Nevada, on the southern edge of the Las Vegas Valley. The shelter was completely excavated in 1997 by UNLV's Harry Reid Center (HRC) for a BLM land exchange project (Blair and Seymour 1998). Thirty-seven units within the shelter were excavated in arbitrary levels to bedrock, which occurred at a depth of 50 to 60 cm. Most of the cultural materials were recovered from the upper Stratum I, which was a layer of gray to brown ashy silt. The opening of the shelter was circumscribed by a low rock wall that Blair and Seymour felt was modern in origin; however, one small wall segment in the rear of the shelter was believed to be prehistoric. Seven radiocarbon dates from the cultural deposit, hearths, and basketry yielded a combined calibrated date range of A.D. 895 to 1630 (Table H.1). These dates, plus the features and artifacts, suggested to Blair and Seymour that the rockshelter served as a temporary camp for multiple short-term stays by Chemehuevi or Southern Paiute people. Use of the site probably did not extend into the historic period because no Euroamerican artifacts were present.

Five unprepared shallow hearths and a slab-lined cist surround by an earthen berm were excavated and radiocarbon dated. The cist was lined with grass (*Hilaria rigida*) and bushes (*Brickellia arguta*) and contained shredded yucca (*Yucca* sp.) leaves and juniper (*Juniperus* sp.) bark. The contents of the cist were covered with yucca spine pieces and more *Brickellia*. Since the nearest source of juniper bark would have been the Springs Mountains or the Bird Spring Range, Blair and Seymour (1998:75) suggested that the yucca and juniper fibers were stored in the cist for future use. The contents of the cist were radiocarbon dated to A.D. 1046, and represent one of the three earlier dates from the site.

Artifacts recovered from the site included a bone awl, a scoop-like bone tool and 494 flaked stone artifacts. Flaked-stone tools included three Rosegate points, one Desert Side-Notched point, several bifaces, and drills, two of which were covered with red ochre. The ground stone assemblage consisted of four manos and two lightly ground metates. Pottery included 12 potsherds of Great Basin Brown Ware representing two vessels (Blair and Seymour 1998:93). Unfortunately, their method of construction was not discussed and their shape could not be determined. Textiles recovered included two closed-twined winnowing trays (two rods with and up-to-the-right slant) made of willow (both frame and weaving portions). One of the trays was radiocarbon dated to A.D. 1240–1420. A single exotic artifact, a small shell disc bead, was recovered from the surface of the cultural deposits.

Although the faunal assemblage was quite large (1606 specimens), only 4 percent of the bones were burned. Sixty percent of the burned bones were tortoise, 1 percent were rabbit, 4 percent were bird, and the remainder could not be identified. Seeds collected from the cultural levels were from coyote melon gourds, mesquite, domestic squash, and *Opuntia basilaris* (burned pulp fragments were also recovered).

Table H.1. Radiocarbon Dates for the Mended Basket Site.

Site Number	Provenience	Material	Age	Combined Cal. Date
CK4038	N98-99/E102-103, Level 5 (deepest point in shelter)	charcoal	1016±58	A.D. 895–1160
CK4038	N99.54-100/E104-104.28, Level 1, Feature 3 (thermal feature [roasting pit])	charcoal	947±62	A.D. 990–1220
CK4038	N101-102/E1-3-104. Level 4, Feature 6 (slab-lined cist)	charcoal	904±72	A.D. 1020–1265
CK4038	N99.3-99.8/ E103.25, Level 2, Feature 1 (thermal feature)	charcoal	705±55	A.D. 1220–1395
CK4038	Level 2	basket fragments	660±72	A.D. 1240–1420
CK4038	N101-102/E102-103, Level 2 (associated w/ a metate)	charcoal	606±61	A.D. 1290–1425
CK4038	N99.19-99.48/ E101-101.6, Level 2, Feature 4 (ash and charcoal concentration)	charcoal	477±71	A.D. 1305–1630

Garrett's Shelter (26CK5712)

This rockshelter, located in a cluster of hills along the northeastern rim of the Las Vegas Valley, was completely excavated by HRA in 2000 (Ahlstrom and Roberts 2001c) as part of the Apex Survey and data recovery project. The rockshelter measured 5 m wide by 5 to 6 m deep by 1.6 m high in the front (Figure H.1). Four radiocarbon dates from the shelter's deposits, features, and coprolites indicated intermittent use between A.D. 990 and 1850. The lack of ceramics from this site is surprising, particularly in light of the fact that a similar site, 26CK4440, located less than five miles to the northwest, contained a large and varied assemblage of pottery (York et al. 1992). Although the site lacked pottery, it contained nine features including four thermal features, three small pits, a rock alignment, and three clusters of plant material.

Figure H.1. Garrett's Shelter looking north toward the opening.

The site was excavated by natural stratigraphy: Stratum 1 was the most recent cultural level, and Stratum 4 the deepest and oldest. Stratum 1 varied from 5 to 15 cm in thickness and contained abundant evidence of human use including flaked-stone artifacts and burned and unburned plant and animal remains, and perishable artifacts of fiber and wood including a yucca sandal fragment. Stratum 2 ranged in depth from 5 to 30 cm and it also contained evidence of cultural use. A calibrated date range of A.D. 1300 to 1400 was obtained from Stratum 2. Feature 8, a hearth, intruded into Stratum 3 and the deepest level, Stratum 4 contained a hearth and two pits. The area around these features may have been a living surface. In addition to abundant quantities of artifacts, Stratum 4 contained a human coprolite (Coprolite 1) that was radiocarbon dated to a two-sigma calibrated range of A.D. 990 to 1190. The coprolite contained evidence that the individual had consumed hedgehog or barrel cactus flowers, globe mallow flowers, and material from plants in the genus *Solanum* (including wild potato and wild tomato), wild buckwheat, and evening primrose. A second coprolite (Coprolite 2) was recovered from a thermal feature and was radiocarbon dated to A.D. 1640–1960. Pollen analysis suggests that the individual had consumed plants very similar to Coprolite 1. No evidence of cultigens was found in either coprolite.

Artifacts collected from the shelter included 1,675 pieces of debitage, 56 flaked stone tools, 28 ground stone tools or fragments, 3 worked sticks, 2 shell beads, and 1,886 bone fragments. Perishable items consisted of three knots of yucca leaves, one knot of grass stems, one cordage fragment (2 ply, z-spun, s-twist), and a fragment of yucca sandal. An Elko Corner-Notched point, a Humboldt point base,

and a serrated dart point resembling a Datil point (Justice 2002:174) were collected from the deeper stratum. A Rosegate point and two Desert Side-Notched points were recovered from the upper stratum.

Faunal and macrobotanical remains demonstrate that plants and animals were collected and processed. Tortoises, jackrabbits, rodents, and artiodactyls were cooked and likely consumed. The flaked-stone assemblage suggests that the shelter's occupants manufactured and rejuvenated their projectile points (Flenniken 2001), and the ground stone assemblage is expedient and lightly used. The single artiodactyl element that could be identified as to species was from pronghorn antelope, which are not found in southern Nevada today. There was no evidence of bighorn sheep hunting despite the presence of the animals in the project area today. Yucca pods and cactus were probably the most important plant consumed, although the coprolites indicate that a wide variety of plants were eaten. The site was likely occupied in the late spring to early summer when the cactus and yucca fruit were ripe. The shell beads, and pronghorn remains indicate travel or trade with eastern and western groups.

26CK1139

Site 26CK1139 is a small rockshelter located in Clark County Wetlands Park in Henderson, Nevada (Figure H.2). The site is one of a concentration of sites along Las Vegas Wash, which drains the Las Vegas Valley on its way to the Colorado River. The rockshelter was first recorded in December 1971 and it was excavated several years later (Ferraro and Ellis 1982). In 2005, HRA reevaluated the artifact assemblage from this site and others investigated during the Las Vegas Wash Project (Ahlstrom 2005).

Figure H.2. Site 26CK1139 before excavation in 1971.

There are two sets of radiocarbon dates from the site including five that were processed during the original investigations and an additional nine processed by HRA (Ahlstrom 2005:220). The three earliest dates have a combined range calibrated range of A.D. 1020 to 1260. There is one date of A.D. 1280 to 1490, three dates with combined ranges of A.D. 1400 to 1650, and six between A.D. 1650 and 1950. The dates indicate that the rockshelter was used intermittently after A.D. 1020 and probably more intensively after AD 1400. The site appears to have lacked stratigraphy and there were no significant changes in pottery types from the arbitrary excavation levels (Seymour 2005: Table 3.2).

The lithic assemblage contains numerous bifaces and preforms. These include 69 lithics the size and shape of arrow points (one Rose Spring, one Parowan Basal-Notched, five Cottonwood Triangular, and 8 to 10 Desert Side-Notched points), five perforators and three flake tools that are part of a formed tool assemblage used in "tool-making activities that involved the cutting, scraping, or perforation/drilling

of hard surfaces" and relate to the "retooling of hunting equipment" (Ahlstrom 2005:166-172). The ground stone assemblage is small and fragmentary in nature. The assemblage includes mano fragments (n=8), a basin metate, slab metates (n=12), a metate of unknown type, grinding slabs (n=8), and palettes (n=6) (Ahlstrom 2005:187). A total of 319 sherds comprise the ceramic assemblage. These sherds represent a minimum of 19 vessels (Seymour 2005:69), with Lower Colorado Buff Ware being the dominant type (n=237). Other varieties included Great Basin Brown Ware (n=15), Virgin Series Gray Ware (n=12), Tizon Brown Ware (n=11), Prescott Gray Ware (n=18), a few unidentifiable pieces, and one Fremont sherd.

Vokes (2005:205) examined the ornaments from the site, which included one bone bead, four pieces of worked bone that may be tube blanks, five shell beads (one each *Olivella* barrel, cap, cupped, and split bead and one unidentified marine bivalve disk bead), one cut pendant (unidentified marine shell), one worked fragment (*Glycymeris*), and seven unworked fragments (unidentified marine nacreous shell). In addition, 11 small decorated stones were collected including eight incised slabs, one painted and incised slab, one painted slab, and one incised pebble.

Euroamerican-manufactured trade beads were also recovered; they include three white glass barrel beads and one blue glass faceted cylindrical bead (Ahlstrom 2005:215, Figure 9.3). Glass trade beads have been found in other historic Native American contexts elsewhere in southern Nevada (Shutler 1961:40), and it is likely that these beads came from Euroamericans through trade. The Old Spanish Trail crossed the project area so trade beads would not be unexpected.

The macrobotanical and faunal remains recovered from the site suggest that the occupants ate honey and screwbean mesquite, chenopods, seepweed, pickleweed, squash, piñon nuts, and prickly pear and cholla fruit and pulp. Evidence of maize was also present. Radiocarbon dates from a kernel of the maize dated to A.D. 1660–1950. A similar date range was also obtained from a cob. Faunal remains were dominated by artiodactyls and desert tortoise; however, rabbits, birds, and small mammals were also represented and were probably consumed by the site's inhabitants.

Gypsum Cave (26CK5)

Gypsum Cave is a large limestone cave site that was first excavated by Mark Raymond Harrington in 1920s and 1930s and more recently investigated by Amy Gilreath (2009). Gilreath (2009) reopened areas of Harrington's excavation units in Room 1 to evaluate the deposits for integrity and to re-assess "the chrono-stratigraphic relationship of the materials Harrington previously recovered" (Gilreath 2009:4). Two radiocarbon dates obtained from pieces of string (strung selenite ornaments) from the upper component in Room 1 suggested to Gilreath that Room 1 had intermittent use between A.D. 1050 and 1390. Additional dates on cotton and corn cobs from Room 1 support this date range and suggest earlier use between A.D. 483 and 511 (Gilreath 2012: Table 17).

Artifacts collected by Harrington from Room 1 and reexamined by Gilreath include 16 sherds from two vessels including "a small, dark, thin-walled corrugated pot" and a bowl with Dogoszhi-style designs (Gilreath 2009:59), 12 to 14 pieces of arrow-sized wooden and cane weapons, cotton cordage, s-twist yucca cordage (40 to 44 pieces), 72 selenite crystals, bone tools, a cactus spine awl, thin milling stones, flaked stone, bits of leather, and hundreds of corn cobs of uncertain provenience, two shell beads, two bone beads, and faunal bone from artiodactyls and medium large game.

Harrington described the deposits in Room 1 as 11 to 30 inches thick and containing "quantities of ashes, charcoal, burnt sticks, cobs of corn (maize), flint chips, bones of animals, the shells of desert tortoise, as well as such artifacts as fiber strings, broken metates or grinding slabs, mano or mullers, occasional pieces of Puebloan pottery, and selenite pendants in varying stages of completion" (Harrington 1963:20). Harrington also reported traces of grass-lined storage pits that were badly disturbed and he described a tortoise shell bowl and horn spoon from Room 1. He interpreted the room to have been a human encampment where the occupants had manufactured selenite ornaments (72 pieces of worked selenite were reported by Gilreath 2009: 64) and left debris from eating and making stone tools and baskets (Harrington 1963:17).

The Puebloan pottery was described by Harrington as consisting of two Puebloan vessels and a buff ware sherd he called "Colorado River Ware related to red-on-buff." One of the Puebloan vessels was a bowl that measured 10 inches in diameter that is likely one of the Dogoszhi-style vessels described by Gilreath. The second vessel was a small (4-inch high) "corrugated cooking-pot" with a rounded base that was dark-brown and thin. Harrington reported that the pieces of this vessel were scattered in the upper levels of Rooms 1 and 2. Harrington suggested that the corrugated vessel was wiped and resembled those recovered from Mesa House phase sites in the Lost City area.

Berger Site (26CK501/1528)

The Berger site was a midden located in an open setting along Duck Creek Wash just upstream from its confluence with in Las Vegas Wash in Clark County Wetlands Park. The site was first recorded and partially excavated in the late 1960s, but not formally reported, by the Archaeo-Nevada Society, by Robert Crabtree of Nevada Archaeological Society, and by Richard Brooks for UNLV's field schools (Rafferty 1986:52) (Figure H.3). A total of 30,222 artifacts including 2,266 sherds, 497 projectile points or fragments, 12,085 flaked tools and pieces of debris, 427 core tools, and 14,949 organic samples were collected from the site and are curated at UNLV's Museum of Natural History. Nineteen thermal features were reported. Gregory Seymour (1997) has argued that the site's stratigraphy was intact. With the exception of a master's thesis by Seymour and an unpublished manuscript by Myhrer and Hughes (in Seymour 1997:73), the collections have not been analyzed.

Figure H.3. The Berger site being excavated in the 1960s (from the collection of Gregory Seymour).

Seymour analyzed 1,969 sherds from the collection, which consisted of 39 percent Great Basin Brown Ware, 28 percent Lower Colorado buff ware, 10 percent Tizon Brown Ware, and 6 percent Prescott Gray. Seymour compared the ceramics recovered from the upper (Levels 2–4; see Seymour 1997:Figure7), middle (Levels 5–15; see Seymour 1997: Figure 8) and lowest levels (Levels 24–33; see Seymour 1997: Figure 9) of the combined excavation units and found that brown ware pottery was recovered in greater quantities in the upper levels and buff ware increased in quantity in the deepest level. Seymour processed six radiocarbon dates from the upper (n=1), middle (n=4), and lowest level (n=1). The combined date calibrated date range for the six radiocarbon samples is A.D. 1190 to 1630, and the earliest date is also the earliest for the Post-Puebloan period. Based on these data, Seymour argued that buff wares pre-dated Great Basin Brown Ware in the southern region of the Las Vegas Valley.

Pardee Site (26CK3799)

This large open campsite was located in the Eglington Escarpment area, approximately 5 miles north of Las Vegas, in an area of sand dunes and low mesquite trees. The site was investigated in 1998 by the HRC (Blair et al. 2000) as part of a data recovery project for the construction of the Northern Beltway. Fifty-three small hearths and thermal features were excavated across the site's low dunes. Radiocarbon dates suggest that occupation of the site began 6,000 years ago and continued intermittently during the Archaic and Post-Puebloan periods. Three hearths associated with artifact clusters at the north and south ends of the site dated to the Post-Puebloan period.

A two-sigma calibrated date range of A.D. 1235 to 1390 was obtained from Feature 40A and a second calibrated range of A.D. 1275 to 1400 was obtained from a nearby thermal feature, Feature 40B. Feature 40 consisted of three distinct hearths (Features 40A, 40B, and 40C) in an area that measured 6 m by 4 m. The hearths consisted of shallow basins filled with ash, charcoal, and fire-cracked rock. No economic plants were identified in the macrobotanical samples processed from the features. No diagnostic artifacts were associated with this feature.

Feature 27, a hearth at the south end of the site, yielded a slightly later calibrated date of A.D. 1290 to 1425. Feature 27 was a bowl-shaped feature containing a mixture of burned soil, fire-cracked rock, and a caliche base. A charred yucca seed and mesquite charcoal were obtained from a flotation sample. Although no artifacts were directly associated with Feature 27, excavation units located less than 10 m north of Feature 27 contained 3 Great Basin Brown Ware and 26 North Creek Gray sherds.

Burnt Rock Spring Mound (26CK3601)

Burnt Rock Mound, situated on the Eglington Escarpment north of Las Vegas, was first recorded by Kevin Rafferty in 1985 as a large, intensively used prehistoric campsite that covered over 50 to 60 acres. The site consisted of a dense scatter of artifacts, charcoal stained soil, and fire-cracked rock located on and around a natural spring mound (Figure H.4). Early in 2000, Gregory R. Seymour and Hal B. Rager conducted archaeological excavations and geological trenching at the site (Rager 2001; Seymour and Rager 2001). Seymour and Rager's archaeological investigations included surface collection of a 2300-m square area, excavation of two backhoe trenches into the spring mound for geomorphological study, and excavation of 14 small excavation units (1x1 m) in arbitrary levels. No macrobotanical or pollen samples were processed from these investigations.

Figure H.4. Burnt Rock Mound during excavation, looking north. Note the fire-cracked rock and charcoal-stained spring mound deposits in the foreground (photograph from the collection of Gregory Seymour).

Radiocarbon dates obtained from various depths suggest that occupation began during the Terminal Archaic period and extended into the Historic period (Table H.2; Seymour and Rager 2001:Table 2). Temporally diagnostic artifacts, including arrow points and ceramics, support this occupation range. A total of 645 sherds were analyzed from Burnt Rock Mound. The majority were Puebloan (66 percent), though Patayan ceramics were also fairly abundant (20 percent). The remainder were Great Basin Brown Wares or unidentified varieties (Seymour and Rager 2001:Table 5).

Table H.2. Radiocarbon Dates from Burnt Rock Mound (26CK3601).

Provenience	Material	Age	Combined Cal. Date
Beta-143485	Unit 8, 10–20 cm	200±60	1715–1885
Beta-152723	Unit 8, 20–30 cm	230±50	1520–1570, 1630–1690, 1730–1810, 1920–1950
Beta-143489	Unit 9, 10–20 cm	310±50	1455–1665
Beta-143482	Unit 2, 10–20 cm	320±50	1450–1660
Beta-152725	Unit 9, 40–50 cm	350±50	1440–1650
Beta-143490	Unit 9, 30–40 cm	380±50	1430–1645
Beta-143481	Trench 2	460±60	1400–1515, 1590–1620
Beta-143480	Trench 2	460±80	1310–1638
Beta-152724	Unit 8, 30–40 cm	540±50	1310–1440
Beta-143492	Unit 5, 20–30 cm	580±50	1300–1430
Beta-152726	Unit 9, 50–60 cm	580±50	1300–1430
Beta-143491	Unit 1, 10–20 cm	660±70	1250–1420
"	"	580±50	1560–1630
Beta-143486	Unit 8, 40–50 cm	980±50	980–1195
Beta-143488	Unit 8, 60–70 cm	1160±80	680–1020
Beta-152721	Unit 14, 20–30 cm	1270±40	670–870
"	Unit 1, 20–30 cm	"	"
Beta-143487	Unit 8, 50–60 cm	1280±60	650–885
Beta-143483	Unit 2, 50–60 cm	1590±70	330–625
Beta-152722	Unit 1, 30–40 cm	1930±60	50 BC–230
Beta-143484	Unit 1, 40–50 cm	1960±60	80 BC–155

The radiocarbon dates and artifacts suggest that the site was occupied on an intermittent basis from the Terminal Archaic period through the Post-Puebloan period. No intact thermal or habitation features were encountered during test excavations to provide data on the specific uses of the site. The dense concentration of fire-cracked rock and charcoal-stained soil in the spring mound caldron and sides hints that the spring mound itself was repeatedly reused as a thermal feature since the Terminal Archaic period and possibly earlier.

Rager's (2001) analysis of flaked stone from the subsurface contexts suggests that the percentage of biface thinning flakes decreased significantly in favor of pressure reduction flakes between A.D. 700 and 1250. Although Rager's chronological control over the assemblages was somewhat problematic due to stratigraphic mixing he felt his data supported a model of greater sedentism during the Puebloan period (A.D. 850–1250).

26CK2461

This site contains four small rockshelters that were excavated by Dames and Moore for the Kern River Pipeline project (York et. al. 1992) in the early 1990s. The site is located north of Las Vegas at the northeastern edge of the Las Vegas Valley in the Las Vegas Range. Two of the four rockshelters contained cultural deposits that were completely excavated. Shelter No. 1 contained a shallow cultural deposit (surface to 10 cm) with three hearth features, from which radiocarbon testing produced a combined calibrated date range of A.D. 1260 to 1620. Artifacts collected from this shelter included 92 pieces of debitage, 2 quartzite bifaces, 1 edge-modified tool, 56 faunal bones (predominantly unmodified or burned tortoise and rabbit), and 3 metates. Shelter No. 3 contained shallower and sparser cultural deposits than Shelter No. 1. The only cultural materials recovered included 6 pieces of debitage, 2 metates, and 230 faunal bones. As with Shelter No. 1 the remains were unmodified and may not have been left by people using the shelter.

Bighorn Cave (26CK4446)

In 2002, URS Corporation completely excavated this rockshelter, located a few miles south of Goodsprings, to mitigate impacts related to the construction of a nearby transmission line. The site consisted of a cave (5 m deep, 3 m wide, 2 high) and two smaller alcoves. Artifacts observed on the floor and just outside the cave included debitage, pottery, charcoal, bone, a metate, and a mano fragment. The cave likely functioned as a short-term camping locale possibly related to agave processing and tortoise procurement. The presence of piñon nuts and reeds suggest procurement activities in the adjacent mountains and at springs.

Fifty-one 1- x 1-m units were excavated within the cave and 27 units were excavated in the apron. The two areas did not contain stratified cultural deposits, but instead consisted of a single level of shallow, ashy silt intermixed with rocks and limestone. The deposits in the shelter averaged 42 cm in depth and in the apron 22 cm. Four radiocarbon dates obtained from the ashy silt yielded a calibrated range of A.D. 1290 to 1950. The earliest date yielded a calibrated range of A.D. 1290 to 1420, two other dates have a range of A.D. 1420 to 1800, and a fourth begins at A.D. 1520 and extends to 1950. The subsurface of the site lacked caches, or hearths or other features, although the surface did contain a rock alignment.

Diagnostic projectile points recovered during the excavations included 17 Rosegate Series, 11 Desert Side-Notched, 4 Cottonwood Triangular, and 2 Elko Corner-Notched. A stemmed point of unknown type was also found. Pottery included 216 sherds; Lower Colorado Buff Ware (n=81) and Great Basin Brown Ware (n=79) dominated the assemblage. Other types included Tizon Brown Ware (n=6), Topoc/Tizon (n=4), Moapa Gray Ware (n=5), and North Creek Gray (n=3). Based on the analysis of the rims the assemblage represents 13 vessels. Thirty-six projectile points were submitted for obsidian sourcing and 32 of the samples were from the Devil's Peak source, which is 5 miles south of the site. Three other sources were represented by the other four samples including Wild Horse Canyon in Utah (Rosegate point and debitage), Kane Springs (point fragment) north of Moapa in Nevada, and Castle Mountain in Californian (Desert Side-Notched point).

A total of 4,063 pieces of debitage were collected and other flaked stone artifacts consisted of 78 bifaces, 13 retouched flakes, and 47 cores. The ground stone assemblage included 2 manos, 5 mano fragments, 1 basin metate, 11 metate fragments, and 7 ground stone fragments. Perishable artifacts included processed raw fiber, knotted fibers (single-ply twine), bundled yucca, quids (n=4), a basket sidewall (close diagonal twining, s-twist weft), cordage (two-ply, Z-spun S-twist; two-ply S-spun, Z-twist; three-ply, s-spun, Z-twist, one-ply S and Z spun), netting fragments, and reeds. Floral remains consisted of agave leaves, a devil's claw pod, piñon nut shells (n=40), and burned cactus. Faunal remains suggest that tortoise, rabbits, rodents, and birds were likely cooked at the site. Ornaments were also present and consisted of two shell beads, three bone beads, one polished turquoise nugget, one polished pebble, and two fragments of shell.

