Lake Mead

National Recreation Area
National Park Service
U.S. Department of the Interior

LOWER LAS VEGAS WASH FLOW REGULATION ENVIRONMENTAL ASSESSMENT

Clark County, Nevada

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CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

Introduction

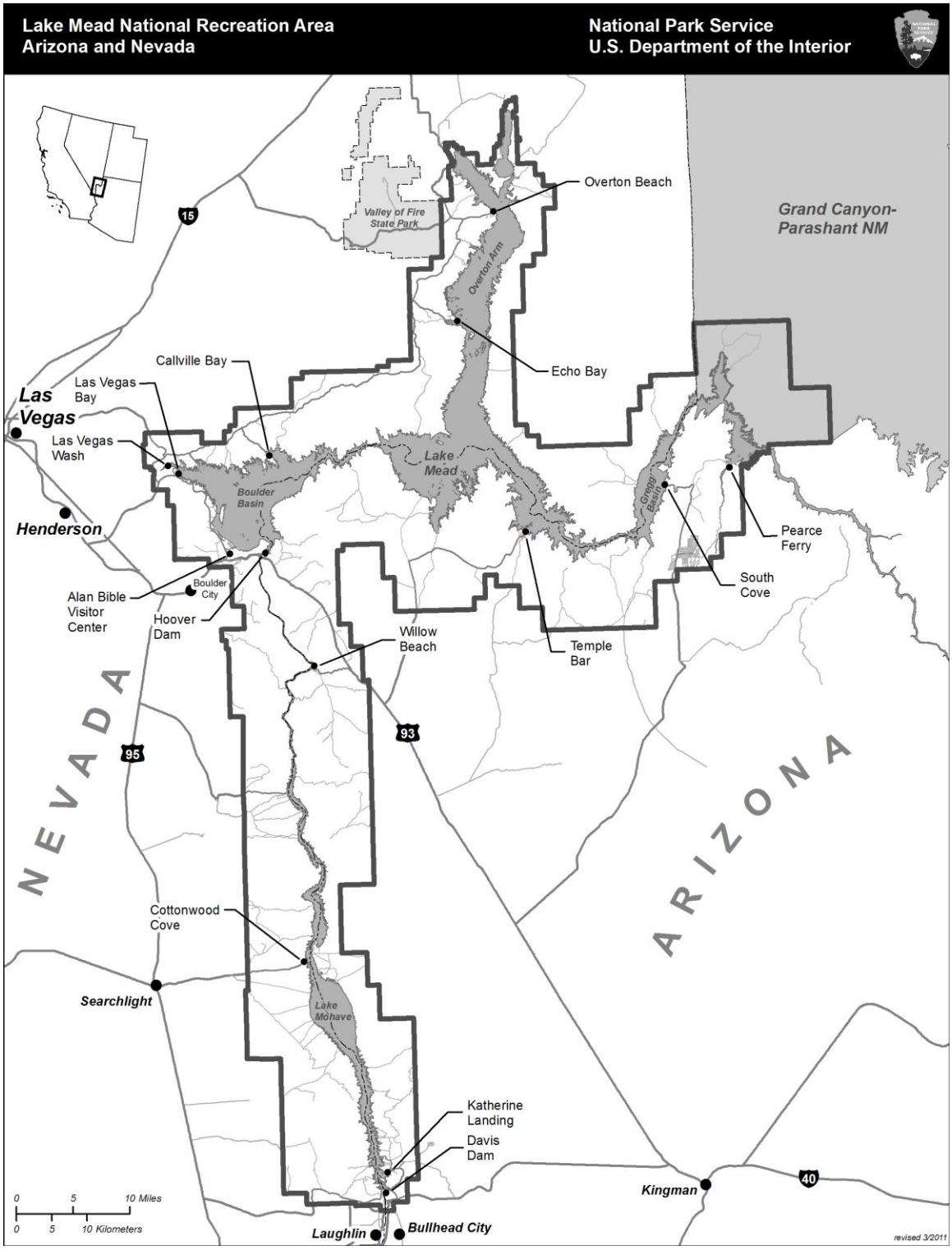
The National Park Service (NPS) is considering a proposal to further regulate flows in the lower end of Las Vegas Wash in order to reduce erosion that threatens the bridge over the Wash on Northshore Road. The proposal is in response to a study completed by the Federal Highway Administration, suggesting that active management of the channel and additional grade control structures are needed to protect the bridge and maintain access across the Wash to the northern portions of Lake Mead National Recreation Area (NRA). Lake Mead NRA is situated in southeastern Nevada and northwestern Arizona and encompasses lands around Lake Mead and Lake Mohave (Figure 1). The NPS has prepared this environmental assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, regulations of the Council on Environmental Quality's Regulations for Implementing the National Environmental Policy Act (1993), and NPS Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision Making (2001).

The EA evaluates the no action alternative and one action alternative. The alternatives analyzed are: Alternative A: No Action; and Alternative B: Construction of Grade Control Structures to Regulate Flows. Also included is a discussion of alternatives that have been ruled out and justifications for their elimination. The EA analyzes impacts of the alternatives on the human and natural environment. It outlines project alternatives, describes existing conditions in the project area, and analyzes the effects of each project alternative on the environment.

Purpose and Need

Las Vegas Wash is experiencing significant channel erosion from perennial flows of stormwater and wastewater effluent from the Las Vegas Valley. Scouring of the channel poses a threat to the stability of the bridge that crosses over the Wash on Northshore Road. In addition, the sediment generated by this erosion is deposited into Lake Mead at Las Vegas Bay, compromising water quality. In 2002, three grade control structures were constructed in the Wash within the park boundary to slow the flow of the Wash and dissipate some of the energy that was causing this erosion. Continued high flows, along with the rapid and significant drawdown of Lake Mead, have exacerbated the problem, and the three structures are no longer sufficient. The structure furthest downstream is being undermined and has been temporarily repaired. Failure of this structure would eventually cause failure of the two other structures upstream from it, posing a major threat to the foundation of the bridge and eventually to the Lake Las Vegas Dam and outlet works.

Figure 1. Area Map, Lake Mead National Recreation Area



The purpose of the proposed flow regulation in lower Las Vegas Wash is to protect the stability of the bridge that crosses over the Wash on Northshore Road and maintain access to the northern portions of the Recreation Area; to protect the integrity of the three existing grade control structures located downstream from the bridge; to protect Lake Las Vegas Dam and outlet works; and to reduce sedimentation and improve water quality flowing into Lake Mead.

Project Area Location

Las Vegas Wash is in the southeastern portion of the Las Vegas Valley and is approximately 12 miles long, from its headwaters northwest of Las Vegas to its mouth at Las Vegas Bay on the western portion of Lake Mead (Figure 2). The bridge across the Wash on Northshore Road is approximately 1.2 miles north of the intersection of Lakeshore and Northshore Roads. Lake Las Vegas is less than half a mile upstream from the bridge. The first grade control structure is located immediately downstream of the bridge, and the second and third are approximately 600 feet and 1,400 feet downstream, respectively. Additional grade control structures are proposed downstream between the third grade control structure (existing) and the Wash's confluence with Lake Mead, a stretch which measures approximately 3.5 miles, depending on lake levels (Figure 3).

Background

Las Vegas Wash is the primary outlet for stormwater, urban runoff, and treated wastewater from the Las Vegas Valley, draining into Lake Mead. The drainage encompasses a total area of approximately 2,200 square miles. Once an ephemeral wash, the drainage has become a perennial stream due to the growth of the Las Vegas metropolitan area, and flows have increased from 50 cubic feet per second, as first recorded in 1970, to more than 300 cubic feet per second in 2005.

Northshore Road, also known as State Route 147, crosses over Las Vegas Wash near the northern edge of the Recreation Area. This crossing has been compromised multiple times over the last 40 years. Increased erosion in the Wash caused box culverts to fail in 1969 and again in 1975. In 1978, a 420-foot bridge was constructed that still exists today. To help protect this bridge from the effects of erosion and channel scouring, the Federal Highway Administration, Central Federal Lands Highway Division (CFLHD), designed and constructed three grade control structures downstream from the Bridge. These structures were completed in 2002. In 2000, Lake Mead was at an elevation of 1,210 feet and was within 1,500 feet of the third (i.e. farthest downstream) grade control structure, so the protection offered by the structures was sufficient to ensure stability of the bridge.

Over the next 10 years, Lake Mead dropped over 100 vertical feet in elevation. In 2006, inspectors noticed that the third grade control structure had been undermined and was getting close to failure. Repairs were made in 2007, and CFLHD initiated a planning study to address the long-term stability of the Wash and the bridge that crosses it. This

Figure 2. Las Vegas Wash Location Map

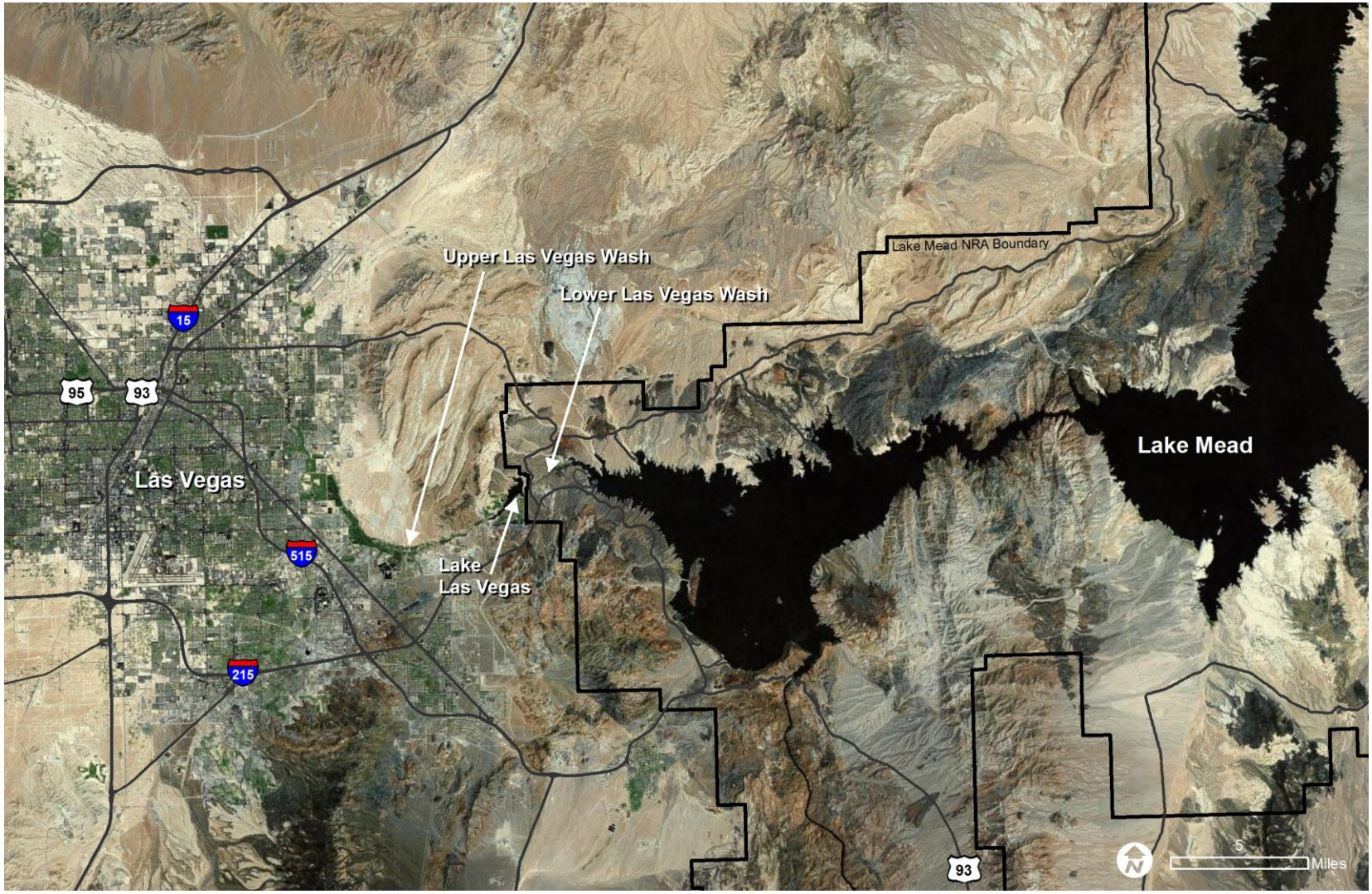
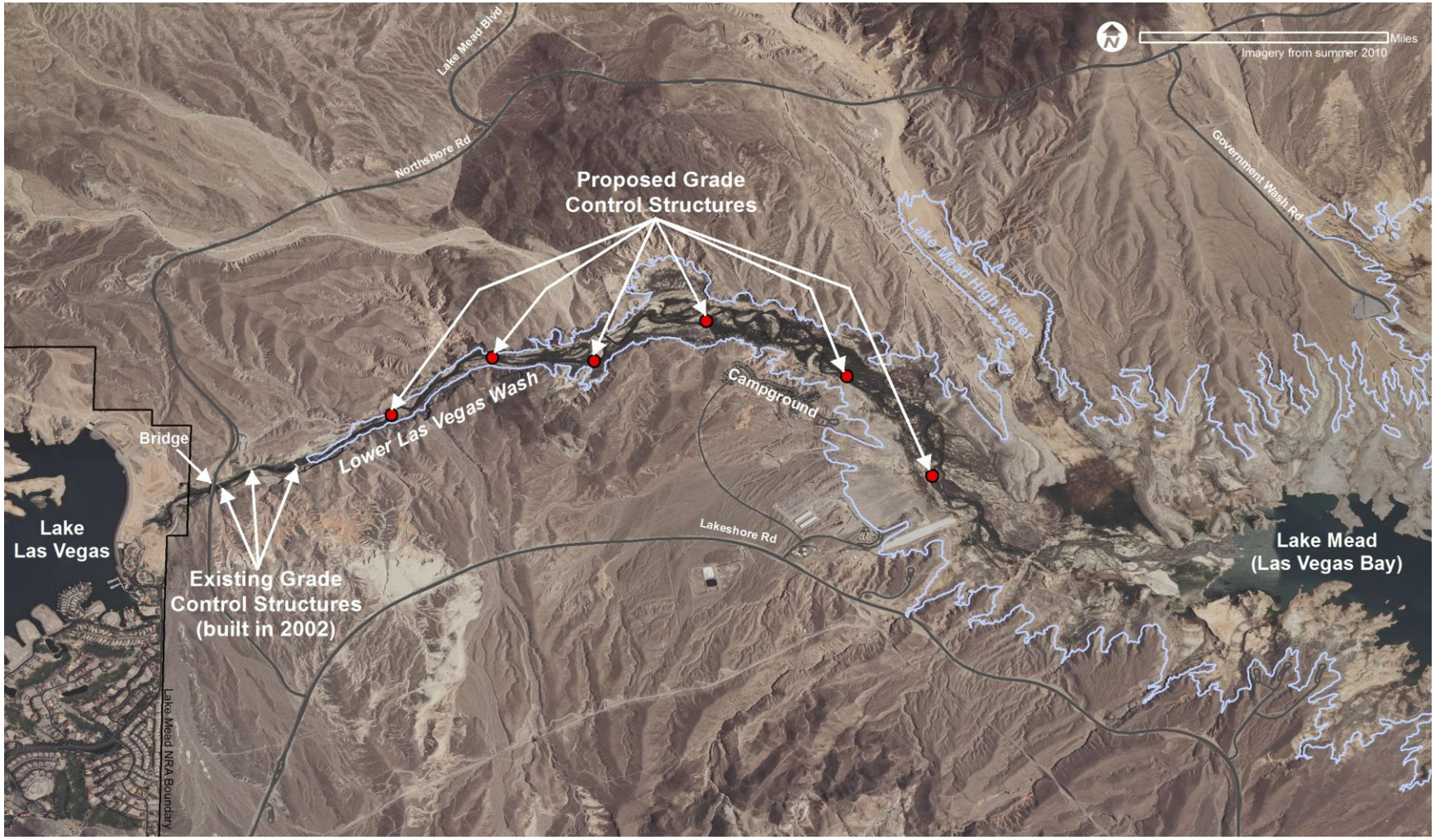


Figure 3. Lower Las Vegas Wash Vicinity Map



study included hydraulic analyses and sediment transport modeling and determined that the Wash could eventually degrade as much as 100 feet at the bridge location if no additional stabilization actions are taken. Geotechnical investigations confirmed that there are no erosion-resistant layers beneath the surface that would prevent degradation to such an extent. Recent annual degradation rates have been as much as 5 feet per year, meaning that the 100-foot degradation potential could be realized in as little as 20 years, although the exact time frame depends on a number of environmental parameters that cannot be predicted with certainty.