26CK6007

This site is located on the south bank of Las Vegas Wash toward Three Kids Wash in Clark County Wetlands Park in Henderson. In 2007 HRA (Ahlstrom 2008) conducted test excavations in charcoal deposits exposed in a cut bank to determine if they were cultural in origin. Mechanical excavations exposed an informal hearth feature on top of a metate (Figure H.5). The only cultural material recovered from the fill of the hearth was a single fragment of burned animal bone. A radiocarbon date obtained from charcoal above the feature, where a small assemblage of debitage was recovered, produced a calibrated date range of A.D. 1270 to 1400. A sample processed from charred material lying below the feature produced an earlier date range of A.D. 970 to 1200.

Figure H.5. Photograph of Feature 1 profile, Site 26CK6007. Note the metate that underlies the hearth feature.

Tule Springs, Locus 41(26CK4)

This hearth feature was excavated and radiocarbon dated to A.D. 1280–1466 during the Tule Springs investigations (Haynes 1967: Table 6). There is no other available information on this feature.

26CK4440

This rockshelter was excavated during the Kern River Pipeline project (York et al. 1992) at the southern edge of the Sheep Range. The shelter covered an area of 21 square meters, and 23 1- x 1-units were excavated to bedrock, which occurred at depths of 20 to 60 cm below surface. The cultural deposits were not stratified, yet several hearth features were identified and radiocarbon dated. Three of the radiocarbon dates fell within the Post-Puebloan period, and they have a combined calibrated date range of A.D. 1280 to 1650. A fourth date, from a small concentration of charcoal buried 20 cm below the surface, produced a calibrated date range of A.D. 540 to 690.

Artifacts recovered from this site included 2,026 pieces of debitage, 64 flaked stone tools (a Elko Corner-notched and a Rosegate), 183 potsherds, 6 pieces of ground stone, 6 incised stones, a sandstone ornament, and 983 bones from desert tortoises, artiodactyls, rabbits, rodents, and birds. Only 13 of the bones were burned and most of these were from tortoises. Five flotation samples were processed and two samples yielded evidence of hedgehog cactus use.

Pottery types were primarily from the Anasazi tradition and included 67 Logandale Gray, 44 North Creek Gray, 25 North Creek Corrugated, 21 Boulder Gray, four Washington Black-on-gray, seven Shivwits, five unclassified Paddle-and-anvil, and two unclassified (Lyneis 1992). Lyneis (1992:194) considered the dearth of Great Basin Brown Ware and Paddle-and-anvil vessels perplexing, considering that most of the radiocarbon dates from the site post-dated the Puebloan period. The projectile point styles were also earlier than one would anticipate for the radiocarbon date range. One interesting aspect of the analysis was the obsidian sourcing. Most of the 12 pieces of obsidian sourced originated from one locale: the Wild Horse Canyon source in the Mineral Mountains of Utah.

26CK1138

This open "fragile pattern" site was investigated during the Las Vegas Wash Project (Ferraro and Ellis 1982), and the artifact assemblage from the site was later reevaluated by HRA (Ahlstrom 2005). The site occupies the top and sides of a bench overlooking the Las Vegas Wash floodplain in Clark County Wetlands Park. The site is located in a concentration of sites at the intersection of Three Kids Wash and Las Vegas Wash, and rockshelter 26CK1139 lies less than 100 m to the west.

Site 26CK1138 consists of more than 30 features including cleared circles and cleared circles ringed with rocks, rock cairns, hearths, and rock alignments. Most of these features were completely excavated during the Las Vegas Wash Project. The calibrated radiocarbon dates from four samples are A.D. 1290 to 1420 and A.D. 1700 to 1955, plus two modern dates. Artifacts collected include a mescal knife consisting of a stone blade inserted into a prepared wooden handle (this item closely resembles one collected from Paiute Cave except that the one from Paiute Cave had a metal blade inserted into a wooden handle [Harrington 1930]), a compound arrow foreshaft, two cores, two dart points, one Desert Side-Notched point, one indeterminate arrow point, one unifacial tool, one pressure-flaked biface, one hammerstone, two one-handed manos, incised stones, 20 Tizon Brown sherds, one Parker Stuccoed sherd, one Lower Colorado Buff Ware sherd, and one North Creek Gray, a small white glass barrel bead, and a bone bead.

Botanical remains collected during the excavations suggest that mesquite pods and cattail plants were processed, and faunal remains consist of 91 bones from desert tortoises (three burned) and a few bones from artiodactyls. Two piñon nuts, which would have been obtained from a distance of over 20 miles, were also present. Based on the artifacts and other evidence Ahlstrom (2005) concluded that the site was used as a limited-activity or campsite possibly for gathering and processing mesquite pods and other wetland plants such as cattail pollen. The white glass trade bead suggests Euroamerican contacts during the early historic period and the ceramics are predominantly Patayan.

26CK6913

This open temporary campsite is located on the Eglington Escarpment north of Las Vegas. The site was excavated by the Far Western Anthropological Group in 2005 (King et al. 2006) and contained two features—a surface scatter of fire-cracked rock and a circular hearth (80 to 90 cm diameter) consisting of a thin lens of ash, charcoal, and oxidized soil. The base of the hearth was buried 10 to 20 cm below the ground surface and some staining was visible on the ground surface. A calibrated radiocarbon date range of A.D. 1300 to 1410 was obtained from a charcoal sample from this hearth.

Excavation of five 1- x 1-m units in the vicinity of these features produced an artifact assemblage of 3 fragmented Desert Side-Notched points, 10 biface fragments, and 1,967 pieces of debitage. Several pieces of obsidian were sourced to the Modena/Panaca Summit source in southwestern Utah. Hunting was indicated by 105 bone fragments from tortoises, rabbits, and large/medium mammals. Although no ground stone was recovered from the site, a flotation sample processed from the hearth yielded burned seeds from Mojave yucca, goosefoot, wild rye, rush, and popcorn flower. Other charred plant remains collected from screening included a mesquite pod and fruit of the Mojave yucca. Mesquite wood and creosote were used as fuel wood. King et al. (2006) found the lack of ground stone perplexing and they inferred from the charred seeds that the site was likely occupied during late spring and the early summer months.

26CK4908

Site 26CK4908 is a rockshelter and roasting pit complex located on the western side of the Las Vegas Valley at the foot of La Madre Mountain. This site was excavated by the HRC for Environmental Studies in 1999 (Blair et al. 2000). The roasting pit complex consisted of three large, mounded roasting pits that are typically associated with agave cooking. Backhoe trenches were excavated through each of the pits and samples were obtained for macrobotanical analysis and radiocarbon dating. Phytoliths recovered from the roasting pit soil samples indicate that cactus species other than *Opuntia* were likely cooked in the features. One radiocarbon date indicated that one of the features was used between A.D. 560 and 760 and four additional dates yielded a combined calibrated range of A.D. 1310 and 1955. Three radiocarbon dates from the rockshelter yielded a calibrated range of A.D. 1675 to 1955, and the artifacts, including a metal projectile point and other Euroamerican items, support an occupation that extended into the historic period.

The rockshelter consisted of a shallow overhang approximately 25 m in length and approximately 1 to 2.5 m deep within an exposed conglomerate formation. The shelter was divided into four small solution cavities or alcoves that were separated by rock walls consisting of one or two courses of stones. The shallow cultural deposits lacked stratigraphy.

Seventy-one excavation units (1x1m) were excavated in 10-cm arbitrary levels to bedrock, which occurred between 10 and 50 cm. One hearth with fired-cracked rock and three possible hearth features, consisting of ashy lenses measuring 30 to 40 cm in diameter, were encountered just below the surface.

Five historical artifacts were recovered from the rockshelter including an iron projectile point, three metal shank coat buttons, and a four-hole white glass shirt button (Blair et al. 2000:298). Other artifacts recovered from the excavation of the shelter and roasting mounds included 1,282 pieces of debitage, 23 bifaces, 3 hammerstones, 2 drills, more than 30 pieces of ground stone, 33 projectile points (1 Pinto, 3 Rosegate, 10 Desert Side-Notched, 18 Cottonwood Triangular, and 1 metal point), three *Olivella* beads, one bone bead, 173 burned bones, and 479 sherds (Blair et al. 2000). The ceramic assemblage included 29 percent Great Basin Brown Ware and Great Basin Corrugated, 69 percent buff wares, and two percent gray wares. Gray ware sherds were recovered from just above the level of the roasting mound (Feature 1) that was radiocarbon dated to A.D. 560–750. All of the seeds (*Amaranthus, Echinocereus, Erodium, Bromus, Yucca schidigera*) collected from the rockshelter's macrobotanical samples were uncharred and may not have been introduced via cultural means. Pine nut shells were also collected. The faunal remains were dominated by tortoise and rabbit bones.

Corn Creek Dunes (26CK2605)

Three radiocarbon dates, with a combined calibrated date range of A.D. 1320 to 1440, were obtained from three features (Feature 9, Feature 13, and Feature 21) during HRA's recent data recovery investigations at the Corn Creek Dunes (26CK2605), located at the Corn Creek Field Station in the Desert National Wildlife Refuge (Roberts and Lyon 2011). A fourth date with a later range of A.D. 1690 to 1920 was obtained from a caliche boulder-lined roasting pit. The Corn Creek Dunes site is a large habitation site that covers more than 800 acres of sand dunes and flowing springs. The area is a lush oasis of wild plant and animal foods including mesquite, marsh plants, rabbits, bighorn sheep, and many other smaller animals. HRA's data recovery investigations were conducted to mitigate the impacts to the site related to the construction of a new visitor center, trail system, and habitat restoration project.

Feature 9 was a heavily bioturbated midden deposits in the meadow area at the western edge of the Field Station. During data recovery an excavation unit (2 x.50 m) was dug into the midden to the base of the deposit. Artifacts recovered from the excavation unit included 1,806 pieces of debitage, 2 Desert Side-Notched points, 7 biface fragments, 1 mano fragment, 1 fragment of ground stone, 5 pieces of wire or metal, 1 piece of clear glass, 1 fragment of long bone from an ungulate, 3 brown ware sherds, 3 Logandale Gray sherds, 1 San Juan Red Ware sherd, and 1 Tusayan White Ware sherd.

One soil sample was processed from the base of the midden for pollen, starch, phytolith, and macrofloral analyses. The pollen record yielded slightly elevated frequencies of *Opuntia* and Poaceae

pollen, which suggests processing of prickly pear cactus and grasses or grass seeds. The analyzed sample yielded an abundance of phytoliths; however, phytoliths from cultigens such as maize, beans, and squash were not observed.

Feature 13 is a large midden that covers an area of more that 50 square meters, with deposits extending to a depth of over 1 m. Unfortunately, the soils are heavily bioturbated and disturbed by historic ranching activities. *Atriplex* charcoal was submitted for AMS radiocarbon dating and yielded a date with a two-sigma calibrated range of A.D. 1320 to 1430. Flaked stone debitage was collected from all levels and only decreased moderately with depth (Level 1=47, Level 2=181, Level 3=144, Level 4=276, Level 5=135, Level 6=313, Level 7=127). Flaked stone tools included 7 projectile points (3 Rosegate/Parowan Basal-Notched, 2 Elko Corner-Notched, 1 Rose Spring, and 1 unidentified point fragment), 15 bifaces, 3 bifacial scrapers, 1 unifacial scraper, and 1 utilized flake. One macrobotanical sample was analyzed and contained a single *Zea*-type rondel, two charred *Amaranthus* seed fragments, a charred probable seep weed seed fragment, a charred strawberry cactus seed, and a charred *Zea mays* kernel fragment.

A third radiocarbon date was obtained from a roasting pit, Feature 21, located stratigraphically above an older shallow pithouse. The structure was associated with cultigens, locally made gray ware pottery, brown ware, and Eastgate/Parowan Basal-Notched points. The roasting pit was a basin-shaped rock-lined pit measuring approximately 1.25 m in diameter and 25 to 30 cm in depth. The soil under the cobbles in the pit was slightly oxidized (Figure H.6). A single saltbush twig from Feature 21 yielded an AMS date with a two-sigma calibrated range of A.D. 1400 to 1440.

Figure H.6. Feature 21, the Corn Creek Dunes site (26CK2605) after excavation, looking west.

Cultural material collected from the feature's fill included 274 general percussion flakes, 247 pressure flakes, 8 biface-thinning flakes, 4 mid-stage bifaces, a late-stage biface, a scraper, 7 Logandale Gray Ware sherds, 1 Tusayan Gray Ware sherd, 1 ground stone fragment, 1 palette fragment, and several bone fragments from rabbit- to ungulate-size mammals. Two macrobotanical samples from the feature contained a burnt cactus spine and glochid, five unidentified fruit fragments, and mesquite charcoal. A third sample from the feature contained a charred strawberry cactus seed, fragments of charred meal, charred parenchymous tissue (possible evidence of root or tuber processing), and a charred *Amaranthus* seed. The charcoal record was dominated by mesquite plus smaller fragments of charcoal from saltbush, creosote bush, and a woody member of the rose family. The heavy fraction from flotation contained

numerous calcined and burned bone fragments. The soil samples indicate that cactus fruit/pulp or buds were processed in the feature along with unknown roots or tubers. *Amaranthus* seeds may also have been processed; however, it is equally likely that these plants were used to line the roasting pit.

The fourth radiocarbon date came from Feature 8, which was identified in the pasture at 26 to 30 cm below the modern ground surface as a large (2.3×2 m) basin-shaped pit that had been lined with locally available caliche cobbles that were 30 to 40 cm in size (Figure H.7). The feature contained very little charcoal, suggesting that the fire was allowed to burn to ash or that the burning material was removed before the pit was filled with the foods to be cooked. Although the floor or base of the pit was not formally prepared, a 5- to 15-cm thick, unconsolidated oxidation rind was present underneath the deep, central portion of the pit. This rind did not extend up along the pit's exterior edges. Charcoal collected from the feature yielded a two-sigma calibrated date range of A.D. 1690–1730 and 1810–1920. Artifacts recovered included 4 Logandale Gray sherds collected from both halves of the pit between 41 and 62 cm; 1,053 pieces of debitage from the feature and surrounding area, as well as a metate fragment, a indeterminate piece of ground stone, and a piece of brown glass. Although this feature was well preserved, the two macrobotanical samples that were processed from feature did not contain any burnt seeds or other evidence of economic species.

Figure H.7. Feature 8 at the Corn Creek site after complete excavation. The rock lining can still be seen in the eastern half, note the modern post intruded into the west edge of the feature and oxidation under the rock lining.

26CK2459

This small rockshelter (5 m long x 4 m deep) was excavated by HRA during a survey and data recovery project in the Apex Project area (Ahlstrom and Roberts 2001c), where Garrett's Shelter was also located (Figure H.8). The only artifacts recovered included a small assemblage of lightly used ground stone including a block metate, a unifacial metate, two manos, and a flaked slab. Excavations within the shelter revealed an informal hearth surrounded by an area of ashy soil that indicated more than one episode of use. A radiocarbon date from charcoal collected from the feature yielded a calibrated date range of A.D. 1320 of 1500. Six pieces of burned and unburned faunal bone suggested processing of tortoises and small reptiles and a single macrobotanical sample did not produce economic plants, but indicated that creosote bush was burned as fuel.

Figure H.8. Photograph of 26CK2459.

26CK6907

Site 26CK6907 consisted of a single thermal feature located on the Eglington Escarpment area north of Las Vegas. The site was excavated by the Far Western Anthropological Group at the same time as 26CK6913, which was situated approximately 90 m to the northwest (King et al. 2006). The feature was a circular, rock-lined roasting pit that measured 1.2 m in diameter and contained fire-cracked rock, charcoal, and ash. This feature closely resembles the roasting pits at the Corn Creek Dunes site, which also dated to this period.

A radiocarbon sample processed from the feature produced a calibrated date range of A.D. 1390 to 1440. A flotation sample processed from the feature did not contain evidence of economic plants species; however, a pollen sample yielded elevated levels of amaranth or chenopod (cheno-ams), which the author suggested may have been used in the construction of the feature. King et al. felt it was possible that the feature was associated with the occupation of the adjacent temporary campsite 26CK6913.

The Larder Site (26CK6146)

This site was first recorded in 2001 as an extensive artifact scatter in an area measuring 85 x 300 m in Clark County Wetlands Park in Henderson, Nevada. HRA's test excavations, conducted in 2005 and 2006, suggested that the site functioned as an open-air cache for wild and cultivated plants. Excavation of backhoe trenches (totaling 762 m) across the site (Ahlstrom 2008) revealed 61 subsurface features including 56 bowl, basin, bell, and globular-shaped storage pits. The macrobotanical and pollen evidence demonstrated that these features were used to store honey mesquite, screwbean mesquite, maize, and other wild plants. Radiocarbon dates obtained from the features indicate that storage activities began around 200 B.C. and continued, perhaps with brief interruptions, until at least A.D. 1500.

Two radiocarbon dates, one from Feature 12 and a second from Feature 30, fall within the Post-Puebloan period. Feature 12 (Figure H.9) consisted of a circular, bell-shaped pit, that was radiocarbon dated to A.D. 1400–1460. Pollen and flotation samples processed from the feature yielded evidence that maize, a member of the mint family, and possible prickly pear cactus were processed, stored, or perhaps discarded in the feature. The radiocarbon date was obtained on two mesquite seeds lying on the floor of the pit, and the flotation samples contained mesquite seeds and pods and a charred screwbean mesquite seed. Half of this feature was excavated; artifacts collected from the fill of the feature included a Desert Side-Notched point and eight pieces of debitage.

Figure H.9. Photograph of Feature 12 in the north wall of Backhoe Trench 130N at the Larder site, following excavation.

Feature 30 was a basin-shaped pit with steep sided walls and a flat floor (Figure H.10). Mesquite seeds and pods produced a calibrated radiocarbon date of A.D. 1430 to 1620. A pollen sample and a macrobotanical sample were processed from the bottom of the feature. The pollen sample produced evidence that maize and possibly cheno-ams were stored in the pit, and the flotation sample contained mesquite pods and seeds, which suggests that they were stored in the pit as well.

Figure H.10. Photograph of Feature 30 in the north wall of Backhoe Trench 170N at the Larder site.

Flaherty Rockshelter (26CK415)

Flaherty Rockshelter is located on the east side of a high limestone ridge that forms the eastern edge of the Las Vegas Range. This shelter faces southeast and measures approximately 8 m wide, 7 m deep, and up to 2.5 m high. The site was excavated by the DRI and UNLV under the direction of Richard Brooks between 1967 and 1969. These investigations went unreported for 30 years until the HRC compiled the excavation notes and analyzed the artifacts recovered. Their analyses were included in a report on the excavations of two other sites in the Apex Land Exchange project area (Blair and Wedding 2001).

More than 40,000 artifacts were collected during these excavations, including 85 projectile points (64 of which were diagnostic). The point sequence includes a Lake Mojave Stemmed point, 6 Gatecliff, 5 Humboldt, 17 Elko Corner-notched, 6 Elko Eared, 2 indeterminate Elko Series, 10 Rose Spring, 8 Desert Side-Notched, 1 Uinta Side-notched, 3 lanceolate/leaf-shaped, and 4 triangular points (Blair and Wedding 2001:153). Ninety-seven potsherds were collected including Moapa Brown (5.2 percent), Boulder Gray (6.2 percent), North Creek Gray 26.8 percent), North Creek Corrugated (3.1 percent), North Creek Black-on-Gray (4.1 percent), Southern Paiute Brown (5.2 percent), Southern Paiute Corrugated (11.3 percent), Prescott Gray (5.2 percent), Shivwits Plain (1 percent), and Tizon Brown (1 percent). With the exception of the single Tizon sherd, which came from 30 to 50 cm below the surface, most of the ceramics appear to have been recovered from the upper 20 cm of fill (Blair and Wedding 2001: Table 20).

Thirteen radiocarbon dates were obtained from the shelter, with a combined calibrated date range of 4220 B.C. to A.D. 1650. Three dates fall within the Post-Puebloan period, and they have a combined date range of A.D. 1405 to 1650. These three dates were obtained from charred material and a yucca sandal (A.D. 1440–1640). The sandal was a simple plain weave figure-8 type. Sandals made in this fashion have been recovered from Etna Cave in Meadow Valley Wash and Black Dog Cave near Moapa in southern Nevada. Numerous figure-8 sandals were excavated by Wheeler from all levels of Etna Cave (Fowler et al. 1973). It is presumed that their use began during the Archaic period and extended into late Prehistoric times. In a recent review of this sandal type, James P. Barker (2008) noted that these sandals have also been found at Ventana Cave (associated with Hohokam pottery) and possibly in southwestern New Mexico. Two radiocarbon dates on the Black Dog Cave figure-8 sandals have yielded a calibrated date range of A.D. 400 to 620.

26LN2254

This site is a large multicomponent artifact scatter with 15 small thermal features/fire-cracked rock clusters. The site follows the edge of a dry playa—Dry Lake—located on the east edge of the Sheep Range along the dirt road between Corn Creek and Alamo. Recent geomorphological investigations for the Alamo Road Improvement Project (Wriston 2007, 2008) included detailed site recording and the excavation of backhoe trench to explore the subsurface deposits.

Artifacts suggest that Site 26LN2253 was first occupied during the Late Archaic period, and then used again during the Late Prehistoric and Historic periods. One feature, Feature 10, falls within the Post-Puebloan period. Feature 10 is a small concentration of fired-cracked rock, ash, and charcoal that yielded a calibrated radiocarbon date range of A.D. 1405 to 1630. No artifacts were directly associated with this feature, and no ceramics were identified at the site.

26CK7454

Site 26CK7454 is a shallow rockshelter (4 m x 2.3 m x 1.5 m high) located in the southeastern edge of the Las Vegas Valley. The site was excavated by Newfields in 2009 (Dubarton 2009) for a flood-control project. The radiocarbon dates and artifacts indicate that the site was occupied between A.D. 1405 and 1600, although the combined calibrated date range for nine dates is A.D. 1405 to 1950. A tenth date of 980 to 840 B.C. is believed by the author to be in error and is an “old wood” date.

The site's 140-cm-deep deposits contained five charcoal concentrations that the authors thought were the remains of hearths. Artifacts collected from the excavations included 31 bifaces, 3 projectile points (1 Rosegate, 1 Cottonwood Triangular, and 1 indeterminate), 16 potsherds (11 Lower Colorado Buff Ware pieces from one vessel, 3 Topoc Buff Ware sherds, and 3 Prescott Gray Ware sherds), and 2 metates. The 10 macrobotanical samples processed from the site yielded very little evidence of plant processing activities; however, burned tortoise bones suggested these animals were cooked and eaten. The large number of heat-treated tool stone materials indicated to Dubarton (2009) that the site had likely been used to heat treat tool stone from nearby procurement areas.

26CK1282 (Late Component)

This open campsite is located in the floodplain deposits of Las Vegas Wash in Clark County Wetlands Park in Henderson, Nevada. This site was first excavated in the 1970s during the Las Vegas Wash Archaeological Project (Ferraro and Ellis 1982) and later test excavated and reevaluated by HRA (Ahlstrom 2005). The site contains an earlier component that dates to approximately A.D. 500 and a later Post-Puebloan component, which is reviewed here. Ahlstrom (2005) felt that the later component was likely a camp that was used periodically between A.D. 1420 and 1900. The artifacts suggest that the site's inhabitants procured and cooked locally available wild foods such as mesquite, cactus, acacia, tortoise, rabbits, ducks, and artiodactyls. One of the radiocarbon dates (A.D. 1660–1950) was obtained from a maize kernel. Other activities included maintenance of hunting equipment, building of fires, limited use of ground stone, use of ceramic vessels, and making of a cattail mat. Pottery types resembled those recovered from nearby rockshelter site 26CK1139, and were dominated by Lower Colorado Buff types including Topoc Buff, Parker Red-on-buff, and Tizon Brown. Southern Paiute Brown and North Creek Gray sherds were also represented.

26CK4415

This rockshelter (7 x 2 x 3 m), located on the west flank of the Arrow Canyon Range, was excavated by the HRC (Blair and Wedding 2001) as part of the Apex Land Exchange project. Twenty-one excavation (1x1m) units were excavated within the shelter in arbitrary levels to bedrock, which was encountered at a depth of 10 to 30 cm. No natural stratigraphic levels could be discerned, and the radiocarbon dates suggest that the site was likely occupied after A.D. 1435. Two radiocarbon dates on two sandals yielded a calibrated date range of A.D. 1435 to 1795 and two dates on charred material yielded a calibrated date range of A.D. 1645 to 1950.

Artifacts recovered from the shelter included 3 Desert Side-Notched points, 2 cores, 1 hammerstone, 1 biface, 1 flake tool, 30 pieces of debitage, 1 wooden firedrill, 2 incised stones, 2 informal pieces of ground stone, 1 North Creek Gray sherd, 2 complete plain weave sandals, 2 fragments of wooden projectile shaft, a sinew-wrapped stick, 2 knots of yucca fiber, and 795 bones fragments (88 percent of these were tortoise and 14 percent of these were burned). The sandals and an atlatl dart shaft were found in a packrat midden in the rear of the shelter. Two flotation samples contained charred plant remains from plantain, yucca, and a member of the nightshade family; plus several types of cactus plants and seeds including barrel, hedgehog, cholla, pineapple, and prickly pear. Other samples of charcoal indicate that Mormon tea, creosote bush, and woody members of the composite family were burned as fuel.

This small shelter is important because it appears to have been occupied only briefly and represents a single temporal component. The sandals were both radiocarbon dated and described as follows. Specimen 1 is made of yucca fiber and is roughly rectangular with a rounded toe area and square heel. The construction technique was twined and the calibrated radiocarbon date was A.D. 1445 to 1645. The other sandal (Specimen 2), with a calibrated radiocarbon date range of A.D. 1510 to 1795, is a plain weave, figure-8 style sandal.

26CK5701

This prehistoric campsite, located at the northern edge of the Las Vegas Valley in the Apex Project area, was excavated by HRA (Ahlstrom and Roberts 2001c). The site occupies two benches that are separated by a 2-m-high rock face. Most of the site lay on the lower bench where two rock alignments and a small scatter of artifacts were recorded. Excavations within the rock alignments (1x2m) revealed three concentrations of buried charcoal and ash (Features 1.1, 1.2, 1.3) suggesting that the feature served as a shelter or cooking area (Figure H.11). A radiocarbon date obtained from Feature 1 yielded a date range of A.D. 1490 to 1660.

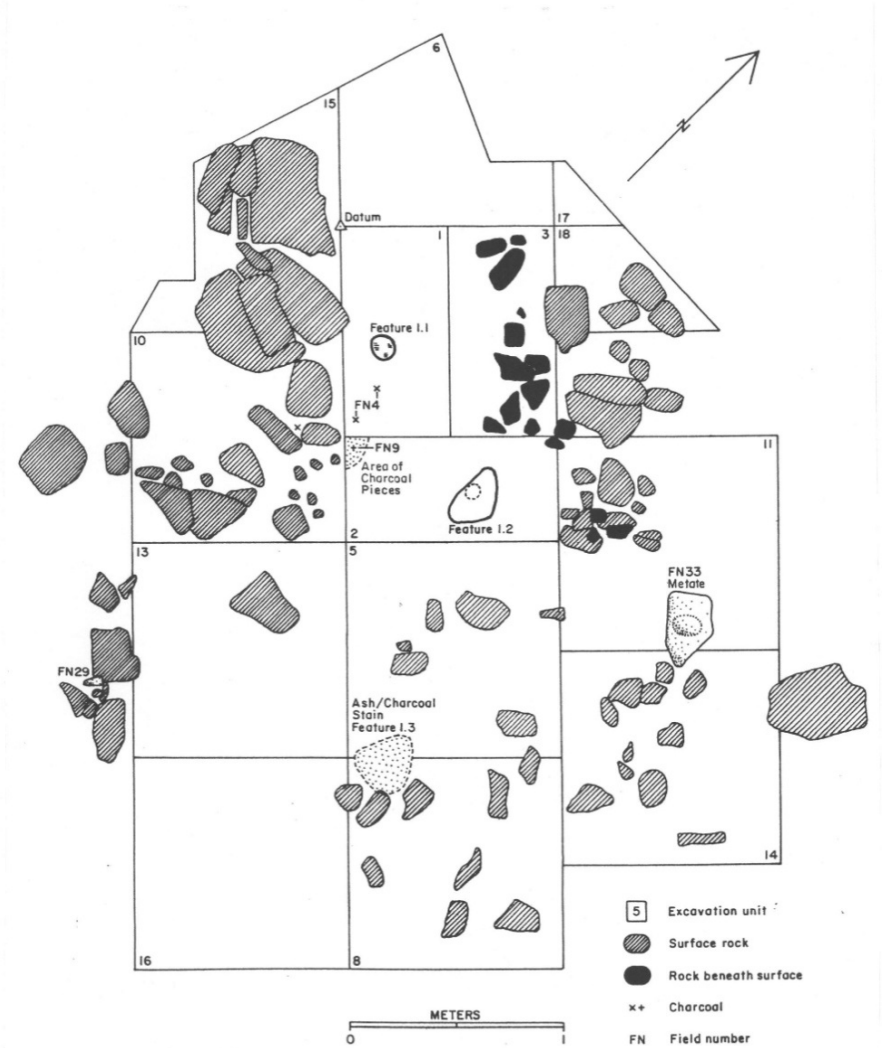

Figure H.11. Map of the rock alignments and excavation units at 26CK5701.

Artifacts recovered from the site included a block metate, a tabular netherstone, an edge-ground cobble, 34 flakes, 2 uniface fragments, and an obsidian biface, which was sourced to the Panaca Summit/Modena source in Utah located 110 miles to the northeast. Faunal remains consisted of several bones from desert tortoise, one artiodactyl bone, and two from a small mammal.

26LN4970

This site is a large multicomponent artifact scatter with numerous small thermal features and seven loci. The site follows the margin of a playa, Dry Lake, south of 26LN2254, which was described earlier. Recent geomorphological investigations for the Alamo Road Improvement Project (Wriston 2007,

2008) included backhoe trench excavations to explore the subsurface deposits. In addition, a few small thermal features on the site's surface were radiocarbon dated and the associated artifacts were described. These studies suggest that the site was first occupied during the Middle Archaic period, then more intensively during the Late Archaic and lastly during the Post-Puebloan period.

A radiocarbon sample obtained from Feature 28, an "isolated hearth" on the modern surface (a concentration of fire-cracked rock, ash, and charcoal that measures approximately 1.3 m in diameter) yielded a calibrated date range of A.D. 1520 to 1950. A slightly earlier date of A.D. 1155 to 1275 was obtained from a similar feature, Feature 34, which was located at the northern tip of the linear site. No artifacts were directly associated with either feature, although gray and brown ware pottery, and Cottonwood Triangular points were recorded 200 m to the northeast in Locus B.

EASTERN REGION

The Rattlesnake Site (26CK1081)

The site was partially excavated by Richard Brooks and the Nevada Archaeological Survey for the Navajo-McCullough Transmission Line Project in the early 1970s (Brooks et al. 1975). The rockshelter (1.5 m high, 2.3 m wide, and 2 m deep) and large roasting pit (7 m diameter and 3 m high) is located north of the Las Vegas Valley and just east of I-15 in the Dry Lake Mountain Range. The rockshelter resembles Garrett's Shelter and 26CK1440, which are situated in an upland setting in the Arrow Canyon Range less than 12 miles to the northeast.

Both the shelter and roasting pit at the Rattlesnake site were partially excavated. Just outside the shelter, Brooks et al. (1975) reported a concentration of fire-cracked rock that suggested various episodes of reuse. Underlying these deposits, a hearth located at a depth of 60 to 70 cm produced a calibrated date range of A.D. 1300 to 1480. Two older radiocarbon dates with a combined calibrated range of A.D. 1000 to 1280 were obtained from the deepest level of the large roasting pit and from the bottom level of the units excavated in the apron of the rockshelter. A hearth inside the shelter at a depth of 15 to 20 cm produced a calibrated date range of A.D. 1470 to 1950.

Artifacts recovered from the shelter and roasting pit included 269 sherds (gray ware = 32 percent, corrugated gray ware = 29 percent, decorated gray ware = 4.5 percent, carbonate tempered grayware = 20 percent, and diatreme temperered = 6 percent, buff ware = 0.6 percent, Paiute Brown ware = 1.7 percent, and not analyzed = 4 percent [Brooks et al. 1975:317]), 48 projectile points (2 Cottonwood Triangular, 16 Desert Side-Notched, 5 Rose Spring series, and 2 Eastgate), ground stone, bifaces, debitage (obsidian was present), and *Olivella* shell beads. The buff and brown ware sherds were recovered from the upper levels of the rockshelter; which post dated A.D. 1400, and the excavators were surprised by the small number of Great Basin Brown Ware sherds, and thought that late date from the 15- to 20-cm level, with little associated Paiute pottery was unexpected, (Brooks et al. 1975:319). Most of the faunal remains were from tortoises, and no macrobotanical samples were processed.

Roadside Roast (26CK1091)

This rockshelter and roasting pit complex, located in the California Wash area, was excavated and reported by Lynda Blair for her master's thesis (Blair 1986). Six units were excavated in the apron of the rockshelter, as well as a large roasting pit that was near the rockshelter. One date from the deepest levels of the rockshelter produced a calibrated date range of A.D. 130 to 570 and a second radiocarbon date from the bottom levels of the roasting pit produced a similar, but slightly earlier, calibrated date range of 295 B.C. to A.D. 175. A much more recent date of A.D. 1210 to 1640 was obtained from the upper 20 to 30 cm of fill in front of the rockshelter.

The pottery collected from the roasting pit included nine Verde Gray, two North Creek Corrugated, and three Moapa Corrugated sherds. Blair noted that most of the pottery collected from the rockshelter was North Creek Corrugated and other Virgin varieties; however, she did not provide a list of the pottery types by quantities (the total number of sherds recovered from the shelter is 253). Numerous other artifacts were collected from the rockshelter including 28 projectile points, drills, bifaces, scrapers,

and cores. Although Blair thought that the projectile point styles—Elko, Humboldt, and Rose Spring types—were too early for the pottery assemblage, these types are consistent with the earlier radiocarbon dates. No macrobotanical samples were processed, and the faunal remains consisted primarily of desert tortoise.

Burial Site (26CK1083)

This rockshelter and roasting pit site is one of a series of sites located along California Wash that were investigated by Lynda Blair for her master's thesis (Blair 1986). California Wash is located northeast of Las Vegas where it extends north from the Muddy Mountains to the Muddy River near Moapa. The wash likely served as a travel corridor that linked the Moapa Valley to the Las Vegas Valley. Seven excavation units were dug in site 26CK1083, in both the rockshelter (5 units) and roasting pit. A radiocarbon date, obtained from the roasting pit at a depth of 40 to 50 cm, provided a two-sigma calibrated date range of A.D. 1220 to 1400. A second radiocarbon date with a calibrated date range of A.D. 1390 to 1670 was obtained from a depth of 30 to 40 cm in the rockshelter. Blair thought that these radiocarbon dates were too late for the predominantly Puebloan pottery, which was recovered from the roasting pit and shelter (Blair 1986:101).

Artifacts recovered from the rockshelter included a metate, North Creek Gray Plain and Corrugated sherds, two Desert Side-Notched points, one Rose Spring point, six projectile point fragments, one biface preform, debitage, and bone fragments. Many other types of tools were collected including bifaces, cores, and scrapers. The roasting pit that was test excavated contained a circular central hearth, small bones fragments, debitage, and a single Virgin Series sherd.

Yamashita 5S (26CK2042)

The Yamashita property southeast of Logandale in the Lower Moapa Valley was investigated over several years by Margaret Lyneis for UNLV's archaeological field schools. This project is discussed in greater detail in Chapter 6. This chapter focuses on the components from four of these excavated Yamashita sites (Yamashita 2, 3, 5N, 5S) that date to the Post-Puebloan period. The Yamashita sites contain evidence of use from the Late Basketmaker II period through the Post-Puebloan period. Lyneis identified over 450 Great Basin Brown Ware sherds and 49 Desert Side-Notched points, plus Cottonwood Triangular points, scattered across the property. The mineralogy of the pottery temper suggested to Lyneis that the pottery was made in the Virgin Mountains.

The earliest radiocarbon date from the Yamashita sites, which falls within the Post-Puebloan period is a calibrated date range of A.D. 1290 to 1420 recovered from Yamashita-5S. This date was obtained on charcoal collected from Feature A, a midden deposit, at a depth of 56 cm below the surface. The midden contained a high frequency of corrugated pottery that suggested to Lyneis that buried structures, dating to the Late Pueblo II period, may lie to the east. At the base of the midden deposit was a thermal feature consisting of stained sand and fire-cracked rock associated with a milling stone and several large corrugated sherds. A luminescence date on a North Creek Corrugated sherd from the midden yielded a date of A.D. 1274±58. The radiocarbon date range corresponds well with the luminescence date on the North Creek Corrugated sherd.

Three later dates were obtained from a depression in an adobe layer at a depth of 75 cm and from a depth of 20 to 32 cm in the midden deposits. The calibrated date range of A.D. 1650 to 1950 for these three samples is identical, which is stratigraphically consistent with the earlier date for deeper levels of this midden deposit.

Yamashita-5N (26CK2041)

Yamashita-5N is located at the northern edge of the Yamashita sites that Lyneis investigated in the Lower Moapa Valley. Excavations in Yamishita-5N exposed an adobe habitation room (Structure 1) with a clay-lined hearth that was covered with adobe rubble. The hearth contents of this structure yielded a calibrated radiocarbon date of A.D. 1000 to 1180.

Three more recent radiocarbon dates were obtained from the deposits covering or adjoining the structure, and suggest reuse of the feature. A calibrated date range of A.D. 1300 to 1420 (Beta-172546) was obtained from charcoal collected from the south edge of the structure, and a second date on charcoal from the base of a pit, at a depth of 70 cm, yielded a calibrated range of A.D. 1430 to 1660 (Beta-172545). Four Paiute Brown Ware sherds and a more recent calibrated date of A.D. 1650 to 1950 (Beta-162560) were obtained from the sand and charcoal layer covering Structure 1.

Yamashita 2 (26CK6445)

Yamashita 2 was a badly vandalized site that contained two Pueblo II habitation rooms (Structures 1 and 4) and associated storeroom remnants (Structures 2 and 3). Structure 1 was an adobe habitation structure with a well-plastered floor that was radiocarbon dated to A.D. 1020–1160. A similar date was obtained from Structure 4 indicating construction and use of these features during the Puebloan Period.

Six later dates were obtained on charcoal and a screwbean from hearths constructed after the structures were abandoned. A calibrated radiocarbon date of A.D. 1310 to 1660 was recovered from a scatter of fire-cracked rock, charcoal, and brown ware sherds that overlay Structure 4. A luminescence date on a Southern Paiute sherd associated with this radiocarbon date yielded a date of A.D. 1312±77. Lyneis suggested that the surface of adobe rubble was selected to serve as a stable surface for the thermal feature.

Two slightly later dates with a calibrated range of A.D. 1450 to 1950 were obtained from extramural hearths built along the south wall of Structure 1, which may have served as a wind break. Two additional radiocarbon dates, with a calibrated range of A.D. 1650 to 1955 were obtained from a screwbean pod and a rock-lined hearth. A second rock-lined hearth is believed to be historic because it was associated with a historic spoon. Taken together, the radiocarbon dates and thermal features indicate that the site's use continued throughout the Post-Puebloan period as a camping location, presumably by the makers of brown ware pottery.

The Shelf Site (26CK1164)

This open camp was excavated during the Navajo-McCullough Transmission Line project by Brooks et al. (1975). The site was located at the northern tip of the Dry Lake Range 2 miles southeast of the Arrow Canyon Range. The site contained two circular depressions surrounded by rock alignments on the top of a ledge and a midden area at the base of the ledge. Surface artifacts included numerous tools, debitage, ground stone, and pottery.

Twenty-seven 1-m units were excavated across the midden deposit in arbitrary levels to a depth of 100 cm. A radiocarbon date with a calibrated range of A.D. 1450 to 1950 was obtained from a depth of 25 cm below the surface. Pottery (133 sherds), consisting of buff ware (29 percent), gray ware (20 percent), red ware (17 percent) and brown ware (2 percent) sherds were recovered from the upper five levels. No corrugated sherds were identified at the site. Ten projectile points were recovered between 40 and 50 cm below the surface including Elko-eared (surface), Rose Spring, and Desert Side-Notched. Other artifacts collected from the site included numerous bifaces, 7 scrapers, 11 hammerstones, 1,132 pieces of debitage, worked flakes, 16 metates or fragments, and 10 manos or mano fragments. Faunal remains included 1,434 tortoise bones and 92 charred tortoise bones. One shell bead was also found in the top 10 cm of the excavations. The excavators felt that this site was a good location for an overnight camping spot along the prehistoric trail route from Moapa to Las Vegas.

Gold Butte Roasting Pits (26CK8163, 26CK3073, 26CK3093, 26CK8172, 26CK7932)

"Agave ovens" found throughout the Gold Butte project area were test-excavated recently by Far Western (McGuire et al. 2010) in order to obtain charcoal samples for radiocarbon dating. The combined calibrated date range for three of the dated features is A.D. 1400 to 1655; an additional two features yielded a calibrated range of A.D. 1525 to 1955. All of these charcoal samples were obtained from the

upper 20 cm of the features' fill (McGuire et al. 2010: Table 12) and, it is likely that the radiocarbon dates reflect the most recent interval of use, rather than the entire period of use.

McGuire et al. 2010 found that the Agave Ovens site (26CK1991), also located in the Gold Butte area, was the only agave pit in the project area where Puebloan use was documented; however, it is also the only site where a large roasting pit was excavated to the bottom of the feature, and radiocarbon samples were obtained from levels deeper than 20 cm below the surface. The profile drawing of the two pits excavated at the Agave Roast site (McGuire et al. 2010; Figure 24) demonstrate that the upper 20 cm of fill contained charcoal samples that dated to the Post-Puebloan/Historic periods. Large roasting pits excavated elsewhere in southern Nevada, for example, in the California Wash area (Blair 1986) and 26CK4908 (Blair et al. 2000) in the Las Vegas Valley, both contained evidence of use over long periods of time. It is possible that more extensive excavation and radiocarbon sampling of the five features in the Gold Butte area would likely demonstrate earlier episodes of use.

The Agave Ovens Site (26CK1991)

This agave processing and habitation site was test excavated by the Far Western Anthropological Group (Far Western) during their recent investigations in the Gold Butte Management Area located in the southeastern corner of Nevada, between the Virgin River and the Nevada Arizona border (McGuire et al. 2010). Artifacts recorded on the surface of the site included 6 projectile points (4 Elko, 1 dart-sized, 1 Cottonwood point), 2 bifaces, 1 flake tool, 6 millingstones, 1 handstone, and 106 potsherds (72 Patayan and 30 Puebloan), and unspecified Euroamerican historic artifacts. No brown ware sherds were present.

Excavation of a single 1- x 4-m unit in the two connecting roasting mounds (Pits 3 and Pit 4) yielded radiocarbon dates. These dates suggest the features were used initially during the Puebloan period, then later during the Post-Puebloan and Early Historic period. The combined calibrated range of two dates for the earlier period of use is A.D. 680 to 1185, and the combined calibrated range for four samples is A.D. 1455 to 1950. Pottery recovered from the excavation unit included eight Moapa sherds, eight Tusayan sherds, and two unidentified sherds. Flaked stone artifacts consisted of 1 biface and 13 flakes from the late component; and 1 flake tool, 1 core, and 48 flakes from the earlier levels.

Macrobotanical samples from the roasting pits yielded plentiful evidence for agave cooking during the Puebloan period. Also present in that level was a pine nut fragment and burned goosefoot seed. A single filaree seed, which is a historic non-native species, was recovered from the late component, and supports artifact evidence for historic period use. Fifty-six unburned faunal bones were recovered from the excavation unit, and they are likely from a single tortoise.

Ian's Rockshelter (26CK6080/6081)

This habitation site, located in the Gold Butte Management Area was also investigated by Far Western during their Gold Butte archaeological project (McGuire et al. 2010). Ian's Rockshelter contains two habitation loci including, Locus 1, which is a hearth associated with a dense artifact scatter, and Locus 2, which is a shelter and midden under a large boulder overhang.

Investigations in Locus 2 consisted of surface artifact collection and the excavation of a trench covering a 1 x 4 m area. Three features were encountered in the trench including a rock-lined hearth/oven (30 cm below the surface and 1 m in diameter), and Feature 3, which was a smaller rock-lined hearth, and a lens of ash overlying the bedrock. Three radiocarbon dates were processed from the base of the midden, and from Features 1 and 3. Feature 1 and the base of the midden yielded a calibrated date range of 165 B.C. to A.D. 435 and the single date from Feature 3 yielded a calibrated range of A.D. 1470 to 1950.

Temporally diagnostic artifacts collected from the upper 20 cm of midden deposit included five historic drawn glass beads and two shell beads that date to California's Late Period. Most of the pottery was recovered from the upper 30 cm of midden deposits including 108 brown ware, 411 paddle-and-anvil,, 13 Logandale Gray, 3 Shivwits, 33 Moapa, and 124 Tusayan sherds. Pottery recovered from 30 to 60 cm below the surface included seven brown ware, 25 addle-and-anvil, 2 Logandale, 9 Moapa, and 23 Tusayan sherds. Diagnostic projectile points from the upper 30 cm consisted of 14 Desert Side-Notched, three Rosegate, two Elko, and 1 Pinto. Based on the radiocarbon dates and diagnostic artifacts, Far

Western concluded that the midden contained three components. Feature 3 was an early historic component that contained brown ware and decorated buff ware sherds, Desert Side-Notched points, glass and shell beads, ground stone and battered stones, awls, bifaces, debitage, drills, ochre, palettes, and a quartz crystal. Feature 2, a Puebloan component, included Puebloan sherds, bifaces, debitage, a handstone, and bone tools. The oldest component (part of Feature 2) dated to the Basketmaker II period and was associated with an Elko point.

Flotation samples from each of the components suggested that goosefoot, piñon nuts, and other grasses were processed in the features. The Puebloan and Post-Puebloan components also contained charred tansy mustard seeds. Faunal remains indicate that hunting activities were particularly important during the Post-Puebloan period. Animals included bighorn sheep, artiodactyls, rabbits, smaller mammals, and tortoises. Tortoise use increased in frequency over time and bighorn sheep remains decreased. Rabbit use was highest during the early and late periods of occupation.

Far Western concluded that the site was occupied most intensively during the Post-Puebloan period and the ethnicity of the site's occupants were likely affiliated with Patayan people who occupy the Colorado River, possibly the Hualapai.

Dune Field Site (26CK8013)

This scatter of artifacts (flaked stone tools, corrugated brown ware pottery, debitage, and fire-cracked rock) is located in the Gold Butte Management area in sand dunes near Red Rock Springs (McGuire et al 2010). Far Western excavated several test units in the site including a 3- x 3-m area surrounding a hearth, Feature 1. Feature 1 was a dish-shaped, fire-cracked rock cluster with pockets of charcoal that measured 80 cm in diameter. A radiocarbon date from the feature yielded a calibrated date range of A.D. 1520 to 1950, which falls within the temporal range of a lead musket ball that was collected from the surface of the site. The musket ball is likely from a Spanish-era weapon of the seventeenth century.

The pottery collected from the site included 8 Great Basin Brown Ware sherds and a scatter of 86 Southern Paiute Corrugated Brown Ware sherds, located 30 to 40 m west of Feature 1, that likely represent a pot drop (McGuire et al. 2010:177). Artifacts recovered from the excavation units surrounding Feature 1 include 2 obsidian flakes from Modena/Panaca and Kane Springs sources, 3 Desert Side-Notched points, 3 bifaces, 3 flake tools, 340 flakes, and 2 millingstones that were reused in the roasting pit. One hundred fifty-three pieces of bone from desert tortoises (n=118), artiodactyls (n=16), and rabbits were collected from the excavation units surrounding Feature 1. Far Western identified this site as a typical foraging camp with a small living area, associated with cooking pots, milling equipment, and a modest flaked stone assemblage that included Desert Side-Notched points.

Coyote Springs Rockshelter (Site 26CK2954)

This site is a small rockshelter located two-thirds of a mile north of Moapa and approximately 1 mile east of the Muddy River and Muddy River Spring (Figure H.12). HRA completely excavated this site in 2003 (Harper 2006) for a water line project. Thirty excavation units were dug to bedrock, which ranged from 30 to 60 cm below the surface. Although the deposits were somewhat mixed, five cultural and natural strata were identified in the profiles of the main trench excavated into the rockshelter. Harper thought that a low earthen berm located outside the mouth of the rockshelter was formed by cleaning out or deepening the shelter to allow for continued use. A radiocarbon date obtained from a hearth yielded a calibrated date range of A.D. 1650 to 1950 and a second date from the deepest levels of the cultural deposits yielded a calibrated date range of A.D. 1520 to 1950. Four sherds, including two brown ware sherds and two North Creek Gray sherds, were dated using thermoluminescence methods. Three of the potsherds including a North Creek Black-on-gray sherd from a bowl yielded a combined date range of A.D. 1707 to 1872 and a fourth North Creek Gray plain ware sherd dated to A.D. 1212 to 1288.