Several factors contribute to channel degradation in lower Las Vegas Wash. Construction of Lake Las Vegas reduced the natural sediment supply into the lower portions of the Wash. Although flows in the Wash completely bypass Lake Las Vegas, sediment traps and a deposition basin are used to remove most of the sediment load before it enters the bypass conduits. Additionally, the dropping of Lake Mead creates a longer channel with a greater elevational gradient between the upper and lower ends of the Wash, which in turn increases flow velocities and erosion potential. Erosion is the process by which a wash seeks an equilibrium in which the sediment input is balanced by the sediment outflow. Results of the CFLHD study indicate that the equilibrium slope of the lower Wash is approximately 0.2%. This is considerably flatter than the 0.5% slope that exists now, which is why erosion continues to be a problem.

Grade control structures function by flattening the channel slope and dissipating the energy within the limits of the confined structures. The structures incorporate a weir crest that spans the main channel and drops into a stilling basin. Water flow is slowed, and erosion potential is reduced. According to the CFLHD study, six additional grade control structures are needed to stabilize the Wash. These structures, along with the three already in place, would provide for a stable channel slope between the structures and effectively accommodate the 120-foot vertical drop that currently exists across the project reach. The structures could be built one at a time, on a schedule that addresses the observed rate of degradation. If Lake Mead levels rise in the future, all structures may not need to be built. Any that are built could be inundated but would remain functional when the lake level recedes again. The ability to phase the construction of multiple structures that can withstand the effect of rising and falling water levels is a key factor in addressing potential effects of climate change, which may cause greater variability in lake elevations in the future.

Related Laws, Legislation, and Other Planning and Management Documents

The NPS Organic Act of 1916 directs the NPS to manage units “to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner as will leave them unimpaired for the enjoyment of future generations.” Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.” The Organic Act prohibits actions that permanently impair park resources

unless a law directly and specifically allows for the acts. An action constitutes an impairment when its impacts "harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources and values."

NPS Management Policies (2006) requires the analysis of potential effects of each alternative to determine if actions would impair park resources. To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts." The NPS must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment to the affected resources and values.

NPS units vary based on their enabling legislation, natural and cultural resources, missions, and the recreational opportunities appropriate for each unit, or for areas within each unit. The enabling legislation for Lake Mead NRA (Public Law 88-639), established the recreation area "for the general purposes of public recreation, benefit, and use, and in a manner that will preserve, develop and enhance, so far as practicable, the recreation potential, and in a manner that will preserve the scenic, historic, scientific, and other important features of the area, consistent with applicable reservations and limitations relating to such area and with other authorized uses of the lands and properties within such area." This environmental assessment analyzes the context, duration, and intensity of impacts related to regulating flows in Lower Las Vegas Wash, as required by Director's Order 12: Conservation Planning, Environmental Impact Analysis and Decision Making (2000).

Issues and Impact Topics

Issues are related to potential environmental effects of project alternatives and were identified by the project interdisciplinary team. Once issues were identified, they were used to help formulate the alternatives and mitigation measures. Impact topics based on substantive issues, environmental statutes, regulations, and executive orders were selected for detailed analysis. A summary of the impact topics and rationale for their inclusion or dismissal is given below.

Issues and Impact Topics Identified for Further Analysis

The following impact topics have been determined relevant to the project proposal and are therefore analyzed in the EA. Whether each issue is related to taking action or no action is specified.

Geology and Soils: Both the Action Alternative and the No-Action Alternative affect the amount and extent of erosion in lower Las Vegas Wash and thus have an effect on the local area's topography.

Vegetation: Continued erosion and channelization under the No Action Alternative and controlled flows under the Action Alternative influence the amount and type of vegetation that can be supported within the project area.
Wildlife: Wildlife would be impacted by construction activity under the Action Alternative and by the resulting habitat changes that occur under both the Action and No-Action Alternatives.
Special Status Species: Special status species, including those protected under the Endangered Species Act, may use the project area and thus would be impacted similarly to other wildlife under both the Action and No-Action Alternatives.
Water Resources: Both the Action Alternative and the No-Action Alternative affect the amount and extent of erosion in lower Las Vegas Wash and thus have an effect on the quality of the water flowing into Lake Mead.
Wetlands and Floodplains: The Action Alternative is functionally dependent on being located within a floodplain. The potential for modification of wetlands exists under both the Action Alternative and the No-Action Alternative.
Air Quality: Construction of grade control structures under the Action Alternative would generate dust and exhaust and potentially compromise air quality in the project area.
Cultural Resources: Under the Action Alternative, cultural resources could be impacted or uncovered by activities in Las Vegas Wash, which was used by peoples for hundreds of years as a natural corridor to the Colorado River.
Soundscapes: Construction-related noise would occur under the Action Alternative, potentially disturbing sensitive noise receptors in the project area.
Visual Resources: The natural appearance of the Wash would be affected by the addition of grade control structures under the Action Alternative and by the habitat changes that occur under both the Action and No-Action Alternatives.
Park Operations: Both the Action Alternative and the No-Action Alternative affect the long-term stability of the bridge over Las Vegas Wash, which is owned by the NPS. In addition, under the Action Alternative, the NPS would be responsible for initial construction and periodic maintenance of the grade control structures.
Safety and Visitor Use and Experience: Both the Action Alternative and the No-Action Alternative affect the stability of the bridge over Las Vegas Wash, which in turn affects both the safety of visitors that travel on it and their ability to access and experience the northern portions of the Recreation Area.

Impact Topics Considered but Dismissed from Further Consideration
The following topics are not further addressed in this document because there are no potential effects to these resources, which are not in the project area or would be imperceptibly impacted: designated ecologically significant or critical areas; wild or scenic rivers; designated coastal zones; wilderness; Indian Trust Resources; prime and unique agricultural lands; sites on the U.S. Department of the Interior's National Registry of Natural Landmarks; and sole or principal drinking water aquifers.

Regarding energy requirements, conservation potential, and climate change, construction activities would require the increased use of energy for the construction itself and for transporting materials. However, the overall energy required, beyond current usage, to

implement the action alternative would be negligible when viewed in the context of local and regional rates of consumption.

There are no potential conflicts between the project and land use plans, policies, or controls (including state, local, or Native American) for the project area. There are no potential effects to local or regional employment, occupation, income changes, or tax base as a result of this project. The project area of effect is not populated and, per Executive Order 12898 on Environmental Justice, there are no potential effects on minorities, Native Americans, women, or the civil liberties (associated with age, race, creed, color, national origin, or sex) of any American citizen. No disproportionately high or adverse effects to minority populations or low-income populations are expected to occur as a result of implementing any alternative.

CHAPTER 2: DESCRIPTION OF ALTERNATIVES

Introduction

This section describes the alternatives considered, including the No Action Alternative. The alternatives described include mitigation measures and monitoring activities proposed to minimize or avoid environmental impacts. This section also includes a description of alternatives considered early in the process but later eliminated from further study; reasons for their dismissal are provided. The section concludes with a comparison of the alternatives considered.

Alternative A: No Action

Inclusion of a No Action Alternative is required by the Council on Environmental Quality's regulations and sets a baseline against which to compare impacts of action alternatives. Under the No Action Alternative, no new stabilization measures would be implemented, and no additional grade control structures would be constructed. Flows in the lower Las Vegas Wash would not be further regulated. Existing management actions, such as periodic bridge inspection and maintenance and repair of the existing grade control structures, would continue under the No Action Alternative, but the effects of channel erosion would remain. High levels of sediment would continue to be transported from the Wash into Lake Mead, and the wash channel would continue to deepen and widen.

Alternative B: Construction of Grade Control Structures to Regulate Flows (Management-Preferred Alternative)

Under Alternative B, up to six new grade control structures would be built downstream from the existing structures. This alternative would be implemented in phases, with structures built as necessary. The need for the structures will depend significantly on future water levels in Lake Mead, which influences the rate of degradation in the Wash. If the observed recent rate of degradation continues, the grade control structures would need to be constructed at a rate of approximately one every five years. The first of these (Structure 4) would be constructed approximately 1,000 feet downstream of the existing third structure, followed by Structures 5 through 9 spaced 2,000 to 3,000 feet apart (Figure 3).

The grade control structures would consist of sloping riprap structures bounded by sheet pile cutoff walls, which have been used successfully further upstream. Riprap protection is more cost effective and easier to construct than structures made of other materials. It is also flexible and can adjust to changes within the channel. It also includes open voids, which over time fill in with sediment and support the growth of vegetation, helping to disguise the structures.