The flaked and ground stone, faunal, and macrobotanical analyses indicate that subsistence activities occurred at the site, but that they were not the major focus of use. Instead, the site served primarily as a locale for arrow point manufacture and tool refurbishing. The wear gloss on numerous

bifacial flakes resulted from tool resharpening, and the presence of drills or perforators suggested that arrow shafts were being manufactured at Site 26CK2954 (Flenniken 2006).

Figure H.12. Excavation of the Coyote Springs Rockshelter (26CK2954).

The faunal analysis suggests that hunting was focused on small game, and of the identifiable faunal remains, 31.4 percent are rabbits, 15.7 percent consist of reptiles (12.8 percent of which is desert tortoise), and less than 3 percent were artiodactyls (deer). The remaining 49.9 percent includes birds (1.4 percent), rodents (9.0 percent), carnivores (0.5 percent), unidentified birds (1.4 percent), mammals of all sizes (36.4 percent), and unidentifiable fragments (1.0 percent). The macrofloral samples indicate that saltbush, seepweed, and cheno-am seeds, sedge, and bulrush were processed. No cultigens were recovered from the pollen or macrobotanical samples.

Harper (2006) suggested that the shelter was used as a hunting blind or lookout where stone tools were manufactured and resharpened. The scarcity of formal features (only a single hearth was found) indicated limited use of the shelter, but the amount of charcoal in Stratum A and the smoke-blackened ceiling suggests repeated use of the site over time. A berm outside of the shelter and on the edge of the apron may have served two purposes: to make the shelter more usable and to serve as a barrier or blind where the valley could be monitored. Alternatively the shelter may have been cleaned out to serve as a defensive site, which would have been used by Southern Paiutes during the period of contact with Euroamericans. In support of this argument, historical Euroamerican artifacts, including 41 pieces of aqua glass, 4 fragments of white ware, 2 crushed lead masses, 55 eroded metal fragments, 4 wire fragments, 10 cut nails, 14 glass barrel beads, a bone button, 3 fragments of mother-of-pearl, a copper or brass pocket watch key, and a copper percussion cap (1826–1865) were intermixed with the Native American artifacts.

Flaked stone recovered from the excavations included 8,046 artifacts including 169 formed artifacts (cores, bifaces, arrow point performs, 6 arrow points (Desert Side-Notched) and numerous fragments, 6 drills or fragments, 2 flake tools, 18 bifacial tools, 15 percussion flaked bifaces, 52 pressure flaked bifaces, and 2 battered implements. Virtually all of the debitage and formed artifacts made of chert, chalcedony, and jasper had been heat treated. Twelve pieces of obsidian were sourced to Kane Spring (n=9), the Delamar Mountains (n=2), and the Panaca Summit/Modena area (n=1). The Kane Spring and Delamar Mountains sources are near the site. Other artifacts recovered from the site included four metate fragments, a cylindrical stone pipe blank, and three incised stones.

Yamashita 3 (26CK6466)

A single radiocarbon date from an extramural hearth at Yamashita 3 yielded a calibrated date of A.D. 1530 to 1950. Yamashita 3 is a circular arrangement of adobe habitation and storage rooms surrounding a courtyard that dates to the Puebloan II period. The presence of a hearth feature that dates to the Post-Puebloan period suggests the area was later used for camping, presumably by Southern Paiute people.

Cedar Basin Midden (26CK6078/6095)

This low density artifact scatter was investigated by Far Western in the Gold Butte Management Area (McGuire et al. 2010). The site is visible from Ian's Rockshelter, which is across the drainage near a small arrastra. The site contains a midden area (Locus 1) with a concentration of milling tools and two small rock-rings. In this southeastern margin Far Western dug a 1- x 2-m test unit to a depth of 70 cm. Charcoal from two flotation samples collected from 50 to 70 cm below the surface yielded a date calibrated date range of 975 to 805 B.C. A more recent calibrated date range of A.D. 1655 to 1955 was obtained from charcoal collected 20 to 30 cm below the surface.

Pottery from the upper levels of the test units included 9 unidentified paddle-and-anvil sherds, 7 Logandale gray, 14 Moapa Gray, and 28 Tusayan sherds. Brown ware sherds were identified on the surface of the site, but not in the excavation unit. McGuire et al. (2010: Figure 37) considered the upper levels of the test unit to be mixed due to the presence of Puebloan pottery despite the late radiocarbon date and the four Elko projectile points. Other tools recovered from the upper levels of the unit included 13 bifaces, 1 flake tool, 1 formed flake tool, 1 core, 1 handstone, and 1 battered cobble.

The only macrofloral remains recovered from two processed samples consisted of a single piñon nut fragment. The faunal assemblage was also small. Most of the 26 bones and bone fragments from the upper levels came from artiodactyls and medium-to-large sized mammals.

Dart Shaft Shelter (26CK8047)

This rockshelter complex with an artifact scatter and hunting blind was investigated by Far Western in the Gold Butte Management Area (McGuire et al. 2010). One of the several small rockshelters contained a shallow midden deposit, which was radiocarbon dated to A.D. 1680–1955 at the deepest level. A single unit (1 x 3 m), excavated in the midden, contained four features including a hearth (Feature 1), a rock circle (Feature 2), a small fire pit with fired-cracked rock (Feature 3), and a sand-filled pit. Temporally diagnostic artifacts recovered from the surface of the site consisted of one brown ware sherd, one Shivwits plain sherd, and two Tusayan sherds. Artifacts recovered from the excavation unit included two Tusayan sherds, one drill, six bifaces, three flake tools, one core, and one piece of ground stone. The single project point collected from the site was a dart-sized projectile point from the surface. A corn cob collected from the surface yielded an earlier Terminal Archaic date range.

Five flotation samples produced one unidentifiable seed. The faunal remains came from surface contexts and include tortoises (46 percent), rabbits (33 percent), and artiodactyls (21 percent).

Firebrand Cave (26CK5434)

This cave site is located in the Gold Butte Area and was investigated by the HRC for the BLM (Blair and Winslow 2006). The surface of the cave contained numerous artifacts that were collected and analyzed by the HRC (Blair and Winslow 2006). The cave appears to have been used, possibly as a ceremonial site, since the Archaic period. The only evidence of use during the Post-Puebloan period is a single arrow with a "classic" V-shaped nock used for engagement of the arrow with the bow. The radiocarbon date range from this artifact is A.D. 1600 to 1950.

EXCAVATED SITES THAT LACK RADIOCARBON DATES

Lost City

In 1961 Richard Shutler synthesized archaeological data and collections from previous excavations in the Upper and Lower Moapa Valley by the State of Nevada, the Heye Foundation, the Southwest Museum, and the National Park Service. In this publication Shutler described the Lost City/Pueblo Grande artifact collections held at the Nevada State Historical Society Museum in Reno, the Park Service Headquarters in Boulder City, the Museum in Overton, and the Museum of the American Indian, Heye Foundation. He also had access to the excavator's field notes and other materials.

Shutler examined pottery in the collections that had been recovered from 53 of the 123 excavated sites (called Houses by Harrington and continued by Shutler) in the Muddy River Valley and surrounding region. Great Basin Brown Ware pottery was identified by Shutler from 17 of these sites (Houses 47, 50, 68-69, 71-72, 75, 77, 79, 81, 87-89, 94, 99, 119 and House 2 at the Gentry Ranch Ruin). The pottery assemblages from 50 percent of these 17 sites were dominated by corrugated ceramics and were, therefore, probably occupied after A.D. 1050. The quantities of brown ware sherds in these collections were small, and most sites contained only one or two pieces. Only one site—House 75—contained more than 10 brown ware sherds (n=18). Shutler also reported two complete Great Basin Brown Ware vessels in the collections, including a bowl from Room 62 of House 47 and a Southern Paiute Corrugated jar from Room 11 in House 89.

Shutler concluded that the excavators had found Great Basin Brown Ware "at almost every site in the Lost City area" (Shutler 1961:29), although the excavators had not reported on the context of the pottery within the floor or fill of the rooms. Because brown ware was so widely distributed in the Puebloan sites, Shutler considered it likely that the Paiutes were in southern Nevada since the Lost City Phase.

In 1988 Lyneis re-examined the brown ware and buff ware ceramics that Shutler reported from the Main Ridge site, which includes Houses 1-42, 44, and 45 (Lyneis 1992:5). She disagreed with his identification of Southern Paiute vessels in two burials (Burial 3 and Burial 6), which contained both brown ware and gray ware pottery, and that Shutler considered as examples of Southern Paiute-Puebloan contemporaniety. Because these identifications are in error, Lyneis suspects that his identification of brown ware throughout the collections maybe in error and that the pottery is more likely Shivwits Brown (Lyneis 2011, personal communication).

Tenuous evidence that three of the Lost City sites continued to be occupied into the historic period exists in the form of glass trade beads, which were collected during the excavations at Houses 67, 72, and 103 (Shutler 1962:40). Red and white glass beads were from an ash deposit in House 67 and white and green glass beads from an ash deposit in House 72. Blue glass beads were collected from Room 3 of House 103. The House 67 ceramic assemblage was dominated by corrugated types, so it appears to have been a late site. House 72 contained 31 rooms and corrugated sherds were prevalent in only two of the rooms (76 and 77). House 103 contained four rooms and nine storage features, yet Shutler reported no corrugated sherds in the collections from this site. Great Basin Brown Ware sherds were only report at one (House 72) of these three sites.

Paiute Cave

Paiute Cave, located near Overton in the lower Moapa Valley, was a stratified cave that was excavated by Mark Raymond Harrington in 1929. Harrington (1930) thought that this cave was particularly important because each stratum were separated by microlaminations of successive, culturally sterile deposits of clay. The cave appears to have functioned as a cache site during the Puebloan Period and a habitation and cache site during the Paiute period. The site contained two Paiute layers that were separated from a deeper the Puebloan stratum by a deposit of alluvial clay, which left the Puebloan levels undisturbed. The upper layers had been vandalized.

Within the Pueblo layer, seven grass-lined oval-shaped pits were found, which contained Puebloan artifacts including 9 black-on-white sherds with wide-line designs, 7 corrugated sherds, 37 plain ware (1 sherd was buff ware), corn cobs tied together in pairs, firewood, juniper bark, corn stalks, pieces of arrowcane, basket materials, string (two-strand, twisted counter and clockwise), imprints of coiled baskets, string from fur cloth blankets, cooked mescal and quids, faunal material (desert tortoise and rabbits), and three selenite crystals (Harrington 1930:126).

In a Paiute layer near the surface Harrington recovered basketry (open and close twinning, 3-rod coiled), cordage and netting (two-strand, twisted counter clockwise), strands from fur cloth blankets (two-strand clockwise), a mountain sheep ladle, a tortoise bowl, three bow fragments and numerous wooden and cane shafts, rock-salt, vegetal material (corn cobs, squash, Indian millet [*Panicum urvilleanum*] and unidentified bark, roots, and grasses), bone (tortoise and rabbit), and leather pieces from moccasins. Historical artifacts were also found in the Paiute layer and included rags of clothing, an iron-bladed mescal knife, an iron hoe blade, half of an iron heel plate for a gun, and an S-shaped iron object made by a blacksmith that may be a striking steel to make fire. Harrington also found what he describes as a buffalo hair belt or sash similar to those manufactured in the Midwestern United States (Harrington 1930). No Paiute ceramics were reported, but basketry and over 200 "nearly complete arrow-canes" were collected from the Paiute layer, with cut marks that he attributes to have been made by both stone and steel implements. (Harrington 1930:121).

Black Dog Cave (26CK29B)

Black Dog Cave is part of the larger Black Dog Mesa Archaeological Complex (26CK5686), recently re-investigated by the HRC in 2000 (Winslow and Blair 2003, Winslow 2009). The Black Dog Mesa Archaeological Complex is located along the southern edge of the Muddy River near Moapa and is summarized in Chapter 6 in this volume.

Of interest for the present comparison is a mention by Wheeler (1942, reprinted in Winslow and Blair 2003) of a storage feature. This feature was found by Stuart during his initial excavation on the north side of Room No. 1, where he found Pit No. 14, which contained what he described as a "comparatively modern Paiute cache probably dating sometime between 1860 and 1900." The contents of this unlined pit were described as:

> Under a piece of cowhide and wrapped in fragments of two blankets were several unrelated objects which included a large iron fish-hook, the metal side of a power [sic] flask and the hammer to a percussion-lock gun [Wheeler 1942 reprinted in Winslow and Blair 2003:137].

Stuart Rockshelter

This rockshelter, excavated by Shutler in 1955, is located within Meadow Valley Wash north of Moapa. The shelter is approximately 12 m in width, extended between 4.5 and 6 m in to the mesa. It contained approximately 2 m of stratified cultural deposits. The shelter is located within the same conglomerate Muddy Creek Formation as Site 26CK2954. Because the shelter is located within this conglomerate formation, the deposits contained a large amount of fallen roof material with sand and silty aeolian soil. During excavation, four hearths were noted, and the overall deposit contained charcoal and ash (Shutler et al 1960:7).

As a result of the excavations, four different strata were identified, with the lowest strata characterized by a lack of ceramics and several Pinto points. The next stratum was attributed to a Basketmaker II occupation. It contained a North Creek Gray sherd, basin metates, projectile points, and flaked stone tools. Above this stratum was what the authors called the Pueblo occupation, represented by a variety of Puebloan pottery styles similar to those found at Lost City, as well as Puebloan type projectile points, basin metates, and other stone tools. The strata were capped with a mixed Southern Paiute and Pueblo occupation consisting of Great Basin Brown Ware ceramics associated with Puebloan ceramics (Shutler et al. 1960:12–14).

This rockshelter was not stratified to the point of having distinct divisions between occupations. The strata were described, instead, as representing a "slow transition in point types and pottery types from one period to another" (Shutler et al. 1960:14). From the various occupations and the lack of caches or burials, the shelter was thought to have been used as a campsite by hunting and gathering parties, and not as a "stop-over by trading parties" because of the "lack of any definite foreign or trade goods" (Shutler et al. 1960:14–15).

REFERENCES CITED

Ahlstrom, Richard V.N. (editor)

2005 *Desert Oasis. The Prehistory of Clark County Wetlands Park, Henderson, Nevada*. HRA Papers in Archaeology No. 4. Prepared for the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

2008 *Persistent Place: Archaeological Investigations at the Larder and Scorpion Knoll Sites, Clark County Wetlands Park, Southern Nevada*. HRA Papers in Archaeology No. 7. HRA Inc., Conservation Archaeology, Las Vegas.

Ahlstrom, Richard V.N., and Heidi Roberts (editors)

2001 *Archaeology at the Apex: Excavations in the Apex Project Area, Southern Nevada*. HRA Papers in Archaeology No. 2. HRA, Inc., Conservation Archaeology, Las Vegas.

Barker, Pat

2008 Woven Sandals as Boundary Markers Between the Great Basin and Southwest Culture Areas. In *Past, Present, and Future Issues in Great Basin Archaeology: Papers in Honor of Don D. Fowler,* edited by Bryan Hockett, pp. 125–145, Cultural Resource Series No. 20. USDI, Bureau of Land Management, Nevada, Reno.

Blair, Lynda M.

1986 A New Interpretation of Archaeological Features in the California Wash Region of Southern Nevada. Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Blair, Lynda M., and Gregory R. Seymour

1998 *Mended Basket Rockshelter and Quarry. An Archaeological Excavation in the Southwestern Las Vegas Valley*. Report 5-164-6. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Blair, Lynda M. and Jeffrey R. Wedding

2001 *Archaeological Excavations for the Apex Land Exchange, Clark County, Nevada*, Vol. 1, *Rockshelters 26CK415, 26CK3780, and 26CK4415.* USDI, Bureau of Land Management Report No. 5-2377(P), Las Vegas. Report No. 5-164-13. Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Blair, Lynda M., Diane L. Winslow, and Jeffrey R. Wedding.

2000 *Northern Beltway Data Recovery Program Archaeological Sites 26CK3799 and 26CK4908, Clark County, Nevada,* Vol. 1. BLM Report #5-2373.

Brooks, Richard H., Daniel O. Larson, Kathryn Olson, Joseph King, Gregory King, Robert Leavitt, and Patricia Anderson

1975 *Prehistoric and Historic Research along the Navajo-McCullough Transmission Line Right-of-way*. Report No. 4-2-1. Nevada Archaeological Survey, University of Nevada, Las Vegas.

Buck, Paul E., William T. Hartwell, Gregory Haynes, and David Rhode

1998 *Archaeological Investigations at Two Early Holocene Sites near Yucca Mountain, Nye County, Nevada*. Quaternary Sciences Center, Desert Research Center, Las Vegas.

Dubarton, Anne
2009 *Northeast C1 Detention Basin Cultural Resources Data Recovery River Mountains, Nevada*. Final Report, Vols. 1 and 2. Bureau of Reclamation Project No: LC-NV-06-06-01D. NewFields, Las Vegas.

Eskenazi, Suzanne, and Heidi Roberts
2011 Archaeological Testing at the Fairbanks Spring Site (26NY1729), Ash Meadows National Wildlife Refuge, Nye County, Nevada. HRA Inc. Report No 08-19.

Ferraro, David, and Robert R. Ellis
1982 *The Survey and Mitigation of Thirteen Archaeological Sites within the Las Vegas Wash Project.* ARC Report No. 1-3-13. Archaeological Research Center, Museum of Natural History, University of Nevada, Las Vegas.

Flenniken, J. Jeffrey
2001 Flaked Stone from Survey and Testing. In *Archaeology at the Apex: Excavations in the Apex Project Area, Southern Nevada*, edited by Richard V.N. Ahlstrom and Heidi Roberts, pp. 79–90. Papers in Archaeology No. 2. HRA, Inc., Conservation Archaeology, Las Vegas.
2006 Technological Analysis of Flaked Stone Artifacts. In *A Room with a View: Data Recovery of an Early Historical Rockshelter Site Located in the Upper Moapa Valley, Clark County, Nevada*, edited by Christopher Harper, pp. 53–74. Papers in Archaeology No. 5. HRA, Inc., Conservation Archaeology, Las Vegas.

Fowler, Don D., David B. Madsen, and Eugene M. Hattori
1973 *Prehistory of Southeastern Nevada*. Publication in the Social Sciences No. 6. Desert Research Institute, Reno, Nevada.

Gilreath, Amy J.
2009 *Gypsum Cave Revisited*, Vol. I and II. Nevada Cultural Resources Report # CR5-2462-4(P). Far Western Anthropological Research Group, Davis, California.
2012 *Improving the Prehistoric Chronology for Southern Nevada*. Far Western Anthropological Research Group, Henderson, Nevada

Harper, Christopher
2006 *A Room with a View: Data Recovery of an Early Historical Rockshelter Site Located in the Upper Moapa Valley, Clark County, Nevada*. Papers in Archaeology No. 5. HRA, Inc., Conservation Archaeology, Las Vegas.

Harrington, Mark R.
1930 Paiute Cave. In *Archaeological Explorations in Southern Nevada*, pp. 106–126. Southwest Museum Papers No. 4. Los Angeles.
1963 *Gypsum Cave, Nevada.* Southwest Museum Papers No. 8. Los Angeles. Reprint of 1933 edition.

Haynes, C. Vance
1967 Quarternary Geology of the Tule Springs Area, Clark County, Nevada. In *Pleistocene Studies in Southern Nevada*, edited by H. Marie Wormington and Dorothy Ellis, pp. 15–104. Anthropological Papers No. 13. Nevada State Museum, Carson City.

Hoisch, Thomas D.
2011 Description and Interpretation of Temper from Pottery in the Ash Meadows Area, Nevada. In *Shared Place: Cultural Landscapes in the Ash Meadows National Wildlife Refuge, Nye County, Nevada,* prepared by Jerry Lyon, Heidi Roberts, Richard V.N. Ahlstrom, Christopher Harper, Suzanne Eskenazi, Robert Davide, Catherine Fowler, and Elizabeth von Till Warren, pp. 115–130. Draft outreach report prepared for U.S. Fish and Wildlife Service. HRA Inc., Conservation Archaeology, Las Vegas.

Justice, Noel
2002 *Stone Age Spear and Arrow Points of California and the Great Basin*. Indiana University Press, Bloomington.

King, Jerome, Allika Ruby, and Amy Gilreath
2006 *Mitigation of Sites 26CK6907 and 26CK6913, Northern Las Vegas Valley, Clark County, Nevada.* BLM Report No. 5-2524. Far Western Anthropological Research Group, Davis, California.

Lyneis, Margaret M.
1992 *The Main Ridge Community at Lost City: Virgin Anasazi Architecture, Ceramics, and Burials.* Anthropological Papers No. 117. University of Utah Press, Salt Lake City.
2008 Ceramic Analysis. In *Shared Place: Cultural Landscapes in the Ash Meadows National Wildlife Refuge, Nye County, Nevada,* prepared by Jerry Lyon, Heidi Roberts, Richard V.N. Ahlstrom, Christopher Harper, Suzanne Eskenazi, Robert Davide, Catherine Fowler, and Elizabeth von Till Warren, pp. 101–115. Draft outreach report prepared for U.S. Fish and Wildlife Service. HRA Inc., Conservation Archaeology, Las Vegas.

Lyon, Jerry D. Heidi Roberts, Rick Ahlstrom, Christopher Harper, Suzanne Eskenazi, Robert Davide, Catherine Fowler, and Elizabeth von Till Warren
2008 *Shared Place: An Archaeological Survey of the Ash Meadows National Wildlife Refuge, Nye County, Nevada.* Archaeological Report No. 07-24, HRA Inc., Conservation Archaeology, Las Vegas.

McGuire, Kelly, William Hildebrandt, Amy Gilreath, Jerome King, and John Berg
2010 *Final Research Results for the Gold Butte Study Area, Clark County, Nevada*, Vol. I, *Prehistoric Resources*. BLM Report No. 5-2617. Far Western Anthropological Research Group, Davis, California.

Mehringer, Peter J., Jr., and C. N. Warren
1976 Marsh, Dune, and Archaeological Chronology, Ash Meadows, Amargosa Desert, Nevada. In *Holocene Environmental Change in the Great Basin*, edited by R. G. Elston and P. Headrick, pp. 120–150. Research Papers, No. 6. Nevada Archaeological Society, Reno.

Pippin, Lonnie C. (editor)
1986 *An Overview of Cultural Resources on Pahute and Rainier Mesas on the Nevada Test Site, Nye County, Nevada*. Technical Report No. 45. Desert Research Institute, Quaternary Sciences Center, Reno.

Rafferty, Kevin A.
1986 *New Investigations in the Northern Las Vegas Valley: The Las Vegas Valley Archaeological Survey, Phase III*. DAS Report 2-5-12. USDI, Bureau of Land Management, Las Vegas, Report 5-1570.

Rager, Hal B.
2001 *Burnt Rock Mound (26CK3601): Late Archaic and Ceramic Period Human Use of A Northern Mojave Spring Mound*. Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.

Rhode, David
1994 Direct Dating of Brown Ware Ceramics Using Thermoluminescence and Its Relation to the Numic Spread. In *Across the West: Human Population Movement and the Expansion of the Numa,* edited by David B. Madsen and David Rhode, pp.124–132, University of Utah Press, Salt Lake City.

Roberts, Heidi, and Jerry Lyon
2011 *Archaeological Excavations at the Corn Creek National Register Site, Desert National Wildlife Refuge, Clark County, Nevada*. Draft Report Prepared for the U.S. Fish and Wildlife Service, Desert National Wildlife Refuge. Archaeological Report No. 08-22. HRA, Inc. Conservation Archaeology, Las Vegas.

Schroeder, Albert H.
1961 *The Archaeological Excavations at Willow Beach Arizona.* Anthropological Papers No. 50. University of Utah, Salt Lake City.

Seymour, Gregory R.
1997 A Reevaluation of Lower Colorado Buff ware Ceramics: Redefining the Patayan in Southern Nevada. Unpublished Master's thesis, Department of Anthropology, University of Nevada, Las Vegas.
2005 Ceramic Analysis. In *Desert Oasis. The Prehistory of Clark County Wetlands Park, Henderson, Nevada*. HRA Papers in Archaeology No. 4, edited by Richard V.N. Ahlstrom, pp. 63-72. Prepared for the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

Seymour, Gregory R., and Hal B. Rager
2001 Tales from the Black Mat: The Prehistory of Burnt Rock Spring Mound in the Northern Mojave Desert. Paper presented at the annual meeting of the Society for American Archaeology, New Orleans.

Shutler, Richard Jr.
1961 *Lost City: Pueblo Grande de Nevada.* Anthropological Papers No. 5. Nevada State Museum, Carson City.

Shutler, Richard Jr., Mary Elizabeth Shutler, and James S. Griffith
1960 *Stuart Rockshelter: A Stratified Site in Southern Nevada*. Anthropological Papers No. 3, Nevada State Museum, Carson City.