The general configuration of the grade control structures is shown in Figure 4 and consists of a vertical cutoff wall at the crest, an upstream riprap approach of 4H:1V, a downstream 20H:1V riprap slope or flatter, a riprap apron extending at the channel slope of approximately 0.002 ft/ft, and a launchable riprap toe trench at the end of the structure. The downstream slope will be formed to concentrate low flows toward the center of the structure. Riprap protection will extend laterally up the channel banks to the 100-year water surface level. The flatter section of riprap at the end of the downstream slope will help to minimize local scour, and the toe trench will protect the structure from downstream degradation until the next subsequent structure is built. Since the width of the Wash increases in the downstream direction, each subsequent structure would be wider than the previous one. Table 1 shows the grade control design summary.

Construction access into the Wash would be from Northshore Road, using the same road that was used to build Grade Control Structure No. 3, or from the Las Vegas Bay launch ramp, which is just downstream from the terminal structure. Once in the Wash, an access road would be built on the sand/gravel benches on either side of the channel. The road would have a total width of 20 feet, comprised of a 12-foot driving surface and two 4-foot ditches. Turnarounds and pull-offs would be included. Several low-water crossings would be needed to accommodate the meandering channel alignment. Since this road would be located in an active wash, it would be susceptible to the effects of erosion and channel migration, so maintenance or reconstruction of this road would be initiated only when necessary to complete repairs on the grade control structures.

With regular maintenance, the grade control structures could function effectively for 50 to 100 years. Future maintenance of the grade control structures would consist of replacement or regrading of displaced riprap, placement of riprap or training features upstream of the structures to maintain favorable flow alignment, removal of vegetation that impedes normal flow or causes undesirable flow patterns, and minor road grading or repair.

Alternatives Considered but Dismissed from Further Evaluation

In addition to the construction of additional grade control structures, other alternatives were also considered to maintain access across Las Vegas Wash. One option was to retrofit the bridge to withstand the 100 feet of scour that are predicted by hydraulic analyses and sediment transport models. However, due to the age of the structure and the depth of pier extension that would be required to accommodate full scour, retrofitting was found to be impractical. As a short-term option, the piles on which the piers sit could be extended, allowing them to take up the load as the existing piles lose their capability. Since this is not a long-term solution, this option was not considered further.

Another alternative was to replace the bridge with a new structure. Bridge replacement would require identifying feasible crossing locations along the Wash as well as feasible roadway realignment options. After constructing a new bridge and new roadway approaches, the existing structure and obsolete roadway segments would be removed.

Figure 4. Grade Control Structure Profile Configuration

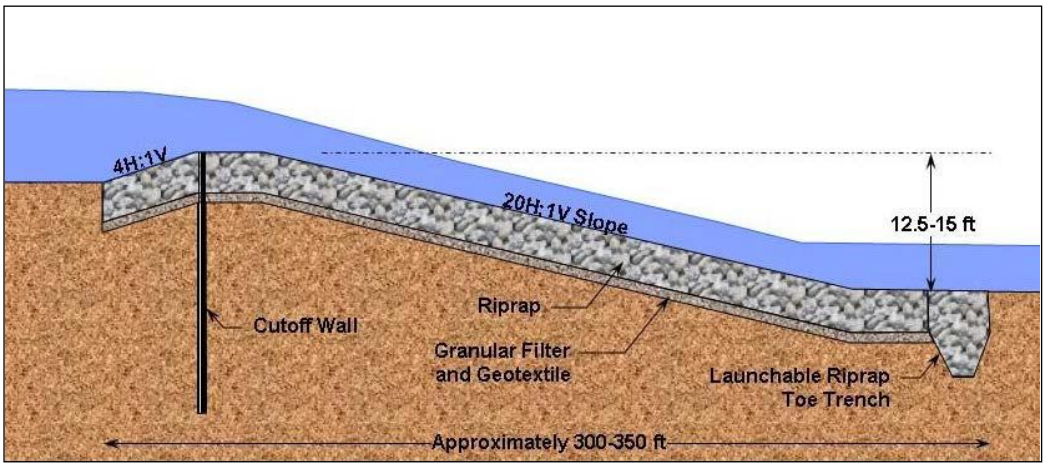


Table 1. Grade Control Design Summary

Feature	Grade Control Structure					
	4	**5**	**6**	**7**	**8**	**9**
Weir Crest Length Across the Wash (feet)	180	220	350	500	500	1500
Estimated Drop Height (feet)	12.5	12.5	12.5	12.5	12.5	12.5
Structure Slope	20H:1V	20H:1V	20H:1V	20H:1V	20H:1V	20H:1V
Crest Elevation (feet)	1210.0	1195.0	1180.0	1165.0	1150.0	1135.0
Toe Elevation (feet)	1197.5	1182.5	1167.5	1152.5	1137.5	1122.5
Structure Length (feet)	350	350	350	350	350	350
Cutoff Wall Depth (feet)	30	30	30	30	30	30

However, more favorable crossing locations could not be identified. Longer than normal bridge spans would be needed to cross the upper portion of the Wash to accommodate future degradation, while a significantly higher bridge is necessary near the lower end of the Wash to accommodate the maximum storage elevation in Lake Mead. In addition, both construction of a new bridge and the retrofit option presented above provide a solution for maintaining access across the Wash, but they do not address the risks to the Lake Las Vegas Dam and outlet works or the large amount of sediment that is being deposited into Lake Mead; thus, they do not fully meet the purpose and need.

Mitigation and Monitoring

Mitigation measures are specific actions designed to reduce, minimize, or eliminate impacts of alternatives and to protect Lake Mead NRA resources and visitors. Monitoring activities are actions to be implemented during or following project implementation to assess levels of impact. Mitigation measures that would be implemented as part of the Action Alternative are shown in Table 2 and are assumed in the corresponding analysis of effects.

Table 2. Mitigation Measures Required Under Alternative B

AFFECTED RESOURCE	MITIGATION MEASURES
Geology and Soils	• Clearly delineate disturbance limits and restrict all activity to within these limits • Obtain all fill and topsoil from the local project area • Rehabilitate staging areas by decompacting soil and restoring original contours.
Vegetation	• Within the project area, remove exotic species and avoid disturbing native vegetation to the extent practicable. • Salvage plants and topsoil from areas slated for disturbance for use in post-construction restoration. • Pressure-wash all construction equipment prior to use to prevent the introduction and spread of non-native plant species.
Wildlife	• Avoid construction activity during the nesting season to the extent practicable. • During the nesting season, conduct surveys for nesting birds and establish buffers around active nests.
Special Status Species	• Conduct pre-construction survey for desert tortoise in upland staging and access areas. • If seasonally appropriate, conduct southwestern willow flycatcher surveys in areas of potential habitat. • Provide on-site training to all project personnel on the potential occurrence of special status species, explaining measures that all employees can take to protect them. • If federally protected species are found within the project area, suspend all work and consult with the U.S. Fish and Wildlife Service to determine a course of action. • Enforce a strict litter control program to avoid attracting opportunistic predators to the project area.
Water Quality	• Use silt fencing or other erosion control measures around stockpiled fill material. • Divert flows to create drier work areas contained from water courses. • Ensure proper storage, use, and disposal of fuels and other chemicals.
Air Quality	• Apply water to control dust in disturbed areas.
Cultural Resources	• If previously undiscovered archaeological resources are found during construction, suspend all work and contact the Park Archaeologist to determine a course of action.
Safety and Visitor Experience	• Temporarily close portions of Las Vegas Wash and the access trail to prevent visitor conflicts with construction activities. Use adequate signage at all access points. • Upon completion of construction, restore equipment access route to create a suitable trail for visitor access into the Wash.

Coordination, Consultation, and Permitting

No permitting is required for the No Action Alternative. The following coordination, consultation, and permitting would be required under Alternative B:

- U.S. Fish and Wildlife Service: A site visit with a representative of the U.S. Fish and Wildlife Service occurred on June 18, 2012. The NPS formally initiated consultation under Section 7 of the Endangered Species Act in August of 2012 in order to minimize impacts to threatened and endangered species. Consultation was completed in October of 2012.
- Nevada State Historic Preservation Office: Consultation under Section 106 of the National Historic Preservation Act would occur to ensure that no historic properties will be affected and that effects from the project on archaeological resources have been taken into account and mitigated to the extent possible.
- U.S. Army Corps of Engineers: A permit would be required under Section 404 of the Clean Water Act for minor discharges of dredged or fill material into waters of the U.S.
- Nevada Division of Environmental Protection: A water quality certification would be required, pursuant to Section 401 of the Clean Water Act. In addition, a construction stormwater permit would be required.
- Clark County Department of Air Quality: A dust permit would be required prior to construction of the grade control structures.