Vokes, Arthur W.
2005 Ornaments. In *Desert Oasis. The Prehistory of Clark County Wetlands Park, Henderson, Nevada*, edited by Richard V.N. Ahlstrom,199-208. HRA Papers in Archaeology No. 4. Prepared for the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada. HRA, Inc. Conservation Archaeology, Las Vegas.

Wheeler, S. M.
1942 The Archaeology of Etna Cave, Lincoln County, Nevada. Manuscript on file, Nevada State Museum, Carson City.

Winslow, Diane L.
2009 *Pithouse Excavations, Locus 4. Mitigation, Black Dog Mesa Archaeological Complex (26CK5686/BML 53-7216)*, Vol. 3. BLM Report No. 5-2430(3), HRC Report No. 5-4-26(3). Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Winslow, Diane L., and Lynda Blair
2003 *Black Dog Cave, Vol. 2, Mitigation, Black Dog Mesa Archaeological Complex (26CK5686/BLM 53-7216)*. BLM Report No. 5-2430(2), HRC Report No. 5-4-26(2). Harry Reid Center for Environmental Studies, Marjorie Barrick Museum of Natural History, University of Nevada, Las Vegas.

Wright, Barton A.
1954 Excavation of Catclaw Cave, Lower Colorado River. Master's thesis, Department of Anthropology, University of Arizona, Tucson. Reprinted by the Arizona Archaeological Society in 2008.

Wriston, Teresa
2007 *Desert Dry Lake Archaeological and Geomorphological Survey, North of Las Vegas, Nevada*. Far Western Anthropological Group, Davis.
2008 Prehistoric Occupation of the Desert Dry Lake Basin. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 331–354. Nevada Archaeological Association, Las Vegas.

York, Andrew L., Michael S. Kelly, and William Zukosky
1992 *Kern River Gas Transmission Company: Kern River Pipeline Cultural Resource Data Recovery Report, Nevada*. Dames & Moore, San Diego.

APPENDIX I
THE STATUS OF CERAMIC RESEARCH IN SOUTHERN NEVADA

Margaret M. Lyneis

THE STATUS OF CERAMIC RESEARCH IN SOUTHERN NEVADA

Margaret M. Lyneis

The use of techniques and concepts to derive meaningful information from prehistoric pottery is underdeveloped in our area. Too often, the result of a ceramic analysis is little more than a chart with sherd counts listed by ware or type that provides some chronological information. Luminescence dating, which can directly date the time since a pot was fired from a sherd with an associated soil sample, is rarely applied. One can infer some activities from the kinds of vessels broken at a site, but information about whether there are multiple sherds from particular vessels is often missing, along with vessel forms and sizes.

Studies fall short of investigating where the pottery was produced in contrast to where it was discarded, limiting information about mobility and socioeconomic contacts. A time-tested method for simple assessment of clays is refiring, another rarely-applied technique. Lyneis (1988b:153) suggested the "proposition of localized production" as a better entry-point to studying upland Patayan-tradition pottery than seeking to develop a typology for it. This proposition moves the focus of study to ceramic materials and their sources. The typology for upland Patayan ceramics did not materialize, but neither has a materials-based approach within southern Nevada. The local production proposition is also a starting point for understanding Great Basin Brown Ware, although efforts to set up a typology for it have been rare, short-lived, and without tangible results. Although Pueblo-tradition pottery has been sorted into wares and types, some of those wares, such as North Creek Gray Ware, Virgin Series, and North Creek White Ware, have highly variable clay colors and tempering materials, which could allow researchers to identify production locales within the extensive use areas of the wares.

Understanding the great variety of ceramics in southern Nevada is difficult. Pottery from three technical traditions is found, and none of them are centered or dominant in the Las Vegas Valley. Great Basin Brown Ware is found to the east, north, and west. Patayan tradition pottery continues to the south and west of the valley along the lower Colorado River and continues into the deserts and uplands to the west into southern California. Great Basin Brown Ware is widespread in the Great Basin and within Nevada. Its distribution continues westward and to the northwest. There is a great zone of overlap of Great Basin Brown Ware and Patayan pottery. Patayan pottery continues to the northwest at least as far as Death Valley and Ash Meadows (Hunt 1960; Lyneis 2008a) but apparently not to Owens Valley. To the southwest, pottery of both traditions is documented at Fort Irwin at Drinkwater Basin and No Name West Basin, both in the northern part of Fort Irwin (Jenkins 1985; Lyneis 1988a). Both Great Basin Brown Ware and Tizon Brown Ware occurred in a small sample of sherds from the South Range of the Naval Weapons Center just west of Fort Irwin recently examined for Helen Wells, California State University, Los Angeles. The overlap between Great Basin Brown Ware and Patayan tradition pottery raises the possibility of replacement of one tradition by another, an intriguing issue much in need of good chronometric and stratigraphic information. Pueblo tradition pottery is centered in the Moapa and lower Virgin valleys. It is distributed westward to the Las Vegas Valley and beyond into the Mojave Desert.

Our understanding of regional pottery differs from tradition to tradition. Of the three, Great Basin Brown Ware is the least studied and is poorly understood. Patayan pottery in southern Nevada is almost as poorly known, although in the southern California deserts, it is the main class of pottery. Pueblo pottery from southern Nevada has received more attention, but publications updating its classification and dating have lagged.

Use of the term "brown" as a ceramic category as though it carried meaning is an example of the difficulties that result from lack of careful study of sherds. For example, Tizon Brown Ware, Great Basin Brown Ware, and some Pueblo-tradition pottery can all have a brown-colored surface or paste. The term has been commonly used on site records; its use should be discouraged.

In southern Nevada, researchers have often assumed that brown pottery is Great Basin Brown Ware. Baldwin (1950) used that category in his discussion of Southern Paiute pottery, leading to identification problems (see discussion later in this appendix). It also led Shutler (1961) to assume that what we now know as a Pueblo utility ware, Shivwits Brown Ware, was Southern Paiute Brown Ware. He identified a jar associated with a Lost City burial as a Southern Paiute piece (Museum of the American Indian, Heye Foundation catalog number 13/6508). On the basis of that jar, and what he thought were Southern Paiute Brown Ware sherds on most of the Pueblo sites, he argued that Southern Paiutes were present in Moapa Valley sometime before A.D. 1100 and were contemporaneous with the Puebloan people (Shutler 1961:69). I examined vessel No. 13/6508 carefully during a visit to the Heye Foundation in October 1987. Based on its characteristics, the jar is actually a dark-fired Pueblo utility ware and not a Southern Paiute Brown Ware. None of its temper was visible enough to assign it to a type.

A big clue that Shutler had a problem with brown pottery was his description of AZ A:15:8 on the Shivwits Plateau as a multi-roomed pueblo. According to his ceramic list, Table 4, the pueblo's pottery was dominated by Southern Paiute Brown Ware totaling 589 sherds, more of it corrugated than plain. It exceeded the Pueblo Utility Ware counts there by 589 to 185 (Shutler 1961:10, Table 4.). The collection was at the Nevada State Museum, and Allison (2000) and I examined it independently. What Shutler had called Southern Paiute Brown Ware was Pueblo-tradition pottery, mostly Shivwits Plain and Shivwits Corrugated.

Each of the three pottery traditions found in the region has been assumed to be associated with a different socio-linguistic group. Pueblo pottery in the Moapa Valley was the western edge of the coil-and-scrape tradition that stretched into the heart of the northern Southwest, although here the relationship is more cultural than linguistic. Patayan pottery, thinned by paddle and anvil, herein shortened to paddled, seems to be associated with Yuman speakers. Great Basin Brown Ware carries a heavy load of assumptions as the pottery of Numic speakers, a craft perhaps developed independently in the southwestern Great Basin and spread by expanding Numic speakers.

The perceived influx of Numic language speakers, association with Great Basin Brown Ware, and population expansion from west to east is not a certainty, though. David H. Thomas (1994) corresponded with linguist Sidney Lamb, who in 1958 suggested a date of around AD 1000 for the beginning of the spread of the Numic languages across the Great Basin. As Thomas says, archaeologists simplified his statement, and a whole generation of Great Basin archaeologists set out to document that spread, and explain it. What Lamb had said, in part, was

> This gives us three Numic languages occupying only a small part of the Great Basin until perhaps one thousand year ago. At about this time, for some reason, there began a great movement northward and eastward, which was to extend the domain of Numic far beyond its earlier limits… As of around 1000 years ago and earlier the major part of the Great Basin is unaccounted for linguistically [Lamb 1958 as quoted in Thomas 1994:56].

In 1992, Lamb told Thomas

> When estimating the age of the Numic expansion, two or even three thousand years ago might not be out of the question (Sydney Lamb, telephone conversion May 16, 1992).

Thomas (1994:57) verified this with Lamb in 1993, before including it in his paper.

Southern Nevada contains one the better cases for non-concordance between pottery-making tradition and linguistic group. The Chemehuevi, southernmost of the Southern Paiute, apparently learned to make pottery from their Yuman-speaking Lower Colorado neighbors and made paddled vessels, as Rogers reports based on field notes by Van Valkenburgh (Rogers 1936:38). Production of paddled pottery by the Chemehuevi/Southern Paiute included the Las Vegas Valley in ethnohistoric times (Fowler 2010:182-183). One implication of this could be that Numic speakers spread across the Great Basin prior to the development of Great Basin Brown Ware, and that the Chemehuevi had no pottery until they came in contact with the Mojave. Carrying this story along, they may have been quite content with their

paddled pottery, and not interested in changing to Great Basin Brown Ware. Great Basin Brown Ware is found in the Las Vegas Valley, however, and in the case of Corn Creek Dunes in the northern part of the valley, was made there (Lyneis 2011). Interestingly, the potters who Kelly talked with said their clay was reddish and came from Cottonwood Island, east/northeast of Searchlight (Fowler 2010:182–183). The island was more than 16 miles south of the southern part of the Las Vegas Valley, in the northern fringe of Mohave territory. If an archaeologist made that match, trade rather than long-distance materials procurement might seem the more likely interpretation.

Distinguishing Technical Traditions

These traditions are differentiated by the ways vessels are built. Although vessels in each are built by some form of coiling or stacking, they are distinguished by the way coils are bonded, surfaces finished, and the shape or form of the vessels. Nevertheless, the characterization of local pottery began with confusion. Baldwin's "The Pottery of the Southern Paiute" (1950) was probably the first formal attempt to define one of the varieties of pottery key to southern Nevada. In part, he gives a classic description of Southern Paiute Brown Ware:

> Remarks: Distinctive or characteristic features of this pottery type are thick pointed or semi-pointed base; conical form; absence of true neck; dark, roughened surface; straight uneven rim; and fingernail indentations below rim, when present [Baldwin 1950:54].

Elsewhere in his description, under "Construction" he says "Normally coiling and thinning with paddle-and-anvil, although many vessels evidently were thinned by scraping" (Baldwin 1950:53). He acknowledges that both Lowie (1924) and Harrington (1937) denied the use of paddle and anvil thinning, but he bases his interpretation on his own study of sherds and vessel. It is possible that he was not familiar with the characteristics of paddled pottery and its vessel forms, for he did not cite Malcolm Rogers *Yuman Pottery Making* (1936), a standard reference for understanding the production of paddled pottery. Or could he have known of the paddled pottery production in the Las Vegas Valley recorded by Isabel Kelly (Fowler 2010:182)? He should have recognized the difference in vessel forms, however.

GREAT BASIN BROWN WARE

Baldwin is not so far off when he says includes thinning by scraping. Some Southern Paiute vessels are thinned by fine, even, parallel scrape marks from a tool, possibly a modified sherd. Technically, these vessels were built by coiling (spiraling upward) or stacking single coils or slabs to make a complete layer as the vessel rises (Figures I.1 and I.2). Coil diameters are generally greater than those of Pueblo tradition coils. Joining of coils is less secure than in Pueblo tradition pottery and paddled pottery. Great Basin Brown Ware is more likely to have broken along coil joints.

In southern Nevada, local Great Basin Brown Ware has been called Southern Paiute Brown Ware, thus attributing it to the protohistoric occupants of the area. Bonding, thinning, and finishing techniques are more variable in Great Basin Brown Ware than in Patayan or Pueblo pottery. In contrast to the scraped vessel shown in Figure I.3, Alice Hunt (1960:204) describes another way of thinning:

> About three quarters of the pottery around the Death Valley salt pan has been bonded, thinned and smoothed by scraping, mainly by with the fingers. The base is hand molded, and is round, pointed, or flat. The walls have been built up by coiling, and are not thick (about 5 mm.), but the surface is bumpy, the coils still show, and finger impressions can be seen, especially on the inside of the vessel.

Illustrations of ethnographic examples of this kind of construction can be seen in Tuohy (1986, 1990). A wide variety of vessel forms are illustrated by Lockett and Pippin (1990). Eerkens illustrates three vessels from Owens Valley in the Current Research and Pictures links on his home page, http://www.anthro.ucdavis.edu/eerkens/. Two volumes focused on Great Basin Brown Ware and related pottery are *Hunter-Gather Pottery from the Far West*, edited by Joanne M. Mack (1990) and *Pottery of the Great Basin and Adjacent Areas* edited by Griset (1986).

Figure I.1. Great Basin Brown Ware vessel PP1, from 26CK1824-1, Lost City Museum (photo by Margaret Lyneis).

Figure I.2. Detail of the wall of vessel PP1, 26CK1824-1, Lost City Museum, showing scrape marks and mending hole (photo by Margaret Lyneis).

Figure I.3. Great Basin Brown Ware vessel at the Lost City Museum showing unobliterated coils close to its base (photo by David Van Alfen).

Variation in Great Basin Brown Ware

Many vectors of diversity characterize this pottery. Vessel forms range from conical and bucket-shaped vessels to globular jars with everted rims. Wallace (1986: Figure 27b) illustrates one from Mesquite Flat that shares the proclivity of Great Basin Brown Ware to break along coil joints. Do vessel forms vary from east to west across the area? Did different vessels serve different purposes? Bases of conical pots have been found in fire hearths, suggesting that they were used for cooking in spite of their tippy shapes. Some have suggested that their shapes are congruent with the conical burden baskets of the Southern Paiute, as though transport was part of their purpose. Could bucket-shaped pots have been used for stone boiling? As our control of internal chronology for Great Basin Brown Ware improves, these variables can serve as keys for examining change through time as well as through space.

Although the stereotype of Great Basin Brown Ware is that they are thick, that thickness varies among parts of a vessel, and among vessels. Is it different from one vessel form to another? Does thickness vary because of the thinning technique used?

Some Great Basin Brown Ware vessels are decorated with punctations or impressions on the lip, neck, or shoulder. These are likely expressions of style. Is there a geographical change in frequency or kind of decorations that might be correlated with group affiliations? On some vessels, these techniques create surface textures that seem to mimic the corrugation of Pueblo vessels. It is often termed "false corrugated," but a characterization of the nature of the impressions, what they may have been made with, their orientation and location on a vessel may provide cultural information.

Analysts should describe true corrugation or banding, in which each coil is joined to the previous by crimping or pinching that leaves a textured surface, structured by each added coil. True coiling is a characteristic of late Pueblo utility ware, and if it can be demonstrated to be present on Great Basin Brown Ware, it would be a basis for arguing for some kind of Pueblo to Southern Paiute learning. Or maybe Pueblo tradition potters are using the same clay and temper as the local makers of Great Basin Brown Ware. Making a corrugated pot is much more time-consuming than other Great Basin Brown Ware pot-building techniques, for it requires rolling many thin coil segments and carefully crimping each coil to bond it to the previous coil.

In the Green Spring report, Blinman (1987:72) reported that of the 621 sherds with outer surfaces present, 68.0 percent were "corrugated," most of which "was accomplished by indentation of each coil as it is being applied to the vessel." This is a clear description of true corrugation. As part of the Coral Canyon project, Perry (2003:208) also reviewed the collections from Quail Creek and Green Spring sites. She confirmed Blinman's identification of corrugated pottery in the Southern Paiute sherds from Green Spring. She found corrugated Southern Paiute pottery from Quail Creek with "exterior surfaces where the coils are pinched (indented) along coil rows. The ridges in the corrugation are most often smoothed down a bit, leaving rounded bumps and indentations." The only site with pottery in the Coral Canyon project, 42Ws1219, yielded parts of three Great Basin Brown Ware vessels, but none was corrugated.

Eerkens (2001; 2003a; 2003b; 2004) and Eerkens et al. (2002a; 2000b) maintains a long-term research interest in the Great Basin Brown Ware of Owens and Death valleys. He has taken a series of different looks at the ware, using it as a window into a variety of anthropological issues, and has been an early adopter of high-tech approaches to pottery analysis, including INAA. Interestingly, he has avoided petrographic analysis, a key technique in localization the production of Great Basin Brown Ware. His work and Bettinger's *The Archaeology of Pinyon House, Two Eagles, and Crater Middens: Three Residential Sites in Owens Valley* (1989*)* make Owens Valley's Great Basin Brown Ware the most intensively studied of any pottery west of Utah and the Pueblo pottery of southern Nevada and the Arizona Strip.

Materials in Great Basin Brown Ware

No particular materials distinguish Great Basin Brown Ware. Sherd temper as in Figure I.4 is highly unusual. More generally it is likely that both residual clay including non-plastic grains and mixes of clay and temper are used as Great Basin Brown Ware as available. With proper characterization, clay and non-plastic materials carry information about where they were made. If found at a distance, mobility or socio-economic connections are up for discussion. Three cases show different circumstances. Great Basin Brown Ware at the Yamashita sites has temper from the Virgin Mountains to the east, identified by petrographic analysis and described in the Yamashita Synopsis. This pattern was used to interprets a bilocal settlement pattern. At Ash Meadows, not only Great Basin Brown Ware, but Tizon Brown Ware and locally produced Pueblo pottery are all made with the same tempering materials, which occur found more than 50 km to the north. Detailed petrographic analysis by Thomas D. Hoisch, a geologist intimately familiar with the rocks of the area, was required to identify the origin of the tempers. The Ash Meadows case is not consistent with the proposition of localized production. In all likelihood, the Ash Meadows clays are unsuited for pottery production because of very high shrinkage rates (Lyneis 2008a).

Figure I.4. Conical vessel from southwestern Utah with exterior impressions at the rim and below. It is tempered with crushed sherd (photo by David Van Alfen).

The third example is Corn Creek Dunes in northern Las Vegas Valley. Here both Great Basin Brown Ware and Pueblo utility ware were made of the same materials. Clay is available at the springs. The temper found in each ware is weathered limestone and quartzite available on the fan that surrounds Corn Creek and in formations in the Sheep and Desert Ranges that feed the fan. Great Basin Brown Ware tended to have more quartzite relative to limestone than the Pueblo utility ware. This analysis is based on 30 x microscopy, samples of the fine materials in the alluvial fan, a sample of weathering Eureka Quartzite from the nearest outcrop, and tests for limestone using dilute hydrochloric acid. Clay samples were tested for shrinkage. This low-tech materials analysis worked well in this particular case (Lyneis 2011).

Schaefer (2003) has completed an exemplary study of potential pottery-making materials in the southern Owens Valley, integrating petrographic analysis and INAA to characterize both sherds and samples of potential clays. He concludes:

> The discovery of clay-ceramic matches in this study helps to more firmly establish regionally specific ceramic "types" within the brown ware tradition that would make ceramic finds a more useful indicator of regional mobility and trade. Clay for the production of Owens Valley Brown Ware is ubiquitous throughout the lower alluvial fan at the base of the Sierra Nevada and could be acquired within the daily foraging range of just about any village locality on the floor of Owens Valley. In fact, villages in the southern Owens Valley were located wherever steams cut through the lower edges of the alluvial fan (Steward 1938:51). The clay bears all the petrographic characteristics of a

> residual clay source but in fact, derived from the in situ decomposition of colluvium within the broad apron of alluvial fans that reach down to the floor of Owens Valley. As such, residual clays that derive from in situ decomposition of granitic bedrock in this region also appear to bear the same chemical signature, such as the sample from the Alabama Hills. This abundance of distinctive red self-tempering clays available to local potters appears to characterize the resource throughout the Sierra Nevada area, as reported by the Yokuts and Western Mono (Gayton 1929:240). Sedimentary clays from playas and pans on the valley floor were unsuitable for ceramic production because of high alkalinity, a characteristic also seen in Death Valley clays (Eerkens et al. 2002a:143).
>
> This study also disproves the assumption that the most useful clays are found where water is breaking down granitic bedrock to form a residual clay. Other weathering factors that do not require a constant water source appear to be producing the preferred clays. This may explain why previous attempts to find clays near Owens Lake, springs and streams were not successful in finding either functional ceramic-making material or matches with Owens Valley Brown Ware. If similar patterns of clay procurement characterize other areas of Owens Valley, then we may posit that the INAA discrimination of regionally specific chemical signatures in southern, central, and northern Owens Valley may reflect the natural regional variability in the chemistry and mineralogy of the Sierra Nevada batholith from which the colluvium derive (Ague and Brimhall 1988; Batemen and Dodge 1970) [Schaefer 2003].

Factors confounding better understanding of southern Nevada ceramics include the rarity of buried, stratified contexts, frequent mixed assemblages and low numbers in small projects or sites. Another is the lack of any large-scale regional studies of Great Basin Brown Ware and Patayan pottery that include or focus on southern Nevada. Such studies would provide contexts in which to understand small and mixed assemblages.

Great Basin Brown Ware sherds are notoriously small and crumbly, but come from relatively large vessels. An overview of regional Great Basin Brown Ware that included the study of whole vessels (Figure I.5) and large rim and body sherds could provide a framework in which to understand the small samples usually recovered. Museum collections with whole Great Basin Brown Ware pots or large sherds include, from west to east, the Eastern California Museum in Independence, Death Valley National Park, Lost City Museum, Overton, and the SUU Archaeological Repository at Southern Utah University, Cedar City. There also may be vessels at the Western Archeological and Conservation Center in Tucson and the National Museum of the American Indian in Washington, D.C., the result of early work by Mark Raymond Harrington and the National Park Service. Others will be found in the Nevada State Museum.

Patayan Tradition

Identification of something as part of the Patayan tradition has many implications. Southeast of southern Nevada, the term refers to a culture or cultural tradition distinguished from the Hohokam along the lower Gila River (Beck 2006:35). Elsewhere "Patayan" refers to a rock art style of a "group commonly associated with lands to the south of the Gold Butte area" (McGuire et al. 2010:25).

In southern Nevada usage of Patayan is mostly focused on pottery without a constructed "culture" to accompany it, although Lyon and Ahlstrom (2006:156) call it "an archaeological culture." It is divided into two wares, Lower Colorado Buff Ware and Tizon Brown Ware.

Lower Colorado Buff Ware "was produced and used along the Colorado River from the southern tip of Nevada to the Gulf of California, along the drainage of the lower Gila River, and in the peripheral deserts of western Arizona and California" (Waters 1982a: 275). It is divided into types, following the structure used in classifying Southwestern pottery. Waters summarizes the history of the typology, providing a perspective for understanding how it, or his version of it, may be used. Waters' classification is built on Malcolm Rogers" earlier classification, which depended on surface collections for its

chronology as well as for distributional information. Waters (1982a: 275–297) describes subsequent research that has supported Rogers' chronology. Lower Colorado Buff Ware is found in the Las Vegas Valley but has not been examined against the description of the several types. In southern Nevada non-descript plain Lower Colorado Buff Ware has been called "Pyramid Gray," referencing Schroeder's (1958) description. This description is too vague to be useful, and Waters (1982b:566) combined Pyramid Gray with Topoc Buff. Pot drops and caches of Lower Colorado Buff Ware have been found in Southern Nevada as well (Figures I.6, I.7, I.8, and I.9).

Figure I.5. Conical Great Basin Brown Ware pot from Southwest Utah; note texture on lower part (photo by David Van Alfen).

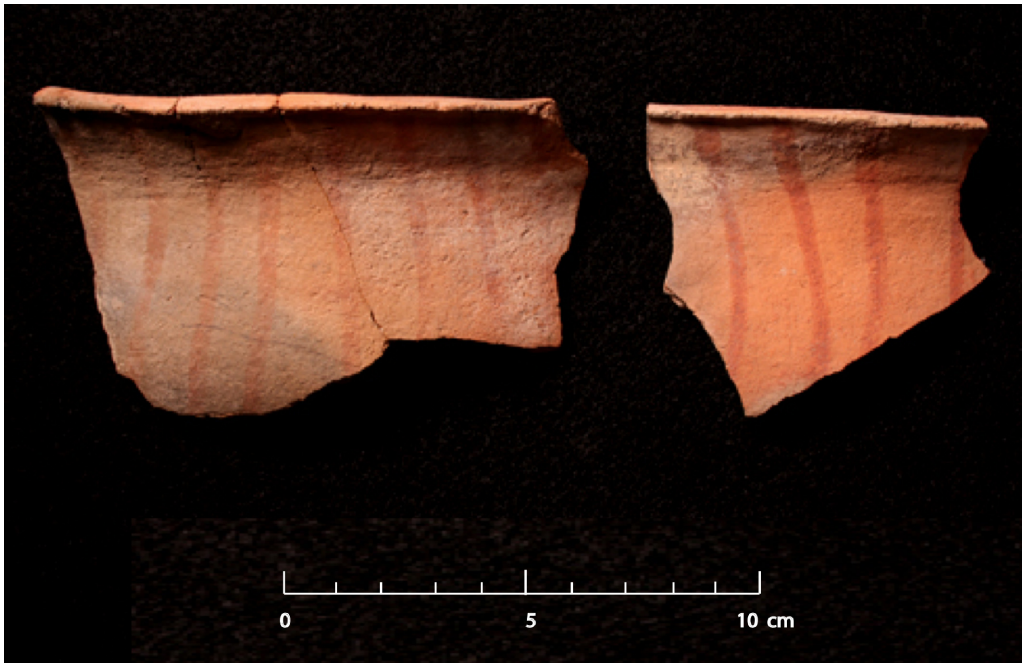

Figure I.6. Rim sherds, exterior, from Parker Red-on-buff pot drop, at Yamashita-2, 26CK26445.

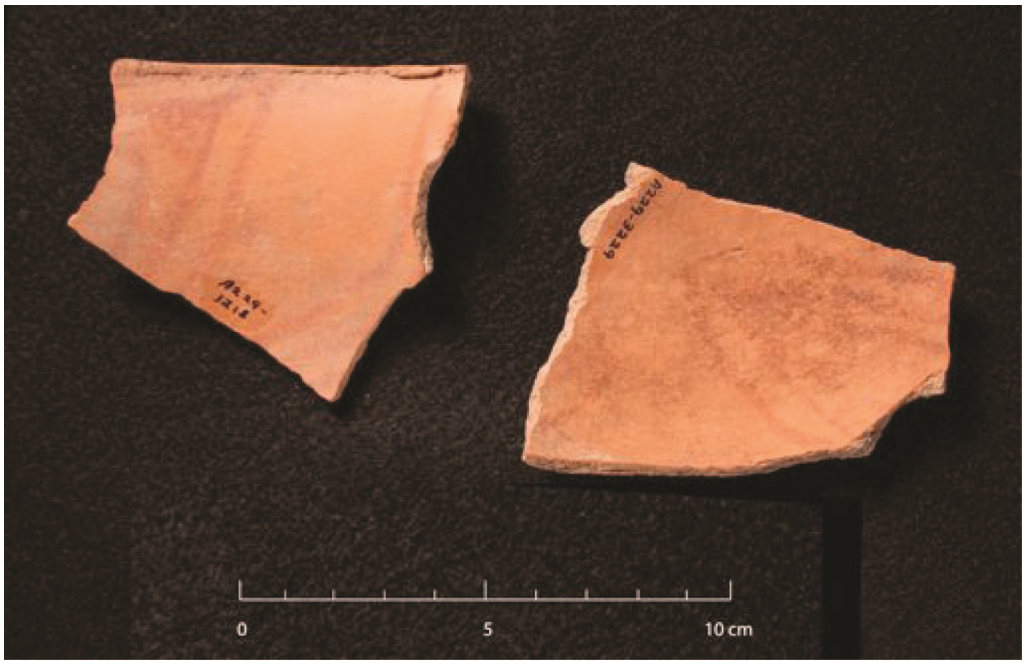

Figure I.7. Sherd interiors from Parker Red-on-buff pot drop (Vessel A229-2421) at Yamashita-2, 26CK26445 (Figure 6). Sherd on left is interior of rim sherd on right in previous figure.

Figure I.8. Cache of Lower Colorado Buff Ware vessels found on federal land in southern Nevada.

Figure I.9. Detail of cache of Lower Colorado Buff Ware vessels found on federal land in southern Nevada.

It has been almost 30 years since Waters' work with Lower Colorado Buff Ware chronology. Its internal chronology continues to be tested by excavations in rare stratified sites. In 1988, Lyneis pointed out the apparent utility of changing rim forms for an overall chronology in Patayan tradition pottery. Waters, who worked with Malcolm Rogers' notes and examples at the San Diego Museum of Man, thought that direct rims were present only in the earliest Lower Colorado Buff Ware vessels (Patayan I), and were replaced by recurved rims for the rest of the sequence. That temporal change in rim forms is no longer supported.

In a rare opportunity to investigate stratified features with ash or charcoal lenses, EDAW investigated 61 examples west of the Colorado River in the vicinity of Palo Verde Point in Imperial County, California. These cultural deposits, exposed by trench for a pipeline, spanned 1100 years, from about A.D. 600 to A.D. 1600. In the ceramics recovered in association with dated materials, direct rims are present throughout the Patayan tradition sequence, and were not limited to its early part. Hildebrand's (2003a, 2003b) results also indicate different time spans for Colorado Beige, Black Mesa Bluff, and Parker Bluff than accorded them by Waters (1982a, b).

Tizon Brown Ware is a general category for upland and dark-fired paddled pottery. A few individual types were once described in southern California, but did not find a place in the taxonomy. In contrast, upland western Arizona's Patayan pottery was subdivided into wares and types long before Dobyns and Euler (1958) produced revised descriptions of the ware. Dobyns and Euler retained many types including Cerbat Brown, Cerbat Red-on-brown, Cerbat Black-on-brown, Sandy Brown, Aquarius Brown, Aquarius Black-on-brown, and Tizon Wiped.

Prescott Gray Ware, an Arizona paddled type not included in Tizon Brown Ware, has been identified in the greater Las Vegas Valley, and includes a painted type, Prescott Black-on-gray and other variants (Seymour 1997:Figure 12; Gilreath and Duke 2006:Figure 4). Its revised description is in Kelley Hays-Gilpin (2001).

Paddled Pottery in the Las Vegas Valley

Seymour (1997) documented the large quantity of paddled pottery from the southern part of Las Vegas Valley, analyzing heritage excavated materials from the Berger site and surface collections. Using site files data, Lyon and Ahlstrom (2006:156-157) discerned a complementary distribution of (Pueblo) gray ware at Las Vegas Springs and northward, with buff ware more common to the south. Recognizing the vagueness of "brown ware," the likelihood that it included both Tizon Brown Ware and Great Basin Brown Ware, they drew no implications from its distribution. They observed that buff ware's dominance in the south could be an extension of Yuman speakers along the Lower Colorado River, and that the northern part of the valley was closest to the Pueblo settlements in Moapa Valley, suggesting a northern route from the Moapa Valley westward to the deserts west of the Las Vegas Valley.

Although the geographic distributions of Pueblo coil-and-scrape pottery and paddled pottery in the Las Vegas make sense, efforts to establish the chronological relation of the two have yielded unexpected results. One supposes that Pueblo pottery would precede Great Basin Brown Ware, and that a chronology would define the period of paddled pottery in the valley. At the Berger site, six dated samples span the depth of the deposits, but all fall in the calibrated range of AD 1155 to 1461. Grouped levels show "buff" ware dominant in the lowest levels of the site, with Great Basin Brown Ware the most common in the middle and upper levels. Lesser quantities of Prescott Gray Ware, Pueblo pottery, and Tizon Brown Ware are present throughout (Seymour 1997: Figures 7-9).

Seymour (2006) investigated Burnt Rock Mound in the north part of the valley along Eglington Scarp, with new excavations and support for radiocarbon dates. As expected, paddled pottery was never dominant, but was present through the sequence. Pueblo pottery was dominant throughout, and Great Basin Brown Ware, also present throughout, was always the least common. These unexpected chronological results led Seymour to suggest an unlikely explanation for the failure of Great Basin Brown Ware to dominate the upper levels of the site: that Southern Paiutes were there, but were reusing Pueblo pottery.

Seymour (1997:61) formally described a type of paddled pottery, Las Vegas Buff, that had been named by Robert Crabtree. Its key characteristic is its temper, ”small to medium-sized granules of rounded carbonate particles measuring from less than 1 mm to 2 mm in diameter.” They are sometimes accompanied by similar-sized grains of quartzite, feldspars, and granitics. Only low quantities of Las Vegas Buff were recovered in Las Vegas Wash investigations when compared to the quantities of other paddled ceramics (Seymour 2003). He considers it a variant of Topoc Buff, a Lower Colorado Buff Ware type. Seymour (1997; 2006) has classified other sherds from the valley as variants of Topoc Buff without explanation.

Another category of paddled pottery reported from the valley is Tizon Brown Ware. To the south in California, Tizon Brown Ware designates dark-colored pottery made in the Peninsular and Coast ranges from residual, self-tempered iron-rich clays that contrast with the sedimentary clays of the Salton Trough and of the desert and river-valley (Hildebrand et al. (2002). In the Las Vegas Valley and areas to the east and west, it simply includes all dark-fired paddled pottery regardless of its (currently unknown) production locales.

Petrographic Analysis of Regional Paddled Pottery

Outside of the Moapa Valley pottery, perhaps the only petrographic analysis of ceramics deals with Las Vegas Wash pottery (Carpenter 2005). Twenty-five sherds representing all of Seymour’s Las Vegas Wash categories were analyzed. The groupings based on temper categories show poor concordance with the assigned types of paddled pottery, except that the example of Las Vegas Buff has carbonate mudstone, (perhaps caliche-MML) for its inclusions, and the two Great Basin Brown Ware sherds have different volcanic tempers.

Topoc Buff sherds are scattered though Carpenter’s clay categories, occurring in five of the seven. She recognizes six categories of temper derived from intrusive rocks, and Topoc Buff sherds are in all of them, but none have volcanic temper, and only one has sherd temper.

One sherd classed as a Tizon/Topoc intergrade is tempered with intrusive rock. The sole Tizon Brown Ware sherd has a unique variant of intrusive rock temper: olivine-augite diorite.

The petrographic analysis has provided important information, but falls short of its potential in two respects. First, it was apparently done after the completion of Seymour’s report, and there is no discussion of its implications for the categories he created or the utility of extending a Lower Colorado Buff Ware type to include sherds from the Las Vegas Valley, the tempers of which have no resemblance to the temper of Topoc Buff from the lower Colorado area as described by Waters (1982b:566).

The second shortcoming results from limited information regarding southern Nevada geology. Carpenter (2005:83) worked from Tingley’s 1999 *Generalized Geologic Map of Nevada.* From this map, she thought that the tempers could be identified in southern Nevada. The mountain sources of her temper groups are all to the south of the Las Vegas Valley: from intrusive rocks in Lake Mead National Recreation Area, the McCullough Range, and the Eldorado Range. Volcanics are found in the same areas. These ranges are distant from the Las Vegas Valley, although the north end of the volcanic portion of the McCulloughs are about 6 miles south-southeast of Las Vegas Wash. The intrusives in the range are about 25 miles away. None of the tempers come from the sedimentary rocks of the mountains that frame the eastern, northern, and western parts of the Las Vegas Valley.

Paddled Pottery in the Moapa Valley and the Gold Butte Area

Dark-colored, paddled pottery has been identified at two Late Pueblo II-Early Pueblo III habitation sites in the lower Moapa Valley. Hayden (1930:79-80) describes “mica-spotted” pottery at Mesa House, saying some of the sherds “suggest the ‘hammer and-anvil’ method of manufacture.” Some of his information is unusual; for instance, he found that 21 percent of the Mesa House’s plain ware was paddled.

At Adam 2 (26CK2059), two varieties of paddled pottery were distinguished, one with large mica pieces, and one with small mica pieces. Relying on Schroeder (1958) to classify Lower Colorado Buff Ware as Parker Buff and Parker Red-on-buff was not a good decision, but those 14 sherds do belong in

Lower Colorado Buff Ware. More numerous are 36 dark, paddled sherds with large mica flecks that were called unidentified brown ware. Paddled pottery is much less common than at Mesa House; the 50 paddled sherds recovered made up only 2 percent of the excavated sample at Adam 2 (Lyneis et al. 1989).

Shutler (1961:29) comments on the "relatively great proportion of Pyramid Gray…in Lost City graves." In my 1988 examination of whole vessels at the Museum of the American Indian, Heye Foundation, I was able to isolate four vessels or large fragments that Shutler (1961:Table 25) classed as Pyramid Gray. None showed any characteristics of paddled pottery. (Lyneis 1990: 28–29). I examined the rest of the utility ware vessels from Main Ridge, and none showed any indication that they were made by paddling.

To the east, I know of no reports of paddled pottery from the lower Virgin River Valley, but that is probably due to lack of research, not to absence. The recent work in the Gold Butte Study Area showed a strong presence of paddled pottery: 1,063 sherds out of 4,466 (23.8 percent) sherds (McGuire et al. 2010: Table 16, p. 69). Most could not be assigned to a particular category, and only two were "buff." Red-on-buff sherds were absent.

Pueblo Tradition

Unlike Great Basin Brown Ware and Patayan-tradition pottery (with the exception of Lower Colorado Buff Ware), Pueblo pottery in southern Nevada has been organized into wares and types in the tradition of Ancestral Puebloan ceramics. Puebloan pottery is divided into three major categories—white wares, gray wares, and red wares. White wares are painted black-on-white or black-on-gray vessels; gray wares (or perhaps better, utility wares) are unpainted vessels, either plain or corrugated; and red wares most commonly have red slips and may have black paint, white paint, or unslipped surfaces to create polychromes.

The classification of most of the Pueblo pottery found in southern Nevada has its foundation in Colton's (1952) *Pottery Types of the Arizona Strip and Adjacent Areas in Utah and Nevada*, the first of Colton's Ceramic Series, Pottery Types of the Southwest. Its history begins earlier, however, with Lyndon Hargrave's attempt to revise and update J. E Spencer's (1934) pottery descriptions from southwestern Utah in time to put them into Colton and Hargraves' *Handbook of Northern Arizona Pottery Wares* (1937). They were unable to resolve some taxonomic matters, and they were not included in the *Handbook*, but were the subject of the first Ceramic Series. The Pueblo settlements along the Muddy and Virgin Rivers are part of the Virgin Anasazi area, lying north and west of the Colorado. The classification heregenerally applies to the whole area, although Moapa Gray and White wares and Shivwits Ware are rare east of Kanab Creek. The evolving sense of what may be Shinarump White and Gray wares places them in the vicinity of Kanab and to the east of Kanab Creek.

Three major changes have occurred in the almost 60 years since the publication of *Pottery Types of the Arizona Strip and Adjacent Areas in Utah and Nevada*. The first is that Colton was confused about red wares, and his distinctions between Tsegi Orange Ware and San Juan Red Ware are not to be followed. The second is the utility, or lack thereof, of Shinarump Gray Ware and its types. It is the only ware described as having iron-rich clay, often fired to shades of brown or dark gray. Its temper was supposed to be "mostly irregular angular fragments with sometimes slight quantities of quartz sand." It became the dumping ground for dark sherds, sherds that analysts think are too dark or to brown to be Tusayan Gray Ware, Virgin Series, or Tusayan White Ware, Virgin Series.

The third change is the recognition of a new utility ware. Shivwits Ware, including Shivwits Plain and Shivwits Corrugated, was first identified in the Moapa Valley in the collections from Main Ridge and the Steve Perkins site (Myhrer 1989) and described in *The Main Ridge Community at Lost City (*Lyneis 1992: 45-46). It is tempered with crushed sherds including fragments from Moapa Gray Ware or Moapa White Ware, sometimes accompanied by fragments of Tusayan White Ware or Tusayan Gray Ware or Shivwits Ware itself. Initial identification of its temper required petrographic analysis.

Parts of the Colton classification are being reexamined, following a conference at the Museum of Northern Arizona. Four resulting papers are available in *Pottery Southwest:* an overview of the conference (Lyneis and Hayes-Gilpin 2007-2008:12-20); a current view of red wares (Allison 2008); a

history of the Shinarump Wares (Collette 2009); and updated information about the gray wares (Lyneis 2008a).

Richard A. Thompson proposed quite a few new names for types including separate names for black-on-gray vessels of various types that also had exterior corrugation. The conference found them difficult to remember and use, and excluded them from their revision/simplification of the wares and types of the area. Instead, they recommended that white ware sherds with corrugation be tabulated under the type name.

White Wares and Types

Within each white ware, the types are distinguished by design styles (Table I.1). The design styles form an approximate relative sequence from earliest at the top to the latest. Each style is named after the Tusayan White Ware, Virgin Series, type that displays the particular style. In the Virgin region including southern Nevada almost all black-on-gray or black-on-white sherds are from bowls, and white ware jars are rare in contrast to areas east of Kanab Creek. Logandale Black-on-gray is extremely rare, known in southern Nevada from Black Dog Mesa (Winslow 2009: Figure 25) and Bovine Bluff (Myhrer and Lyneis 1985). Winslow (2009: Figure 33) also illustrates nine Tusayan White Ware, Virgin Series sherds, five or six of which show characteristic Mesquite-style designs. The others in the figure, with narrow lines and lots of unpainted space, are probably early, too, and would be at home in Washington Black-on-gray.

Table I.1. White Wares and Types from conference "Prehistoric Pueblo Pottery North and West of the Colorado River" (Lyneis and Hays-Gilpin 2007-2008)

Design Style	Logandale White Ware	Tusayan White Ware, Virgin Series	Moapa White Ware	Shinarump White Ware
Mesquite	Logandale Black-on-gray	Mesquite Black-on-gray	Boulder Black-on-gray	not known
Washington	not known	Washington Black-on-gray	Boysag Black-on-gray	not known
St. George	not known	St. George Black-on-gray	Trumbull Black-on-gray	not known
North Creek	not known	North Creek Black-on-gray	Moapa Black-on-gray	Wygaret Black-on-white
Hildale	not known	Hildale Black-on-gray	Slide Mountain Black-on-gray	Vermilion Black-on-white
Glendale	not known	Glendale Black-on-gray	Poverty Mountain Black-on-gray	Cottonwood Black-on-white

Assigning sherds to design styles is subjective. Styles changed gradually, not abruptly. In the early part of the sequence, some sherds show transitional designs between Mesquite and Washington styles. Similarly, there are sherds with designs intermediate between Washington and St. George styles. Colton's sense of white ware design styles was based in Tusayan White Ware, Kayenta Series pottery, and it provided a reasonable sequence in 1952. There are, however, varying degrees of similarity between Virgin and Kayenta design styles. Mesquite style resembles Lino Black-on-gray, but there is little similarity between Washington style and Kana'a Black-on-white. In Pueblo II and early Pueblo III times, greater resemblance between the two series returns. The latest designs, called Glendale style, have some resemblance to Flagstaff Black-on-white, but more in the layouts than the content of the designs.

Thompson was the most active archaeologist working in the western part of the Virgin region. His contributions to chronology and to recognition of changing designs on Virgin White Ware are fundamental to our present understandings. He did not describe the design styles with words, but his many meticulous illustrations and those of archaeologists working with him, show their characteristics. The earliest design style is named after Mesquite Black-on-gray, first described from the Red Cliff excavations (Dalley and McFadden 1985:142-145). The Dead Raven report includes good illustrations of St. George-style sherds (Walling and Thompson 1988). Sherds of Mesquite, Washington, and St. George styles are from the Little Man sites (Dalley and McFadden 1988). Copious illustrations from Quail Creek

span the whole sequence of design styles except Glendale style (Walling and Thompson 1986). Figure I.10 illustrates a sherd of a later style than those included in the Virgin Series classification.

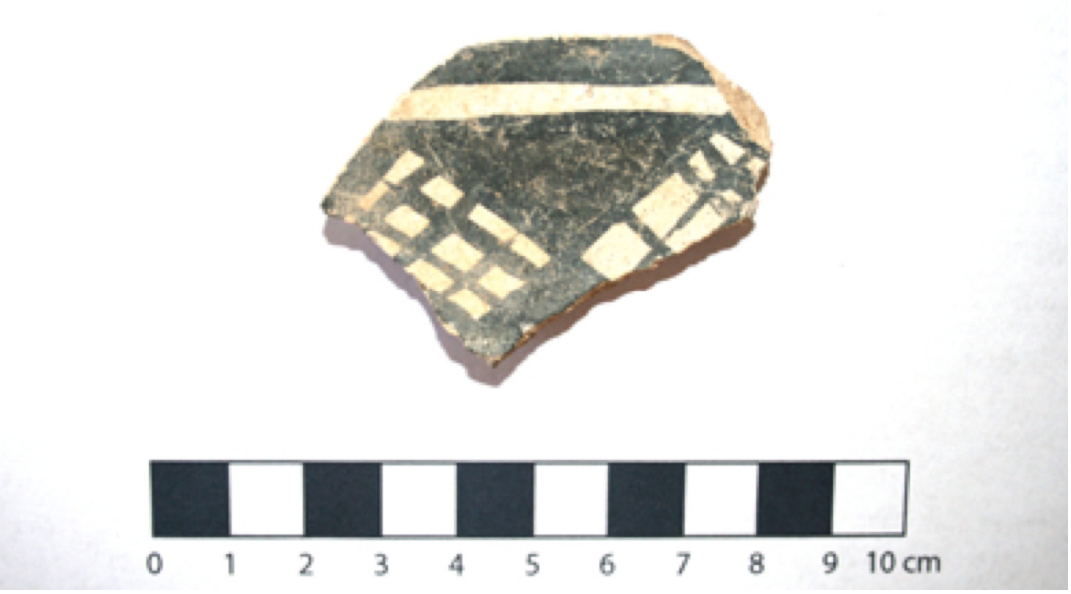

Figure I.10. A very late Tusayan White Ware, Virgin Series sherd from Yamashita 5S, 26CK2042. Its materials place it in the Virgin Series, but it closely resembles Tusayan White Ware, Kayenta Series Betatakin Black-on-white illustrated by Colton and considered a Pueblo III type (1955:Ware 8B Type 8).

Gray/Utility Wares

For gray ware descriptions (Table I.2), see Lyneis (2008b). Logandale Gray Ware is early in the Moapa and lower Virgin River valleys, some of the first pottery, dating to Basketmaker III and Pueblo I times at Black Dog Mesa, Bovine Bluff, Cliff's Edge, and the Steve Perkins site (Winslow 2004, 2009; Jenkins 1981; Myhrer and Lyneis 1985; Myhrer 1989.). The few known sherds of Logandale Corrugated are unprovenienced and undated.

Table I.2. Gray (Utility) Wares and Types from conference "Prehistoric Pueblo Pottery North and West of the Colorado River" (Lyneis and Hays-Gilpin 2007-2008)

Ware	Plain	Corrugated
Tusayan Gray Ware, Virgin Series	North Creek Gray	North Creek Corrugated
Moapa Gray Ware	Boulder Gray	Moapa Corrugated
Logandale Gray Ware	Logandale Gray	Logandale Corrugated (rare)
Shivwits Ware	Shivwits Plain	Shivwits Corrugated
Shinarump Gray Ware	Shinarump Plain	Shinarump Corrugated

A contradiction to the early dating of limestone-tempered pottery is found at Corn Creek Dunes (Lyneis 2011). A large quantity of what might be classed as Logandale Gray was recovered. The site provided poor contexts because of previous disturbance, but there is no reason to think this limestone-tempered pottery was early. It is made of clay from the springs and temper from the immediate vicinity, with low quantities of quartzite also present in the temper, non-plastics available on the alluvial fan surrounding the dunes. A few strange unindented corrugated vessels were also present. This seems to be a case of "exigent circumstances" for potters, using readily available materials, perhaps in the absence of more suitable materials within a reasonable distance. Sherds from the Pueblo settlements are also present, many of them black-on-whites, but not enough Puebloan utility ware to supply the community.

This finding from Corn Creek raises a question about other Logandale Gray reported in the Las Vegas Valley. Seymour (1997 Table C-1) reports a considerable quantity of Logandale Gray from Duck Creek. In light of the information from Corn Creek Dunes, what he classed as Logandale Gray and used to indicate relatively early Pueblo occupation, the "Logandale Gray" in the Las Vegas Valley needs a fresh examination. With identification of the non-plastic inclusions in his Las Vegas Buff as carbonate mud by Carpenter (above), it, too, needs a better, broader materials characterization and independent dating

Boulder Gray is present along with Logandale Gray in the earliest assemblages at Black Dog Mesa, probably a good clue to the socioeconomic connections of these people. The Late Basketmaker II assemblage from Black Dog Cave includes basketry, sandals, and S-shaped sticks like those from Cave du Pont in Kane County, Utah, indicating that the connection of the Moapa Valley to southwestern Utah and the Pueblo heartland preceded the introduction of pottery (Winslow and Blair 2003: 520-523).