Environmentally Preferred Alternative

The environmentally preferred alternative is the alternative that will promote NEPA, as expressed in Section 101 of NEPA. This alternative will satisfy the following requirements:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable or unintended consequences;
4. Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and,
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

ALTERNATIVE B is the environmentally preferable alternative because overall it would best meet the requirements in Section 101 of NEPA. Alternative B calls for the construction of grade control structures that would allow the wash system to move

toward an equilibrium in which sediment inflows and outflows are balanced. By reducing erosion in the lower Las Vegas Wash, Alternative B would mitigate threats to the stability of the bridge, ensuring the safety of park visitors, employees, and others who travel on it. Protection of the bridge ensures that access is maintained to a large portion of the Recreation Area. By reducing sediment outflow from the Wash, Alternative B improves the quality of the water flowing into Lake Mead at Las Vegas Bay. By combating channelization and allowing for slower flows, Alternative B supports the establishment and expansion of wetland and riparian vegetation, resulting in improved habitat quality. Alternative B provides benefits that relate to safety, visitor experience, and natural resource protection and thus is highly preferable to Alternative A, which compromises human safety, degrades the visitor experience, and allows for continued impacts to park resources.

Comparison of Impacts

Table 3 summarizes the potential long-term impacts of the alternatives considered. Short-term impacts are not included in this table, but are analyzed in the Environmental Consequences section. Impact intensity, context, and duration are also defined in the Environmental Consequences section.

Table 3. Comparison of Long-Term Impacts.

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)
Geology and Soils	Moderate Adverse Impacts	Moderate Beneficial Effects
Vegetation	Minor Adverse Impacts	Moderate Beneficial Effects
Wildlife	Minor Adverse Impacts	Moderate Beneficial Effects
Special Status Species	No Effect	May Adversely Affect Razorback Sucker
Water Quality	Minor Adverse Impacts	Moderate Beneficial Effects
Wetlands and Floodplains	Minor Adverse Impacts	Moderate Beneficial Effects
Air Quality	No Impacts	No Impacts
Cultural Resources	No Impacts	No Impacts
Soundscapes	No Impacts	No Impacts
Visual Resources	Negligible Impacts	Minor Adverse and Beneficial Effects
Park Operations	Moderate Adverse Impacts	Minor Adverse Impacts
Safety and Visitor Experience	Major Adverse Impacts	Major Beneficial Effects

CHAPTER 3: AFFECTED ENVIRONMENT

Introduction

This section provides a description of the existing environment in the project area and the resources that may be affected by the proposals and alternatives under consideration. Complete and detailed descriptions of the environment and existing use at Lake Mead NRA are found in the Lake Mead NRA Lake Management Plan and Final Environmental Impact Statement (2002), Lake Mead NRA Resource Management Plan (NPS 2000) and the Lake Mead NRA General Management Plan (NPS 1986).

Location and General Description of Lake Mead NRA and the Project Area

Lake Mead NRA is approximately 1.5 million acres in size and serves millions of visitors each year. The bridge over Northshore Road connects the nearby communities of Henderson, Las Vegas, and Boulder City to park locations such as Callville Bay, Echo Bay, and several backcountry destinations. Las Vegas Wash is the primary drainage for the Las Vegas Valley and empties into the northwest portion of Lake Mead's Boulder Basin. For purposes of this EA, lower Las Vegas Wash is defined as the portion of the Wash occurring within Lake Mead NRA.

Geology and Soils

The Las Vegas Wash is in an area composed of bedrock from the Muddy Creek Formation, consisting of sandstone, siltstone, and conglomerate with lesser amounts of gypsum and limestone. Alluvial sediments compose much of the bed material of the Wash downstream from Lake Las Vegas, with moderate to poorly sorted deposits ranging from silty fine sands to gravelly cobbles. These soil types range from very shallow to very deep, well-drained to excessively drained, and dry to saturated.

Vegetation

Las Vegas Wash is composed of a stream riparian community. The primary vegetation is nonnative tamarisk (*Tamarix ramosissima*), a Nevada State-listed noxious weed. It is an aggressive species that creates thick monocultures, exhibits very little diversity in height or composition, and provides less suitable habitat for wildlife than native vegetation. Other plants found in the Las Vegas Wash portion of the project area include salt-tolerant species such as cattail (*Typha domingensis*), saltgrass (*Distichlis spicata*), and various sedges and rushes.

The main access route in the northern portion of the project area is located in a predominantly barren wash. Plant species found in this wash include creosote bush (*Larrea tridentata*), catclaw (*Acacia greggii*), desert fir (*Peucephyllum schottii*), brittlebush (*Encelia farinosa*), beavertail cactus (*Opuntia basilaris*), and cottontop cactus (*Echinocactus polycephalus*). Creosote-bursage is the characteristic vegetation community surrounding the Wash outside of the project area.

Wildlife

The vegetative community and the soil topography in and around the Wash provide habitat and cover for a variety of wildlife. Common mammals that use the Wash include the black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), and round-tailed ground squirrel (*Spermophilus tereticaudus*). Amphibians that inhabit the Wash include the red-spotted toad *(Bufo punctatus)*, wood house toad *(Bufo woodhousei)*, northern leopard frog *(Rana pipiens)*, and bullfrog *(Rana catesbeiana*). Fish species that have been documented include carp *(Cyprinus carpio)*, fathead minnow *(Pimephales promelas)*, and red shiner *(Notropis lutrensis)*. Several lizards including collared lizards (*Crotaphytus collaris*) can be seen around the Wash. In a recent multi-year study, 147 species of birds were recorded in the Wash, including a variety of songbirds such as Abert's towhee (*Melozone aberti*), song sparrow (*Melospiza melodia*), yellow-rumped warbler (*Dendroica coronata*), and red-winged blackbird (*Agelaius phoeniceus*). Many aquatic species were also identified in the study, including the American coot (*Fulica americana*), killdeer (*Charadrius vociferus*), mallard (*Anas platyrhynchos*), and great blue heron (*Ardea herodias*) (GBBO 2011).

Special Status Species

Several special status species are known to occur in or around the project area. Species that have been recorded in Las Vegas Wash, either in the NRA portion or further upstream in the Las Vegas Valley, include the Western burrowing owl (*Athene unicularia hypugaea*), Southwestern willow flycatcher (*Empidonax traillii extimus*), and razorback sucker (*Xyrauchen texanus*). The Western burrowing owl has not been recorded in the project area, and the habitat is not optimal due to the steep cliffs and differential water flows. The Southwestern willow flycatcher has been recorded in the Wash but not in the project area, and no nests have been documented in or near the Wash. Outside Lake Mead NRA, breeding behavior has been observed, and the presence of adults during nesting season over multiple years has led to the determination that they are summer residents (Van Dooremolen 2011). Subadult razorback suckers have recently been documented in the Wash in the lower portion of the project area while adult razorbacks were more likely to use the upper portion of the project area when the lake was at a higher elevation (B. Albrecht, personal communication, June 18, 2012). Both the southwestern willow flycatcher and the razorback sucker are federally listed as endangered under the Endangered Species Act, and all of Lake Mead (up to the full-pool elevation) has been designated as critical habitat for the sucker.

Special status species with potential habitat or that are known to occur at the mouth of the Wash in the Las Vegas Bay area include the California leaf-nosed bat (*Macrotus californicus*) and banded Gila monster (*Heloderma suspectum cinctum*). Other species that may occur as casual migrants in the project area include the peregrine falcon (*Falco peregrinus*), and bald eagle (*Haliaeetus leucocephalus*). The desert tortoise (*Gopherus agassizii*), federally listed as threatened, is known to occur near the project area, but the Wash and project area itself is considered unsuitable habitat due to the relatively dense

vegetation, high water flows, and extensive bank erosion. The Yuma clapper rail (*Rallus longirostris yumanensis*) has not been observed in the Wash since 2006.

Water Resources

Las Vegas Wash begins northwest of the city of Las Vegas, flows southwest through the Las Vegas valley, and ends in Las Vegas Bay of Lake Mead. Once an ephemeral drainage, the Wash now flows year-round as a result of outflow from urban runoff, shallow ground water, reclaimed water, and storm water. Lake Las Vegas is directly upstream from the project area and is contained by a dam built in 1991 and was filled with water from Lake Mead. Las Vegas Wash water does not flow into Lake Las Vegas, instead bypasses the lake via two 84-inch concrete pipes buried underneath the lake. Flood flows that exceed the bypass pipe capacities do enter Lake Las Vegas and, when necessary, flows from the lake are released back into the Wash through spillways.