Boulder Gray and Moapa Corrugated are tempered with "olivine" temper, clarified by thin section analysis as olivine plus ortho- and clinopyroxene and spinel derived from xenoliths on the Uinkaret Plateau north of the western Grand Canyon (Lyneis 1992:44). Boulder Gray is present in varying quantities throughout the southern Nevada Pueblo sequence. Boulder Gray was also common at Black Dog Mesa, indicating that contact with the Uinkaret Plateau area was part of early Pueblo life in the Moapa Valley Winslow (2009:655).

North Creek Gray Ware, including North Creek Gray and North Creek Corrugated, is thought to have been produced in many areas both east and west of Kanab Creek. Its description allows for considerable variability in clay colors and composition of its sand temper. A variant of North Creek Gray and North Creek Corrugated that is local to the lower Moapa Valley has been identified through petrographic analysis of its distinctive sand temper, comparing it to sand lenses in the Pleistocene gravels that form the terrace on which the sites are situated. Informally called "Local Pueblo Brown," its clay has been tentatively identified, and has passed preliminary tests of workability, fired colors, and response to organic paint, for there are sherds from two painted bowls made with the same clay and temper.

North Creek Gray is present throughout the Pueblo sequence, although at first in small quantities, judging from Black Dog Mesa, where it comprised only about 1 percent of the overall ceramic assemblage, and may have not been as old as some of the Logandale Gray Ware, which dominated the assemblage.

Shivwits Ware from the Shivwits Plateau appears in Middle Pueblo II times in sites in the Moapa Valley, providing, along with Moapa Gray Ware, many of the jars used for cooking and storage. From its original description (Lyneis 1992:44-46) the Shivwits Plateau was recognized as its production area. Plain and corrugated types are present, and a few sherds with black paint have been observed (Eva Jensen, personal communication). In Allison's (2010) on-going investigations in the Hidden Hills area of the plateau, he has yet to find indications of its production before the A.D. 1000s, about the same time it first appears in the Moapa Valley.

The final utility ware, Shinarump Gray Ware, has been loaded with problems since it was described by Colton (1952). Collette (2009) reviews these difficulties. Fortunately from a southern Nevada perspective, it is rare west of Kanab Creek, and probably absent in southern Nevada. East of Kanab Creek, North Creek Gray Ware, and Shinarump Gray Ware may form a dichotomy based on clay colors. How these two wares relate to Walhalla Gray Ware defined by Marshall (1979) needs reexamination, but the Walhalla Wares are not likely to be found in southern Nevada either.

Table I.3 summarizes the changing utility wares at the Yamashita sites. Y-2 and Y-3 probably date just before and just after about A.D. 1050, but there is a gap of as much as 150 years between them and Y-5S Area B. The Yamashita sequence shows the late shift to corrugated wares, sometime after A.D. 1050, probably during the temporal gap between Y-3 and Y-5S, Area B.

Table I.3. Changing Utility Ware, Middle Pueblo II and Middle Pueblo II/Late Pueblo III at the Yamashita sites

Site	North Creek Gray Ware % corrugated	Local Pueblo Brown % corrugated	Shivwits Ware % corrugated	Moapa Gray Ware % corrugated	Total
Y-2, 26CK6445	3465, 36.5%	3766, 39.7%	256, 2.7%	2003, 21.1%	9490, 100%
	<1.0%	6.4%	0.0%	<1.0%	
Y-3, 26CK6446	2392, 42.0%	403, 7.1%	1292, 22.7%	1605, 28.2%	5692, 100%
	5.6%	1.5%	3.2%	0.0%	
Y-5S, Area B, 26CK2042	694, 66.1%	269, 25.6%	51, 4.9%	36, 3.4%	1050, 100%
	84.5%	72.0%	0.0%	0.0%	

Pueblo Red Wares

Three red wares are found in southern Nevada (Allison 2008: Figure 3). Only Shinarump Red Ware was produced in the Virgin region, probably east of Kanab Creek somewhere in the production area of Shinarump Gray Ware. In Shinarump Red Ware, four types with analogous design styles to Tsegi Orange Ware have been named in Shinarump Red Ware (Table I.4), with the design styles taken from types in Tsegi Orange Ware: Medicine Black-on-red, and Tusayan Black-on-red, well illustrated by Colton (1956:Ware 5B, Types 1 and 2).

Table I.4. Shinarump Red Ware Types and Cognates (Allison 2008:Table 2)

Shinarump Red Ware Type	Design Style	Cognate Types San Juan Red Ware	Tsegi Orange Ware
Kanab Black-on-red	Solids and lines in black paint	Deadmans Black-on-red	Medicine Black-on-red
Middleton Black-on-red	Hachured bands in black paint	Deadmans Black-on-red, Dogoszhi-style	Tusayan Black-on Red
Middleton Polychrome	Hachured bands in black paint, contrast between red-slipped and unslipped areas	none	Cameron Polychrome
Nankoweap Polychrome	Wide bands of red outlined with thin black lines on an unslipped background	none	Citadel Polychrome

The other two, San Juan Red Ware and Tsegi Orange Ware, come from farther east. Colton's treatment of the three wares is confused. Allison (2008) describes their history and differences. The three red wares are difficult to distinguish, especially in the field. The temper of each is different, and is key to identifying them, requiring microscopy.

From Tsegi Orange Ware, Medicine Black-on-red and Tusayan Black-on-red are found, and Shutler (1961: Plate 44 f, g) illustrates two sherds of Citadel Polychrome from House 50. Tsegi Orange Ware's origin is in the northern part of the Kayenta region. Illustrations of vessels or their designs can be found in Hays-Gilpin and Hagopian (2007), Hays-Gilpin (2007), and Allison (2008).

San Juan Red Ware comes from the farthest away of all the red wares, the northern San Juan region (Hegmon et. al: 1997). Both Deadmans types are found in Pueblo II contexts. Two sherds of an early type, Abajo Polychrome (Figure I.11), which dates about A.D. 775 to 825, were recovered from the Bonelli site, flooded by Lake Mead (Lyneis 2000:261–262).

The red wares (Table I.5) form a sequence. The transitional dominance from San Juan Red Ware to Tsegi Orange Ware distinguishes Y-2 from Y-3, and dates about A.D. 1050 in the Kayenta area. The small sample from Y-5S, Area B, is all Shinarump Red Ware, but the absence of the other two could result from the small sample.

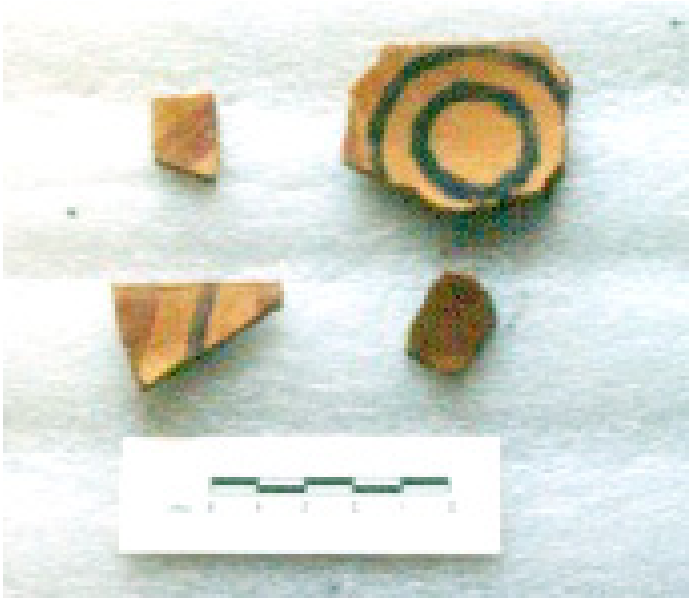

Figure I.11. Abajo Polychrome sherds from Bonelli site. Scale is 10 cm. Photographed at the Southwest Museum, Los Angeles, in 1987 by Margaret Lyneis.

Table I.5. Changing Red Ware Frequencies, Middle Pueblo II and Middle Pueblo II/Late Pueblo III at the Yamashita sites

	San Juan Red Ware	Tsegi Orange Ware	Shinarump Red Ware	Total
Y-2, 26CK6445	122: *87.1%*	13: *9.3%*	5: *3.6 %*	140: *100.0%*
Y-3, 26CK6446	26: *17.6%*	118: *79.7%*	4: *2.7%*	148: *100%*
Y-5S, Area B, 26CK2042	0	0	4: *100%*	4: *100%*

Other Pueblo White Ware Recovered in Southern Nevada

The only external white ware that has been recognized is Tusayan White Ware, Kayenta Series. Kayenta Series types are sand-tempered, and hard to distinguish from some Virgin Series white ware sherds. They are relatively well dated in their homeland. Like the intrusive red wares, they can help with the dating of southern Nevada assemblages. The Black Mesa Black-on-white sherds from Yamashita 2 (26CK6445) date A.D. about A.D. 1050 to 1150 in their production area (Sullivan et al. 1995:180).

CONCLUSIONS

Developing chronology is a perpetual concern in studying prehistory. Prehistoric pottery contributes to relative chronology and estimated dates, but in southern Nevada, the pottery chronology is far from established. Better dating of changing aspects of the ceramic record will help establish the timing of changes in each tradition. Two longstanding methods of dating pottery—association with radiocarbon samples and stratigraphy—have taken us to where we are: a discontinuous record patched together from limited information, but also a good start. Finding pottery in association with materials datable by radiocarbon dating is difficult, and rare. It requires testing or excavating sites and clear understanding of the depositional history of the deposits.

Luminescence dating, a more recent technique, can augment chronometric dating, but has seen limited use in southern Nevada. It cannot be used on surface finds, and requires an associated sediment sample. It directly dates the firing, or the last time of heating of the pottery. It takes only a small piece of a sherd. See http://depts.washington.edu/lumines/ for information on the techniques and instructions for collection of associated sediment samples. Pottery and dating form a positive feedback loop: pottery

dating is tested and refined by chronometric methods, and better pottery chronology supports better dating of associated materials.

Questions about mobility and land use patterns are important to prehistoric studies. Materials-oriented studies that identify ceramic production areas and test pottery for evidence of where it was made in contrast to where it was recovered tell us about past human movements and socioeconomic relationships. If women were the potters in the small-group societies of southern Nevada, then identifying production areas might provide information on group composition. Local pottery production indicates longer stays by family groups rather than by limited, specialized task groups. Pueblo pottery wares and types common in the Moapa Valley have been found at Ash Meadows. They might be interpreted as pottery exchanged with non-pottery-producing folks who might value them. The Pueblo-tradition sherds from the Moapa Valley at Ash Meadows are skewed when compared to Moapa Valley assemblages: red ware and white ware vessels are over-represented in the Ash Meadows sample in comparison with utility wares. Perhaps the plan was to produce utility ware at Ash Meadows (Lyneis 2008c: Table 8.1).

More Materials Analysis

Both the clay and non-plastic inclusions (usually temper) in pottery have information to give about the production locales of pottery. Sometimes temper analysis will provide the necessary information. In other cases, clay characterization is essential.

In addressing the clay fraction, refiring is the best starting point. It is inexpensive and numerous clay samples and sherd samples can be processed at the same time. It tests the iron content of the clays by fully oxidizing them. Sherds with variation in refired color suggest multiple clay sources, but sherds with very similar refired colors may be from the same source or from several sources with similar iron content. Refired samples of clay, when compared to the colors of refired sherds, can point out the likely sources and narrow the field for further investigation. INAA (inductively-coupled neutron activation analysis) or LA-ICP-MS (laser-ablation inductively-coupled plasma mass spectroscopy) are the current methods available for chemical characterization of clays. Their only application of record in southern Nevada and the surrounding area is that of Sakai (2008).

Petrographic analysis is a longstanding geological technique. Its application to ceramics goes back to Anna O. Shepard's 1936 paper, "The Technology of Pecos Pottery," but its use in ceramic analysis remains sporadic and under-applied. It is up to the archaeologist to frame the issues to be addressed in analyses like INAA, LA-ICP-MS and petrographic analysis. These problems guide the selection of samples, both sherds and comparative clay samples, for analysis.

Finding a petrographer is about to get easier. It is sometimes difficult to locate one among geologists, especially one who is familiar with the geology of the research area, but it is worth the search. Desert Archaeology, which has long maintained expertise and facilities for ceramic petrography, is broadening its focus from its long-term interest in the ceramics of southern Arizona to work with ceramics in other areas. Mary Ownby, their research petrographer, was trained at the University of Cambridge and is well-prepared to address many ceramic issues.

REFERENCES CITED

Allison, James R.

2000 Craft Specialization and Exchange in Small-scale Societies: A Virgin Anasazi Case Study. Unpublished Ph.D. dissertation, Department of Anthropology, Arizona State University, Tempe.

2008 Shinarump Red Ware and other Red Ware Pottery: North and West of the Colorado River. *Pottery Southwest* 27(1)(Part 2 of 2): 21-34. (http://www.unm.edu/~psw/).

2010 The BYU Archaeological Field Schools on the Shivwits Plateau. Paper presented at the Kaibab-Vermillion Cliffs Heritage Alliance symposium, Discovering the Archaeology of the Arizona Strip Region, Page, Arizona.

Baldwin, Gordon C.

1950 The Pottery of the Southern Paiute. *American Antiquity* 16(1): 50–56.

Beck, Margaret E.

2006 Lowland Patayan-Hohokam Interaction: A View from Southwestern Arizona. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 33–50. Three Corners Conference, Las Vegas.

Bettinger, Robert L.

1989 *The Archaeology of Pinyon House, Two Eagles, and Crater Middens: Three Residential Sites in Owens Valley, Eastern California*. Anthropological Papers No. 67. American Museum of Natural History, New York.

Blinman, Eric

1987 Chapter Analysis of Ceramics from the Project Area. In*, Green Spring: An Anasazi and Southern Paiute Encampment in the St. George Basin*, by Deborah A. Westfall, William E. Davis, and Eric Blinman, pp. 66–85. Cultural Resource Series No. 21. USDI, Bureau of Land Management, Utah.

Carpenter, Andrea

2005 Chapter 4 Petrographic Analysis. In *Desert Oasis: The Prehistory of Clark County Wetland Park, Henderson, Nevada*, edited by Richard V. N. Ahlstrom, pp.73–83. Papers in Archaeology No. 4. HRA Conservation Archaeology, Las Vegas.

Collette, Jim M.

2009 Shinarump Gray and White Ware: A 75-year perspective, Part 1. Pottery Southwest 28(2) 2-11. (http://www.unm.edu/~psw/).

Colton, Harold S.

1952 *Pottery Types of the Arizona Strip and Adjacent Areas in Utah and Nevada*. Museum of Northern Arizona Ceramic Series No. 1, Northern Arizona Society of Science and Art, Flagstaff.

1955 *Pottery Types of the Southwest: Wares 8A, 9A, 9B, Tusayan Gray and White Ware, Little Colorado Gray and White Ware.* Museum of Northern Arizona Ceramic Series No. 3A. Northern Arizona Society of Science and Art, Flagstaff.

1956 Pottery Types of the Southwest: Ware 5A, 5B, 6A, 6B, 7A, 7B, 7C. Museum of Northern Arizona Ceramic Series No. 3C. Northern Arizona Society of Science and Art, Flagstaff.

Colton, Harold S. and Lyndon L. Hargrave
1937 *Handbook of Northern Arizona Pottery Wares*. Museum of Northern Arizona Bulletin No. 11. Nothern Arizona Society of Science and Art, Flagstaff.

Dobyns, Henry F., and Robert C. Euler
1958 Tizon Brown Ware: A Descriptive Revision. Ware 15. In Pottery Types of the Southwest, edited by Harold S. Colton. Museum of Northern Arizona Ceramic Series No. 3 D. Northern Arizona Society of Science and Art, Flagstaff.

Eerkens, Jelmer W.
2001 The Origins of Pottery Among Late Prehistoric Hunter-Gatherers in California and the Western Great Basin. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Santa Barbara.
2003a Residential Mobility and Pottery Use in the Western Great Basin. *Current Anthropology* 44(5):728–738.
2003b Towards a Chronology of Brownware Pottery in the Western Great Basin: a Case Study from Owens Valley. *North American Archaeologist* 24(1):1–27.
2004 Privatization, Small-Seed Intensification, and the Origins of Pottery in the Western Great Basin. *American Antiquity* 69 (4):653–670.

Eerkens, Jelmer W., Hector Neff, and Michael D. Glascock
2002a Ceramic Production among Small-Scale and Mobile Hunters and Gatherers: A Case Study from the Southwestern Great Basin. *Journal of Anthropological Archaeology* 21(2):200–229.
2002b Typologies and Classification of Great Basin Pottery: A New Look at Death Valley Brownwares. In *Ceramic Production and Circulation in the Greater Southwest: Source Determination by INAA and Complementtary Mineralogical Investigtations* , edited by D. M. Glowacki and H. Neff, pp. 140–151. Monograph No. 44. Cotsen Institute of Archaeology, Los Angeles.

Fowler, Catherine S.
2010 *Facing Snow Mountain: Las Vegas-Pahrump-Desert Southern Paiute Culture in the Late 19th Century.* Prepared for USDA, Forest Service and US Fish and Wildlife Service by HRA Inc, Las Vegas.

Gilreath, Amy J., and Daron G. Duke
2006 Archaeology of the Sloan Canyon National Conservation Area, Clark County, Nevada. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 169–186. Three Corners Conference, Las Vegas.

Griset, Suzanne
1986 *Pottery of the Great Basin and Adjacent Areas*. Anthropological Papers No. 111. University of Utah Press, Salt Lake City.

Harrington, M. R.
1937 Ancient Tribes of the Boulder Dam Country. *Southwest Museum Leaflets* No. 9. Los Angeles.

Hayden, Irwin
1930 Mesa House. In *Archaeological Explorations in Southern Nevada*, pp. 26–92. Paper No. 4. Southwest Museum, Los Angeles.

Hayes-Gilpin, Kelley A.
2007 Painted Pottery: Analysis and Interpretation. In *Prehistory of the Northern Kayenta Anasazi Region: Archaeological Excavations along the Navajo Mountain Road,* Vol. 5, edited by Phil R. Geib and Kimberly Spurr, pp.3.1–3.13. Report No. 02-48. Navajo Nation Archaeology Department, Window Rock, Arizona.

Hays-Gilpin, Kelley A. editor
2001 Ceramic Manual 2001: Prescott Gray Ware. Electronic Document, http://jan.ucc.nau.edu/swpottery/PRESCOTT/PGW.htm

Hays-Gilpin, Kelley A., and Janet Hagopian
2007 Ceramic Analysis. *Prehistory of the Northern Kayenta Anasazi Region: Archaeological Excavations along the Navajo Mountain Road,* Vol. 5, edited by Phil R. Geib and Kimberly Spurr, pp. 2.1–2.22. Report No. 02-48. Navajo Nation Archaeology Department, Window Rock, Arizona.

Hegmon, Michelle, James R. Allison, Hector Neff, and Michael D. Glascock
1997 Production of San Juan Red Ware in the Northern Southwest: Insights into Regional Interaction in Early Puebloan Prehistory. *American Antiquity* 62(3):449-463.

Hildebrand, John A.
2003a Buried Sites Discovered in the Palo Verde Hills Segment. In *A View Across the Cultural Landscape of the Lower Colorado Desert: Cultural Resource Investigations for the North Baja Pipeline Project*, by James H. Cleland and Rebecca McCorkle Apple, pp. 119–157. Prepared by EDAW, Inc., for Tetra Tech FW, Inc., Santa Ana, California.
2003b Ceramics Excavated from the Lower Colorado River Region by the North Baja Pipeline Project. In *A View Across the Cultural Landscape of the Lower Colorado Desert: Cultural Resource Investigations for the North Baja Pipeline Project*, by James H. Cleland and Rebecca McCorkle Apple, pp. 245–260. Prepared by EDAW, Inc., for Tetra Tech FW, Inc., Santa Ana, California.

Hildebrandt, John A., G. Timothy Gross, Jerry Schaefer, and Hector Neff
2002 Patayan Ceramic Variability: Using Trace Elements and Petrographic Analysis to Study Brown and Buff Wares in Southern California. In *Ceramic Production and Circulation in the Greater Southwest*, edited by Donna M. Glowaski and Hector Neff, pp. 121–139. Monograph No. 44. Cotsen Institute of Archaeology, University of California, Los Angeles.

Hunt, Alice P.
1960 *Archaeology of the Death Valley Salt Pan, California*. Anthropological Papers No. 47. University of Utah Press, Salt Lake City.

Jenkins, Dennis
1981 Cliff's Edge: A Pueblo I Site on the Lower Virgin River. Unpublished master's thesis, Department of Anthropology, University of Nevada, Las Vegas.
1985 Appendix A: The Ceramics from No Name West Basin Sites 4-SBr-4454 and 4-SBr4504 and an Updated Discussion of the Spatial and Temporal Distribution of Ceramics at Fort Irwin. In Archaeological Studies in No Name West Basin, Fort Irwin, San Bernardino County California, Vol. 2, *The Field Phase of Data Recovery at Two Sites*, by Michael S. Kelley and Claude N. Warren, pp. A-1–A-4. Prepared by WIRTH Environmental Services, a Division of Dames & Moore, San Diego.

Lamb, Sydney
1958 Linguistic Prehistory in the Great Basin. *International Journal of American Linguistics* 24(2):95–100.

Lockett, C. L. and L. C. Pippin
1990 Reexamining Brownware Ceramics in the Central and Southern Great Basin. In *Hunter-Gatherer Pottery from the Far West*, edited by J.M. Mack, pp. 67–82. Anthropological Papers No 23. Nevada State Museum, Carson City.

Lowie, Robert H.
1924 *Notes on Shoshonean Ethnography.* Anthropological Papers Vol. 20(3). American Museum of Natural History, New York.

Lyneis, Margaret M.
1988a Appendix E: Ceramics. In *The Late Holocene Archaeology of Drinkwater Basin, Fort Irwin, San Bernardino County, California,* edited by Mark E. Basgall, M. C. Hall, and William R. Hildebrandt, pp. E1–E12. Submitted by Far Western Anthropological Research Group, Davis, to the U.S. Army Corps of Engineers, Los Angeles District.
1988b Tizon Brown Ware and the Problems Raised by Paddle-and-Anvil Pottery in the Mojave Desert. *Journal of California and Great Basin Anthropology* 10(2):146–155.
1990 Buff and Brown Wares at Lost City: A Fresh Look at Intrusives. Nevada Archaeologist 8:25–34.
1992 *The Main Ridge Community at Lost City: Virgin Anasazi Architecture, Ceramics, and Burials.* Anthropological Papers No. 117. University of Utah Press, Salt Lake City.
1994 Ceramics. In *Research Context, and Data Analysis,* Kern River Pipeline Cultural Resources Data Recovery Report: Utah, Vol. 1. Dames & Moore, Las Vegas.
2000 Life at the Edge: Pueblo Settlements in Southern Nevada. In *The Archaeology of Regional Interaction*, edited by Michelle Hegmon, pp. 257–274. University Press of Colorado, Boulder.
2008a Ceramic Artifacts. In *Shared Place: An Archaeological Survey of the Ash Meadows National Wildlife Refuge, Nye County, Nevada, by Jerry D. Lyon, et al.*, pp. 293–303Archaeological Report No. 07-24. Prepared for the US Fish and Wildlife Service, Amargosa Valley, Nevada, by HRA Inc. Conservation Archaeology, Las Vegas.
2008b New and Revised Prehistoric Pueblo Pottery Wares and Types from North and West of the Colorado River: Part 1, Gray Wares from the Western Area. *Pottery Southwest* 27(1):3–20. http://www.unm.edu/~psw/
2008c The Socioeconomic Context of Changing Middle Pueblo II Pottery Frequencies at the Yamashita Sites, Moapa Valley, Southern Nevada. In *Proceedings of the 2007 Three Corners Conference*, edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen A. Sprowl, pp. 163–184. Nevada Archaeological Association, Las Vegas.
2010 The Arizona Strip from Southern Nevada. Paper presented at the symposium Discovering the Archaeology of the Arizona Strip Region, Learning from the Past, Planning for the Future, Page, November 12–13, 2010.
2011 Ceramics. In *Archaeological Excavations at the Corn Creek National Register Site, Desert National Wildlife Refuge, Clark County, Nevada*, by Heidi Roberts and Jerry Lyon, pp. 156–184. Prepared for the U.S. Fish and Wildlife Service, Desert National Wildlife Refuge. Archaeological Report No. 08-22. HRA, Inc. Conservation Archaeology, Las Vegas.

Lyneis, Margaret M., and Kelley Hays-Gilpin
2007-2008 Prehistoric Pueblo Pottery North and West of the Colorado River: Museum of Northern Arizona Ceramic Conference November 9-10, 2007. *Pottery Southwest* 26(4):12–19. http://www.unm.edu/~psw/; archived issues.

Lyneis, Margaret M., Mary K. Rusco, and Keith Myhrer
1989 *Investigations at Adam 2 (26CK2059): A Mesa House Phase Site in the Moapa Valley*. Anthropological Papers No. 22. Nevada State Museum, Carson City.

Lyon, Jerry D., and Richard V.N. Ahlstrom
2006 Archaeological Landscapes in the Las Vegas Valley. In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 139–168. Three Corners Conference, Las Vegas.

Mack, Joanne M.
1990 *Hunter-Gatherer Pottery from the Far West*. Anthropological Paper No. 23. Nevada State Museum, Carson City.

Marshall, Michael P.
1979 Appendix D Descriptions of New Ceramic Wares and Types. In *Archaeology of the Grand Canyon: The Bright Angel Site*, by Douglas W. Swartz, Michael P. Marshall, and Jane Kepp, pp. 97–104. Grand Canyon Archaeological Series, Vol. 1. School of American Research, Santa Fe.

McGuire, Kelly, William Hildebrandt, Amy Gilreath, Jerome King, and John Berg
2010 *Final Research Results for the Gold Butte Study Area, Clark County, Nevada*, Vol. I, *Prehistoric Resources*. BLM Report No. 5-2617. Far Western Anthropological Research Group, Inc., Davis, California.

Myhrer, Keith
1989 Basketmaker and Puebloan Occupation at the Steve Perkins Site, Moapa Valley, Southern Nevada. Manuscript on file, USDI-Bureau of Land Management, Las Vegas District, Nevada.

Myhrer, Keith, and Margaret M. Lyneis
1985 *The Bovine Bluff Site: An Early Puebloan Site in the Upper Moapa Valley*. Technical Report No. 15. USDI, Bureau of Land Management, Reno.

Perry, Laureen M.
2003 Chapter 8 Ceramic Analysis. In *The Coral Canyon Project Archaeological Investigations in the St. George Basin, Southwestern Utah*, edited by Heidi Roberts and Richard V. N. Ahlstrom, pp. 201–212. Papers in Archaeology No. 3. HRA, Inc. Conservation Archaeology, Las Vegas, Nevada.

Rogers, Malcolm J.
1936 *Yuman Pottery Making*. Paper No. 2. San Diego Museum, San Diego.

Sakai, Sachiko
2008 Explaining Change in Production and Distribution Pattern of Olivine Ceramics in the Arizona Strip and Adjacent Areas of the American Southwest. In *Proceedings of the 2007 Three Corners Conference,* edited by Mark C. Slaughter, Steven Daron, Eva Jensen, and Kathleen Sprowl, pp. 227–248.Nevada Archaeological Association, Las Vegas.

Schaefer, Jerry
2003 Petrographic and INAA Analysis of Southern Owens Valley Clays and Brown Ware Ceramics from the Olancha/Cartqago Four-Lane Project. In *Lacustrine Lifeways along Owens Lake: NRHP Evaluation of 15 Prehistoric Sites for the Olancha /Cartago Four-Lane Project, U.S. Route 395, Inyo County, California*, by Brian F. Byrd and Micah Hale, pp. 567–606. ASM Affiliates, Inc., California

Schroeder, Albert H.
1958 Lower Colorado Buff Ware: A Descriptive Revision. In *Pottery Types of the Southwest,* edited by Harold S. Colton. Museum of Northern Arizona Ceramic Series 3D. Northern Arizona Society of Science and Art, Flagstaff.

Seymour, Gregory R.
1997 A Reevaluation of Lower Colorado Buffware Ceramics: Redefining the Patayan in Southern Nevada. Unpublished master's thesis, Department of Anthropology, University of Nevada, Las Vegas.
2003 Ceramics. In *The Las Vegas Wash Collections Project: Analysis of Artifacts and Biological Specimens from Past Archaeological Excavations in Clark County Wetlands Park, Southern Nevada*, edited by Richard V.N. Ahlstrom, pp. 43–50. Archaeological Report No. 01-01. Draft Report, submitted to the Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, Nevada, by HRA, Inc. Conservation Archaeology, Las Vegas.
2006 The Four P's: Pots, Puebloans, and Patayan. But where are the Paiutes? In *Beginnings: Proceedings of the 2005 Three Corners Conference*, edited by Mark C. Slaughter, Gregory R. Seymour, and Laureen M. Perry, pp. 113–122. Three Corners Conference, Las Vegas.

Seymour, Gregory R., and Laureen Perry
1998 *A Guide to the Ceramic Type Collection at the Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas and the Bureau of Reclamation*. Report No. 1-3-31. Harry Reid Center, University of Nevada, Las Vegas.

Shepard, Anna O.
1936 The Technology of Pecos Pottery. In *The Pottery of Peco*s, vol. 2, by Alfred V. Kidder and Anna O. Shepard, pp. 389–587. Papers of the Phillips Academy Southwestern Expedition No. 7. Yale University Press, New Haven, Connecticut.

Shutler, Richard Jr.
1961 *Lost City: Pueblo Grande de Nevada.* Anthropological Papers No. 5. Nevada State Museum, Carson City.

Spencer, J. E.
1934 Pueblo Sites of Southwestern Utah. *American Anthropologist* 36(1): 70–80.

Sullivan, Alan P., III, Matthew E. Becher, and Christian E. Downum
1995 Tusayan White Ware Chronology: New Archaeological and Dendrochronological Evidence. *Kiva* 61(2): 175–188.

Thomas, David H.
1994 Chronology and the Numic Expansion. In *Across the West: Human Population Movement and the Expansion of the Numa*, edited by David B. Madsen and David Rhode, pp. 56–61. University of Utah Press, Salt Lake City.

Tingley, Susan L.
1999 Generalized Geologic Map of Nevada. Educational Series E-30. Nevada Bureau of Mines and Geology, Reno.

Tuohy, Donald R.
1986 Ethnographic Specimens of Basin Brown Ware. In *Pottery of the Great Basin and Adjacent Areas* edited by Suzanne Griset, pp. 27–36. Anthropological Papers No. 111. University of Utah Press, Salt Lake City.
1990 Second Thoughts on Shoshoni Pots from Nevada and Elsewhere. *Hunter-Gatherer Pottery from the Far West* edited by Joanne M. Mack, pp. 83–105. Anthropological Papers No. 23. Nevada State Museum, Carson City.

Wallace, William J.
1986 The Pottery of Mesquite Flat, Death Valley, California. In *Pottery of the Great Basin and Adjacent Areas,* edited by Suzanne Griset, pp. 71–74. Anthropological Papers No. 111, University of Utah Press, Salt Lake City.

Walling, Barbara A., and Richard A. Thompson
1988 *Archaeology of the Dead Raven Site*. Prepared for the Kane County Commission by Intersearch, Cedar City, Utah.

Waters, Michael R.
1982a The Lowland Patayan Ceramic Tradition. In *Hohokam and Patayan: Prehistory of Southwestern Arizona*, edited by Randall H. McGuire and Michael B. Schiffer, pp. 275–297. Academic Press, New York.
1982b The Lowland Patayan Ceramic Typology. In *Hohokam and Patayan: Prehistory of Southwestern Arizona*, edited by Randall H. McGuire and Michael B. Schiffer, pp. 537–570. Academic Press, New York.

Winslow, Diane L.
2004 Possibly One of the Earliest, and Not Necessarily One of the Poorest: Luminescence Dating of Logandale Gray Ceramics from Black Dog Mesa. Twenty-ninth Great Basin Conference, October 14-16, Sparks, Nevada.
2009 *Pithouse Excavations, Locus 4. Mitigation, Black Dog Mesa Archaeological Complex (26CK5686/BML 53-7216)*, Vol. 3. BLM Report No. 5-2430(3), HRC Report No. 5-4-26(3). Harry Reid Center for Environmental Studies, University of Nevada, Las Vegas.

Winslow, Diane L., and Lynda Blair
2003 *Black Dog Cave. Mitigation, Black Dog Mesa Archaeological Complex (26CK5686/BLM 53-7216)*, Vol. 2. BLM Report No. 5-2430(2), HRC Report No. 5-4-26(2). Harry Reid Center for Environmental Studies, Marjorie Barrick Museum of Natural History, University of Nevada, Las Vegas.

APPENDIX J
EARLY ARCHAEOLOGISTS OF SOUTHERN NEVADA

Claude N. Warren

EARLY ARCHAEOLOGISTS OF SOUTHERN NEVADA

Claude N. Warren This review of the history of Nevada archaeology reveals that, in the early years, few archaeologists lived in Nevada, specialized in Nevada archaeology, or developed long lasting research programs in Nevada. Nonetheless, their work represents the foundation of the science in Nevada and the beginning of modern understanding of the relationship between early peoples and their environment. Understanding this early research, the scholars who produced it and the scientific context in which they worked is important to understanding the full picture of the growth and development of archaeology in Nevada.

THE EARLY YEARS I: MARK RAYMOND HARRINGTON

Archaeology in the State of Nevada was developed and maintained almost entirely by the efforts of one man, the "Father of Nevada archaeology," Mark Raymond Harrington. Others did visit the state and record archaeological sites during these early years; Harrington first came to Nevada in 1924 to investigate northern Nevada cave deposits excavated by others. But he became first among archaeologists because of his subsequent work at Lost City of southern Nevada.

Earlier explorations in Nevada are few: *American Anthropologist* 1904 Vol. 6, rep. (1962:148-150) carried an article by one M. S. Duffield, a mining engineer who traversed part of southern Nevada, exploring the potential for mining ores, the development of which would become feasible when the San Pedro, Los Angeles, and Salt Lake Railroad opened up the region. Duffield described the geology of the Spring Mountains and various spring sites. He focused especially on the petroglyphs so frequently found on exposed rock faces. He noted the presence of pottery and stone implements, mescal pits, and "old dwellings places" in the "cavernous limestone bluffs." As a mining professional, he surveyed the Providence Mountains and noted that several turquoise-producing properties were located there. Further, he noted that "in every case the discovery of these was due to the finding of old pits and workings." Duffield hoped that his "few observations" would interest others "with time and facilities for systematic study of the remains uncovered."

In 1912, A. V. Kidder and H. P. Mera visited a site in southern Nevada with evidence of Pueblo occupation. Also in 1912, Llewellyn Loud and a University of California crew explored Lovelock Cave in northern Nevada. The Lovelock Cave excavation is what first brought Harrington to Nevada (Harrington 1929).

Lovelock Cave had been mined for bat guano for decades, beginning in the nineteenth century. Over time, it was noted that the guano decreased with depth, and archaeological material increased. Loud excavated part of the cave, after which private collectors moved in. These collectors worked the deposits for artifacts and sold their finds to George Heye of the Heye Foundation in New York City. In 1924, Heye sent Mark Harrington to Lovelock Cave to investigate what might remain of the cave deposits. Loud joined the expedition at Harrington's request. Lovelock Cave was found to contain storage pits that had been excavated by prehistoric people. The pits contained very interesting artifacts; among the items recovered were a bundle of duck decoys and a variety of feathers from large birds including eagles and pelicans (Loud and Harrington 1929).

The governor of Nevada, James G. Scrugham (1935:541), became interested in Nevada's archaeology. Lovelock Cave piqued his interest in the ancient past, both from the standpoint of intellectual curiosity and because of its potential for developing attractions to bring tourists and all they could do for Nevada's lean economy. Scrugham, learning from Overton residents that ancient Pueblo ruins were located in southern Nevada, sent a party to investigate the sites along the Muddy River in Clark County. The party, aided by local residents, located a large site with numerous foundations of rectangular adobe structures and plentiful Pueblo pottery. These finds stimulated Governor Scrugham to develop a plan for excavating the site, first known as Pueblo Grande de Nevada, and more recently, as Lost City. He asked that the Museum of the American Indian place Mark Harrington in charge and arranged funding from the Smithsonian and Carnegie institutions. Excavation at Lost City and limited

surveying in the area consumed virtually all of Harrington's time in 1925 and 1926, but the survey expanded knowledge of Pueblo activity, especially with the discovery of the nearby salt caves mined by the Pueblo people.

Publicity about these discoveries caught the interest of the public, who were encouraged to visit the sites by articles in the *National Geographic* magazine, as well as national and foreign newspapers. Governor Scrugham planned and promoted a "great pageant" to be staged in 1926 on the lower Muddy River, "on the very site of the first ruins" (Hafner 1967:358). The Union Pacific Railroad (UPR) ran special trains to St. Thomas, near the pageant site where Zuni artisans restored Pueblo ruins so that the prehistory and history of the region could be staged in an authentic setting. Hundreds of local residents joined Nevada's Southern Paiutes and Zunis from New Mexico to stage the production, which depicted life in Lost City when it was alive and thriving a thousand years earlier. Archaeologist M. R. Harrington directed the Zuni participants in portraying life in the Anasazi community before Paiute occupation of the region (Hafner 1967:358). The UPR supplied its Los Angeles band for the production, maintained dining service and lunch counters for the public, advertised the pageant, and ran special trains to bring spectators. Nevada improved local roads and highways to aid automobile access, and suitable campgrounds were opened at St. Thomas and Overton. The pageant was a huge success; estimates of the number of attendees range from 2,500 to 10,000 people (Hafner 1967:173 and 358), boosting regional and local awareness of the value of the archaeological remains. In 1935, Nevada's Lost City Museum was built in Overton to preserve artifacts and the record of the Harrington's excavations (Hafner 1967:174–175). More recent work in the Muddy River Valley, conducted by Claude Warren for University of Nevada, Las Vegas, is also exhibited there today.

Harrington resigned from the Museum of the American Indian (Heye Foundation) in 1928, and moved to the Southwest Museum in Pasadena, where he remained for the rest of his career. In January 1929, under the auspices of the Southwest Museum and the State of Nevada, he launched a program of archaeology in the Moapa Valley (Muddy River Valley) of Nevada. The plan was to survey the valley and excavate a few key sites. The survey of the Colorado and Virgin rivers yielded few traces of prehistoric activity, while the Muddy River Valley yielded 77 ruins just in the lower 16 miles of its channel. Harrington noted, in explanation, that the Virgin and the Colorado rivers in that area were not conducive to irrigation, while the Muddy River Valley offered quite favorable conditions.

In 1929, still in the Muddy River Valley, Harrington began to excavate at Mesa House, a large site dating from the Basketmaker III through Pueblo III periods. He also dug at Paiute Cave, which contained rich deposits of Paiute basketry, textiles, and other, less perishable artifacts, including arrow shafts, mescal knives, and fire drills. Pueblo storage pits found at the back of Paiute Cave reflect its earlier use by these people (Harrington 1929).

Moving into Las Vegas Valley, Harrington excavated at Gypsum Cave, a large cave located in gypsum beds included in the boundary of the proposed Lake Mead National Recreation Area. The cave contained six chambers and is about 300 feet long, with a maximum width of 120 feet. This site is stratified and deep. Harrington worked there in the early 1930s and published a report of the results in 1933. This site excited significant attention because remains of a giant sloth were found in the cave; much speculation revolved around the question of possible human hunting activity in connection with this animal. Harrington's report suggested that human hunters had indeed killed the sloth.

In the spring of 1933, Fenley Hunter of the American Museum of Natural History, while searching for Pleistocene paleontological material in the vicinity of Tule Springs in Las Vegas Valley, found a large obsidian flake in the same matrix as a large bison skull. For the next 30 years, this association was taken to validate Harrington's interpretation of the Gypsum Cave sloth-human connection. Pleistocene fauna continued to weather out of the Tule Springs Wash, ultimately attracting the attention of Willard Libby, then at UCLA, whose new technique for dating ancient carbon remains could be used to date the fossils and the age of any humans connected with them. A stellar group of scientists, backed financially by private funds, conducted a major excavation there in 1965 (Wormington and Ellis 1967). Harrington died before this project began.

While Hunter was exploring at Tule Springs in 1933, Harrington returned to the lower Muddy River. Concerned that the new reservoir to be created by damming the Colorado River at Black Canyon would flood many sites along the Muddy, including Lost City, he obtained funding and by April was in the field on the lower Muddy. He found and conducted limited excavation at the Bonelli site, but lack of funds precluded completing the work. The Bonelli site was inundated by the first rise of water in Lake Mead.

Next, supported by a grant from the Carnegie Institution, Harrington returned to Tule Springs, to the site where Hunter had found the obsidian flake and bison skull. There, Harrington found other carbon deposits that contained bones of horses, bison, mammoth, and, most abundantly, camel. Some bones were burned and others appeared to have been split, as if to obtain marrow. Two possible bone tools were recovered from the same carbon deposit (Harrington and Simpson 1961; Simpson 1993). Meanwhile, Governor Scrugham was arranging with the National Park Service and the Civilian Conservation Corps (CCC) to continue efforts to salvage more materials from unexcavated parts of Lost City before it was flooded by Lake Mead. Harrington was in charge of this work, which continued through 1934, breaking for the hot summer months. During those months, Harrington returned to Smith Creek Cave in northern Nevada, where he had dug in 1932 and found possible association between humans and extinct horses. The 1934 work at Smith Creek proved inconclusive regarding any such relationship.

In the fall of 1934, Harrington returned to Lost City and continued working there until late spring, when the temperatures in southern Nevada once more became intolerable for fieldwork. In California, meanwhile, more and more sites were being discovered that were within the province of the Southwest Museum. Consequently, Harrington was called back to southern California to begin a program of excavating early sites. His last archaeological project in Nevada, the testing of Black Dog Cave, was conducted in 1935 in the upper Muddy River Valley near Moapa. His report on this site was published in *The Masterkey* in 1942.

Harrington returned to Nevada once more in connection with the Tule Springs site. In 1954, some burned bones from there yielded a radiocarbon date of 23,500 B.P. A preliminary excavation produced one stone tool, many more bones of mammoth, camel, horse, and bison, and a second carbon date of 28,000 years B.P. The site, previously discussed, was excavated in the mid-1960s by others, and again produced inconclusive evidence for human occupation of the site contemporaneously with the Pleistocene mammal assemblage (Wormington and Ellis 1967).

THE EARLY YEARS II: SIDNEY MERRICK WHEELER

Sidney Merrick Wheeler graduated from West Point Military Academy in June 1926, but served only one year in the military. He married in 1927. The Great Depression years brought hard times, including the death of his two children. In 1933, Wheeler was ordered back into the military for duty with the newly formed Civilian Conservation Corps. He was stationed at Mt. Charleston near Las Vegas, then transferred to Kaolin, Nevada, to assist M. R. Harrington with a CCC crew to excavate at the Lost City site on the lower Muddy. Few specifics are known about Wheeler's duties during that excavation, but he stated later (Wheeler 1942:1) “my introduction to archaeology was mainly through association with Mr. Harrington. Under his guidance my wife and I came to realize the value of the research, and gradually acquired, through suggested reading and discussion, a foundation for future work.”

In May 1934, the CCC group was transferred to Lincoln County, Nevada, and Harrington suggested that Wheeler and his wife explore the new area and report to him any evidence of archaeological sites. Wheeler and wife left from that assignment to begin work at site near Etna, Nevada, still in Lincoln County. This site was to become well known in the archaeological literature. It was another cave site, and Wheeler introduced a new method that provided better control for recording and mapping spatial relationships among cultural items and stratigraphic units. He introduced a 3-foot grid system, which had not been used earlier in the Great Basin or in California. In fact, the grid system was not in general use anywhere in North America at this time. From where the idea came is not known, but its use at Etna Cave preceded its general use elsewhere in the western United States. Coincidentally, a

highly respected British archaeologist also named Wheeler, Sir Mortimer Wheeler, claimed to have first used the grid system in 1935 (M. Wheeler 1954), a year later than Sidney M. Wheeler (1973).

There is scant information about Sidney Wheeler's activities between 1935 and 1937 (Winslow 1996), but during the late 1930s, Wheeler's ideas regarding archaeological methods began to materialize. He had come to believe that, if archaeology was to be central to learning the history of prehistoric peoples, great care and precision must be taken during archaeological excavation. Further, archaeology should be the province only of those who were properly trained. In the general tradition of his day, and in keeping with the stance of his mentor, Harrington, Wheeler adopted the direct historical approach to understanding the cultural remains of prehistoric peoples. The direct historical approach extrapolates back in time from the present. Thus, by obtaining knowledge about historic aboriginal peoples and at the same time describing and classifying artifacts from prehistoric sites, it was possible to work out chronologies based on changes in artifact types. This method worked especially well for projectile points.

During these years, Wheeler worked in California at Borax Lake, returning to Nevada in the summer of 1938 to excavate at Lehman Caves. These complex excavations required tunneling, a very expensive technique, and early in October 1938, the excavation halted when funds ran out. Wheeler's life was about to change; in 1939 he was hired by the Nevada State Parks Commission as Staff Archaeologist. He traveled far and wide throughout the state, checking on known sites and potential sites, especially in caves. Perhaps the most important of the discoveries he made for Nevada State Parks was at Spirit Caves in western Nevada. Exploration in these caves produced a number of well-preserved, perishable artifacts associated with burials.

Between June 6 and November 18, 1940, Wheeler conducted reconnaissance and tested 26 caves and rockshelters in the Lake Lahontan area. It was during this time that he excavated Hidden Cave, which provided a well-detailed chronological sequence despite the deposits having been disturbed earlier by guano hunters. In analyzing the material, Wheeler adhered to then-accepted tradition in American archaeology previously mentioned, and based the Hidden Cave chronological sequence on the stratigraphic placement of artifacts within the cave deposits.

The peak of Wheeler's archaeological career came in 1941, when he was appointed curator of the newly established Nevada State Museum. During his tenure there, Wheeler worked at numerous sites throughout the region. Among them are Granary Cave, Black Dog Cave, and Smith Creek Cave. Granary Cave is in Moapa Valley. It was discovered in 1941 by Bradley Stuart, who excavated a small test unit there and found stratified deposits. The information was passed along to Wheeler, who journeyed to Moapa in 1942 to excavate there. Wheeler discovered numerous slab-lined storage pits in the cave, which subsequently was named for these features.

In the mid-1940s, Wheeler was busy in Carson City directing the Nevada State Museum. In 1948, however, he was again on the payroll of the Southwest Museum, hired to work at the Stahl site in California. After the 1955 field season, Wheeler returned to his small farm in Ely, Nevada, where, on September 11, 1959, he died at the age of 57. He had made significant contributions to the development of Mojave Desert and Great Basin archaeology, for which he is remembered today (Winslow 1996).

END OF EARLY PERIOD

World War II disrupted the steady development of archaeology in Nevada as it did everywhere in the United States. The young went off to war, and older archaeologists lacked financial support. Work in archaeology did not begin again in the Mojave Desert until after 1950, and even then, there were no archaeologists with research designs who wanted to work in the Nevada and California deserts. World War II forms a temporal boundary for archaeological development in Nevada that was not breached significantly until the 1960s.

REFERENCES CITED

Duffield, M. S.
1962 Aboriginal Remains in Nevada and Utah, Kraus Reprint, New York. Originally published in 1904, *American Anthropologist* 6:148–150.

Hafner, Arabell Lee (compiler)
1967 *100 Years on the Muddy.* Printed by Art City Publishing Company, Springville, Utah.

Harrington, Mark R.
1929 An Archaeological Survey of the Lower Moapa Valley, Nevada. MS No. 214-34, Mark Raymond Harrington Collection, Southwest Museum, Los Angeles.
1942 Black Dog Cave. *The Masterkey* 16:173–174.

Harrington, Mark R., and Ruth D. Simpson
1961 *Tule Springs, Nevada with Other Evidences of Pleistocene Man in North America*. Southwest Museum Papers No. 18. Los Angeles.

Loud, Llewellyn L. and Mark R. Harrington
1929 *Lovelock Cave.* Publications in American Archaeology and Ethnology No. 25. University of California, Berkeley.

Scrugham, James G. (editor)
1935 *NEVADA, A Narrative of the Conquest of a Frontier Land*. American Historical Society, Chicago and New York.

Simpson, Ruth DeEtte
1993 *Mark Raymond Harrington: Father of Nevada Archaeology*. California Indian Library Collections [distributor], Berkeley.

Wheeler, Mortimer
1954 *Archaeology from the Earth.* Clarendon Press, Oxford.

Wheeler, Sidney M.
1942 The Archaeology of Etna Cave, Lincoln County, Nevada. Manuscript on file, Nevada State Museum, Carson City.
1973 The Archaeology of Etna Cave, Lincoln County, Nevada. In *Prehistory of Southeastern Nevada* edited by Don D. Fowler, Brigham Madsen, and Eugene M. Hattori. Desert Research Institute Publications in the Social Sciences No. 7, Nevada State Parks Commission, Reno.

Winslow, Diane L.
1996 Restricted Reconnaissance: The History and Archaeology of S. M. Wheeler in Nye County, Nevada. Unpublished master's thesis, Department of Anthropology and Ethnic Studies, University of Nevada, Las Vegas.

Wormington, H. Marie, and Dorothy Ellis
1967 *Pleistocene Studies in Southern Nevada*. Anthropological Papers No. 13. Nevada State Museum, Carson City.

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