Lake Mead is the endpoint of Las Vegas Wash and, as such, the ultimate catch basin for the Las Vegas valley drainage. The primary water quality issues of concern in Las Vegas Wash have included sediment, selenium, perchlorate, nutrient loading, and urban chemicals. Other water quality concerns include pesticides, heavy metals, human pathogens, hydrocarbons, and the presence of endocrine disrupters. Water in the Las Vegas Wash and/or Lake Mead is routinely sampled for quality by the Las Vegas Valley Water District, Southern Nevada Water Authority, Las Vegas Wash Coordination Committee, Las Vegas Stormwater Quality Management Committee, Bureau of Reclamation, and National Park Service.

Water quality is largely determined by the quality of the treated discharge from treatment facilities along the Wash. The volume of effluent discharge significantly dilutes most of the parameters used for water quality monitoring with the exception of nutrient levels, which tend to increase as a result of the treated effluent. These increased nutrient levels, however, tend to be absorbed and utilized by the wetlands along the Wash (Ryan 2008).

Wetlands and Floodplains

Multiple wetlands alongside the 12-mile-long Las Vegas Wash are a mechanism for improving water quality as urban flows enter the Wash en route to Lake Mead and the Colorado River system. Wetlands within Las Vegas Wash in the NRA have been impacted by the continued degradation and deepening of the wash channel. The only wetlands in the project area are fringe wetlands, typified by their occurrence alongside the wash channel. These wetlands are within the Palustrine (non-tidal) system of wetlands and classified as a combination of emergent and scrub-shrub under the Cowardin classification system (Cowardin et al. 1979). These wetlands may have plants that are woody or herbaceous, perennial, and generally less than 20 feet tall. Where there is high moisture, there are patches of cattail and common reed (*Phragmites*), mixed with tamarisk and wetland annual plants. In the drier areas the primary vegetation is saltbush (*Atriplex spp*.) and arrowweed (*Pluchea sericea*).

The Wash extends approximately 3,000 feet from the bridge to the high-water mark of Lake Mead. This area is impacted by differential flows through the Wash. The majority of the Wash is a floodplain in the form of a canyon, where the fluctuating flows and lake elevations have degraded the walls and cut into the terraces through erosion processes. Lands surrounding the Wash at the lower end of the project area have a more typical floodplain appearance--relatively flat and normally dry land (when the lake elevation is low) that is covered by water when wash flows increase or the lake elevation is high.

Air Quality

The Clark County Department of Air Quality and Environmental Management is the regulatory and enforcement agency for air quality matters in Clark County, Nevada. Lake Mead has been designated as a Class II air quality area under the Clean Air Act, meaning that it is in attainment of national ambient air quality standards and that only modest increases in certain pollutants are allowable. Air quality is generally good in the recreation area. Most reductions in air quality are due to air flows from the Las Vegas Valley west of Lake Mead NRA.

Cultural Resources

The Las Vegas Wash is a natural corridor to Lake Mead, as it was an ephemeral waterway that drained into the Colorado River before the construction of Hoover Dam in 1935. This route was traditionally used by the Southern Paiute and possibly other prehistoric peoples. Archaeological sites along the Las Vegas Wash suggest that the area has been inhabited since around AD 600 and possibly earlier. Flood flows in 1976 removed between 20 and 30 feet of alluvial sediments throughout most of the project area and damaged the previous bridge, thereby requiring construction of the current bridge. These changes to the historic appearance and configuration of the Wash, combined with more recent residential and other development, have altered the historic appearance of the area (NPS 1996).

Several cultural resource inventories have been conducted in and adjacent to the project area. In 1976, a corridor was inventoried along Northshore Road before the construction of the existing bridge. Two sites were located south of Las Vegas Wash and west of Northshore Road. Both sites are outside the area of potential effect for this project. In 1991, the Las Vegas Wash Wetlands Trail was inventoried; no cultural resources were located. In 1996 and 1997, the area of potential affect for the previous bridge stabilization and wetlands restoration project was inventoried; again no cultural resources were located.

Soundscapes

Noise-sensitive receptors are those locations where activities that could be affected by increased noise levels occur and include locations such as residences, motels, churches, schools, parks, and libraries. Existing noise levels are determined for the outdoor living area at sensitive receptors. There are no sensitive receptors in the project area, other than

the Lake Mead NRA itself. The dominant noise source in the project area is automobile and truck traffic on Northshore Road and boating traffic in the vicinity of Las Vegas Bay.

Visual Resources

Las Vegas Wash is one of only a few places in the Park's desert setting where visitors can experience a riparian environment with flowing water, making it a unique visual resource. There are currently three grade control structures within Lake Mead NRA. These structures are visible from the bridge and certain vantage points on the cliffs overlooking the Wash below the bridge. Visitors that choose to hike and fish along the Wash will encounter the grade control structures. On the north side of the bridge above the Wash there is a parking area with a restroom and a trailhead. The Wetlands Trail descends into the Wash. Housing development in Lake Las Vegas is visible from the upper portion of the project area. Further downstream at the outflow of the Wash into Lake Mead, the Las Vegas Bay campground overlooks the Wash. The Las Vegas Bay launch ramp (no longer open due to the current lake elevation) is situated at the downstream terminus of the project area.

Park Operations

Several divisions of Lake Mead NRA Management use the Northshore Road Bridge to cross the Wash in order to perform routine duties associated with park operations. While both Maintenance and Law Enforcement have some personnel stationed at Callville Bay and Echo Bay, overall operations for both are based in Boulder City, and travel between these areas is essential. Maintenance is responsible for the upkeep of park and visitor facilities in the developed areas, while Law Enforcement responds to emergencies and regularly patrols Northshore Road and numerous visitor destinations to which it leads. The Visitor Services Division leads hikes and other educational outreach activities on the Wetlands Trail and at other locations along Northshore Road. Resource Management is active in the backcountry areas along Northshore Road, where vegetation, wildlife, and archaeological resources are inventoried and monitored.

Safety and Visitor Use and Experience

The bridge is part of a highly used, major transportation corridor within the park, allowing visitors to safely travel over the Wash in order to access different park areas and resources. On busy days, over 2,000 vehicles may cross the bridge. Visitors from Boulder City, Henderson, and some parts of Las Vegas use the bridge to access Callville Bay, Echo Bay, Redstone, Rogers and Blue Point Springs, and several backcountry and wilderness areas along Northshore Road. The Wash itself is regularly used by visitors as it provides recreational opportunities such as hiking, birding, and fishing. In cooler months, visitors are led on interpretive hikes along the Wash by park staff.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Introduction

This section presents the likely beneficial and adverse effects to the natural and human environment that would result from implementing the alternatives under consideration. This section describes short-term and long-term effects, direct and indirect effects, and cumulative effects. Interpretation of impacts in terms of their duration, intensity (or magnitude), and context (local, regional, or national effects) are provided where possible.

Methodology

In describing potential environmental impacts, it is assumed that the mitigation identified in the Mitigation and Monitoring section of this EA would be implemented under any of the applicable alternatives. Impact analyses and conclusions are based on NPS staff knowledge of resources and the project area, review of existing literature, and information provided by experts in the NPS or other agencies. Any impacts described in this section are based on preliminary design of the alternatives under consideration. Effects are quantified where possible; in the absence of quantitative data, best professional judgment prevailed.

Impacts are characterized as negligible, minor, moderate, or major, according to definitions provided for each impact topic below. In addition, the following terms may also be used in characterizing impact type:

- *Localized Impact*: The impact occurs in a specific site or area. When comparing changes to existing conditions, the impacts are detectable only in the localized area.

- *Direct Effect*: The effect is caused by the action and occurs at the same time and place.

- *Indirect Effect*: The effect is caused by the action and may occur later in time or be farther removed in distance, but is still reasonably foreseeable.

- *Short-Term Effect*: The effect occurs only during or immediately after implementation of the alternative.

- *Long-Term Effect*: The effect occurs for an extended period after implementation of the alternative.

In the absence of quantitative data concerning the full extent of actions under a proposed alternative, best professional judgment prevailed.

Cumulative Impacts

Cumulative effects are the direct and indirect effects of an alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action. Federal agencies are required to identify the temporal and geographic boundaries within which they will evaluate potential cumulative effects of an action and the specific past, present, and reasonably foreseeable projects that will be analyzed. This includes potential actions within and outside the recreation area boundary. The geographical boundaries of analysis vary depending on the impact topic and potential effects. While this information may be inexact at this time, major sources of impacts have been assessed as accurately and completely as possible, using all available data.

Specific projects or ongoing activities with the potential to cumulatively affect the resources (impact topics) evaluated for the project are identified in this document and described in the following narrative. Some impact topics would be affected by several or all of the described activities, while others could be affected very little or not at all. How each alternative would incrementally contribute to potential impacts for a resource is included in the cumulative effects discussion for each impact topic.

One of the factors contributing to the need for this project is the decline of Lake Mead's water level over the last decade. Low water conditions are the driver for a number of other park actions as well. Launch ramps and access roads must be extended to maintain visitor access to the lakes. Navigational aids must be adjusted to maintain boating safety. Marinas, docks, and associated utilities must be moved to accommodate changing water levels.

The Northshore Bridge over Las Vegas Wash is an important part of the park's roadway system, which is in a continual state of maintenance. Bridge stabilization efforts have been undertaken twice before. In the late nineties, smaller structures were built in the Wash but were unable to hold up against high-flow events. This led to the 2002 construction of the three more substantial structures that exist in the park today. The two busiest park roads, Lakeshore and Northshore, have undergone extensive redesign and rehabilitation, as has the access road to Callville Bay. The access road to Echo Bay is scheduled for rehabilitation next year and is likely to be followed by the roads to Katherine's Landing and Willow Beach.

The project area represents the lower end of a much larger watershed; the Las Vegas Wash drainage is estimated to encompass an area of 2,200 square miles, and numerous restoration and management efforts have been undertaken upstream. The Las Vegas Wash Coordination Committee is a coalition of federal, state, and local agencies (including the NPS) formed in 1998 with a mission of stabilizing and enhancing the resources of Las Vegas Wash. This Committee oversees the implementation of a Comprehensive Adaptive Management Plan focusing on water quality, habitat management, erosion control, and other key Wash-related issues. Numerous restoration projects in the Wash, stretching from the Las Vegas Valley to Lake Mead, have been and

continue to be spearheaded by the Committee, including grade control similar to the current proposal.

Geology and Soils

Laws, Regulations, and Policies

NPS Management Policies (2006) stipulates that the NPS will preserve and protect geologic resources as integral components of park natural systems. Geologic resources include geologic features and geologic processes. The fundamental policy, as stated in the NPS reference manual Natural Resource Management (NPS-77, 1991) is the preservation of the geologic resources of parks in their natural condition whenever possible.

Soil resources would be protected by preventing or minimizing adverse potentially irreversible impacts on soils, in accordance with NPS Management Policies (2006). NPS-77 specifies objectives for each management zone for soil resources management. These management objectives are defined as: (1) natural zone- preserve natural soils and the processes of soil genesis in a condition undisturbed by humans; (2) cultural zone- conserve soil resources to the extent possible consistent with maintenance of the historic and cultural scene and prevent soil erosion wherever possible; (3) park development zone- ensure that developments and their management are consistent with soil limitations and soil conservation practices; and, (4) special use zone- minimize soil loss and disturbance caused by special use activities, and ensure that soils retain their productivity and potential for reclamation.

Zones within the recreation area have been designated in the Lake Mead NRA General Management Plan, which provides the overall guidance and management direction for Lake Mead NRA.

Criteria and Thresholds for Impact Analysis

The following impact thresholds were established for analyzing impacts to geology and soils in the project area.

- *Negligible impacts*: Impacts have no measurable or perceptible changes in soil structure and occur in a relatively small area.

- *Minor impacts*: Impacts are measurable or perceptible, but localized in a relatively small area. The overall soil structure is not affected.

- *Moderate impacts*: Impacts are localized and small in size, but cause a permanent change in the soil structure in that particular area.

- *Major impacts*: Impact on the soil structure is substantial, highly noticeable, and permanent.

Alternative A

Under the No Action Alternative, erosion and channelization would continue in lower Las Vegas Wash. Erosion would undermine the three existing structures, which would eventually fail and leave the bridge at risk. There would be no mechanism to slow sediment transport from the Wash into Lake Mead. Material would continue to be removed from the Wash's side slopes, which would continue to retreat, and portions may topple or slump into the wash channel.

Cumulative Effects: Cumulative effects to geology and soils would occur under Alternative A as the problems created by erosion work their way upstream from the project area. Failure to curb erosion in the lower portion of the Wash would result in a greater elevational gradient between the upper and lower ends, increasing flow velocities and causing impacts from erosion to become greater with time.

Conclusion: Erosion, toppling, and slumping would continue to worsen but would be confined to a wash that has experienced multiple cycles of degradation and aggradation, so Alternative A would result in moderate long-term adverse impacts to geology and soils.

Alternative B

Under Alternative B, geology and soils would be affected by the construction of up to 6 new grade control structures and an access road along the banks of the Wash. The 6 structures would permanently occupy a total area of approximately 26 acres in the wash channel but would benefit the area by reducing sediment transport out of the Wash, slowing erosional threats to structures further upstream, and helping to stabilize the banks and side slopes of the lower portion of the Wash. An access road approximately 3.5 miles long and 20 feet wide (for a total disturbance of 8.5 acres) would be needed to construct all 6 structures. However, this road would be located on the sand/gravel banks on either side of the meandering channel, an area which is continually disturbed by the Wash's variable flows, so this would be a short-term temporary impact.

Cumulative Effects: Erosion control measures have been implemented in numerous locations throughout Las Vegas Wash, including areas both within and outside Lake Mead NRA. Alternative B would contribute to these cumulative beneficial effects.

Conclusion: The new grade control structures would reduce erosion and stabilize 3.5 miles of Las Vegas Wash, constituting a moderate beneficial effect to geology and soils.

Vegetation

Laws, Regulations, and Policies

The NPS Organic Act directs the park to conserve the scenery and the natural objects unimpaired for future generations. NPS Management Policies (2006) defines the general principles for managing biological resources as maintaining all native plants and animals as part of the natural ecosystem. When NPS management actions cause native vegetation to be removed, then the NPS will seek to ensure that such removals will not cause

unacceptable impacts to native resources, natural processes, or other park resources. Exotic species, also referred to as non-native or alien, are not a natural component of the ecosystem. They are managed, up to and including eradication, under the criteria specified in NPS Management Policies (2006) and NPS-77.

Criteria and Thresholds for Impact Analysis

The following impact thresholds were established for analyzing impacts to vegetation in the project area:

- *Negligible impacts*: Impacts have no measurable or perceptible changes in plant community size, integrity, or continuity.

- *Minor impacts*: Impacts are measurable or perceptible and localized within a relatively small area. The overall viability of the plant community is not affected and the area, if left alone, recovers.

- *Moderate impacts*: Impacts cause a change in the plant community (e.g. abundance, distribution, quantity, or quality); however, the impact remains localized.

- *Major impacts*: Impacts to the plant community are substantial, highly noticeable, and permanent.

<u>Alternative A</u>

Under the No Action Alternative, degradation in the Wash would continue. Erosion and channelization would reduce the potential of the project area to support wetland vegetation. Areas dominated by tamarisk would likely remain so, and additional loss of wetland vegetation may facilitate the spread of tamarisk. The eventual failure of the existing structures upstream would cause additional flooding downstream and exacerbate these effects.

Cumulative Effects: Upstream of the project area, vegetation in Las Vegas Wash has benefited from extensive restoration efforts that have stabilized the channel and increased wetland and riparian vegetation. Under the No Action Alternative, the opportunity to contribute cumulatively to these beneficial effects is lost.

Conclusion: Anticipated changes to vegetation are restricted to the segment of Las Vegas Wash between the bridge and the confluence with Lake Mead, so the adverse impacts of Alternative A on vegetation would be minor.

<u>Alternative B</u>

Under Alternative B, some vegetation would be removed to create an access road and to construct the grade control structures. However, most of the vegetation along the bank where the road would be constructed is non-native tamarisk, and its removal would be a beneficial effect. In-stream vegetation is sparse due to the current conditions. Following construction, the slower flowing, less channelized stream would support greater amounts

of native wetland vegetation along the banks and in the backwaters of the lower portion of the Wash. In addition, the grade control structures themselves would provide a platform for the establishment of riparian and wetland vegetation within the crevices of the rock.

Cumulative Effects: Upstream of the project area, over 77 acres of wetland vegetation have been created as a result of erosion control measures that have already been constructed outside the park. Alternative B would contribute cumulatively to these improvements in the area's vegetation.

Conclusion: Within the localized project area, the reduction in tamarisk and corresponding increase in native riparian and wetland vegetation would constitute a moderate beneficial effect.

Wildlife

Laws, Regulations, and Policies

The NPS Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted by the NPS to mean native animal life should be protected and perpetuated as part of the recreation area's natural ecosystem. Natural processes are relied on to maintain populations of native species to the greatest extent possible. The restoration of native species is a high priority. Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and ecological integrity of plants and animals.

The recreation area also manages and monitors wildlife cooperatively with the Arizona Game and Fish Department and the Nevada Department of Wildlife.

Criteria and Thresholds for Impact Analysis

The following impact thresholds were established for analyzing impacts to wildlife and wildlife habitat in the project area:

- *Negligible impacts*: No species of concern are present; no impacts or impacts with only temporary effects are expected.

- *Minor impacts*: Nonbreeding animals of concern are present, but only in low numbers. Habitat is not critical for survival; other habitat is available nearby. Occasional flight responses by wildlife are expected, but without interference with feeding, reproduction, or other activities necessary for survival. Mortality of species of concern is not expected.

- *Moderate impacts*: Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or winter; mortality or interference with activities necessary for survival expected on an occasional basis, but not expected to threaten the continued existence of the species in the park.

- *Major impacts*: Breeding animals are present in relatively high numbers, and/or wildlife is present during particularly vulnerable life stages. Habitat targeted by actions has a history of use by wildlife during critical periods, but there is suitable habitat for use nearby. Few incidents of mortality could occur, but the continued survival of the species is not at risk.

Alternative A

Under the No Action Alternative, degradation in the Wash would continue. Erosion and channelization would reduce the potential of the project area to support wetland vegetation, and water quality would not improve. Wildlife habitat would be reduced in both quantity and quality, affecting primarily birds and fish, but other types of animals as well.

Cumulative Effects: Upstream of the project area, wildlife that inhabits the Las Vegas Wash has benefited from extensive restoration efforts that have stabilized the channel and increased wetland and riparian vegetation. Under the No Action Alternative, the opportunity to contribute cumulatively to these beneficial effects is lost.

Conclusion: The No Action Alternative fails to improve habitat available to wildlife within the project area, but larger amounts of higher quality habitat are available upstream, so impacts to wildlife under Alternative A would be minor.

Alternative B

Under Alternative B, wildlife would be negatively affected in the short-term by construction activities. Although steps would be taken to prevent the destruction of active bird nests, the use of heavy equipment would cause a flight response by birds and other wildlife in the immediate project area. Short-term impacts to water quality during construction would negatively affect fish and other aquatic life. Following construction, long-term improvement in habitat quality would benefit wildlife. Greater amounts of native wetland and riparian vegetation would be available for nesting birds. Multiple species would use the vegetation as a source of forage material and cover. Improved water quality would benefit aquatic life as well as any species that feed or drink from the Wash.

Cumulative Effects: Alternative B contributes cumulatively to the wildlife benefits that have been realized upstream through extensive habitat rehabilitation efforts.

Conclusion: Although construction activity would result in short-term minor impacts, the long-term improvements in habitat quality under Alternative B would create moderate beneficial effects to wildlife.

Special Status Species

Laws, Regulations, and Policies

Section 7 of the Endangered Species Act mandates all federal agencies determine how to use their existing authorities to further the purposes of the Act to aid in recovering listed species, and to address existing and potential conservation issues. Section 7(a)(2) states that each federal agency shall, in consultation with the Secretary of the Interior, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

NPS Management Policies (2006) directs the parks to survey for, protect, and strive to recover all species native to National Park System units that are listed under the Endangered Species Act. It sets the direction to meet the obligations of the Act. NPS Management Policies (2006) also directs the NPS to inventory, monitor, and manage state and locally listed species, and other native species that are of special management concern to the parks, to maintain their natural distribution and abundance.

The General Management Plan designated 1,050,030 acres, or 70 percent of the NRA, as natural zones, and areas with known habitat or potential habitat for rare, threatened, or endangered species were further protected by placement in the environmental protection or outstanding natural feature subzone of the natural zone. Management of these zones focuses on the maintenance of isolation and natural process and restoration of natural resources.

Criteria and Thresholds for Impact Analysis

The Endangered Species Act defines the terminology used to assess impacts to listed species as follows:

- *No effect*: The appropriate conclusion when the action agency determines that its proposed action would not affect a listed species or designated critical habitat.

- *Is not likely to adversely affect*: The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on the best judgment, a person would not: (1) able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

- *Is likely to adversely affect*: The appropriate finding if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial. If the overall effect of the proposed action is

beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action "is likely to adversely affect" the listed species. If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" determination should be made.

- *Is likely to jeopardize listed species/adversely modify critical habitat*: The appropriate conclusion when the action agency or the U.S. Fish and Wildlife Service identifies situations in which the proposed action is likely to jeopardize the continued existence of a listed species or adversely modify critical habitat.

Alternative A

Under the No Action Alternative, special status species would not be impacted by construction activities. There would be no potential for construction equipment to impact desert tortoises in upland staging and access areas; there would be no direct manipulation of vegetation (either native or exotic) that would influence habitat quality for the southwestern willow flycatcher or Yuma clapper rail; and there would be no active modification of critical habitat for the razorback sucker.

Cumulative Effects: There would be no cumulative effects to special status species under Alternative A.

Conclusion: There would be no effect to special status species under Alternative A.

Alternative B

Under Alternative B, impacts to special status species would be similar to those described above for wildlife. Access to the Wash would be via upland routes located in potential desert tortoise habitat. However, all access and staging areas are previously disturbed, and no new disturbance would occur in desert tortoise habitat. If a tortoise moved into the staging or access area and was unnoticed, it could be harmed by moving vehicles or equipment, but this is unlikely as no tortoise sign was observed in these areas. Personnel would be trained in how to respond if a tortoise was found in or near the project area.

The project area does not provide suitable nesting habitat for the southwestern willow flycatcher, so the species would only occur in the project area as a migrant, if at all. Nonbreeding individuals would be able to avoid localized project activities. Long-term habitat improvements following the implementation of Alternative B may benefit the southwestern willow flycatcher.

Razorback suckers are endemic to the Colorado River system and would not be adversely impacted by temporary increases in turbidity downstream from construction activity. All six grade control structures would be located in critical habitat and, depending on the lake level, could act as a barrier to movement up the Wash. This would be considered an adverse effect, although the effect is small because Las Vegas Wash is not a known spawning area and represents a very small portion of available habitat.

Cumulative Effects: Cumulative effects would be similar to those described above for wildlife under Alternative B.

Conclusion: Implementation of Alternative B is not likely to adversely affect the desert tortoise or the southwestern willow flycatcher. However, by modifying critical habitat, Alternative B may adversely affect the razorback sucker.

Water Resources

Laws, Regulations, and Policies

The Clean Water Act of 1987, and supporting criteria and standards promulgated by the Environmental Protection Agency (EPA), the Nevada Department of Environmental Protection (NDEP), and the Arizona Department of Environmental Quality (ADEQ), are used at Lake Mead NRA to protect the beneficial uses of water quality, including human health, health of the aquatic ecosystem, and recreational use.

A primary means for protecting water quality under the Clean Water Act is the establishment, implementation, and enforcement of water quality standards. Generally, the federal government has delegated the development of standards to the individual states subject to EPA approval. Water quality standards consists of three components: (1) the designated beneficial uses of a water body, such as aquatic life, cold water fishery, or body contact recreation (i.e. swimming or wading); (2) the numerical or narrative criteria that define the limits of physical, chemical, and biological characteristics of water that are sufficient to protect the beneficial uses; and (3) an anti-degradation provision to protect the existing uses and quality of water.

A state's anti-degradation policy is a three-tiered approach for maintaining and protecting various levels of water quality. In Tier 1 waters, the existing uses of a water body and the quality necessary to protect the uses must be maintained. This is considered to be the base level of protection that must be applied to the water body. If the water quality in a water body already exceeds the minimum requirements for the protection of the designated uses (Tier 2), then the existing water quality must be maintained. The third level provides protection for the state's highest quality waters or where ordinary use classification my not suffice; these water bodies are Tier 3 waters and are classified as Outstanding National Resource Waters. The existing water quality must be maintained and protected at this level. Lake Mead is a Tier 1 water body.

Water quality in Lake Mead NRA in Nevada is regulated by NDEP under water quality standards and regulations that are promulgated in the Nevada Administrative Code (Chapter 445A.118-445A.225). Consistent with federal regulations, Nevada has established numerical and narrative standards that protect existing and designated uses of the State’s waters, and implements the anti-degradation requirements by establishing “requirements to maintain existing higher quality.” Compliance with the numerical standards for water quality is determined at control points that are specified in the regulations.

Criteria and Thresholds for Impact Analysis
The following impact thresholds were established for analyzing impacts to water resources in the project area:

- *Negligible impacts*: Effects are not detectable or are well within water quality standards and/or historical ambient or desired water quality conditions.

- *Minor impacts*: Effects are detectable but within water quality standards and/or historical ambient or desired water quality conditions.

- *Moderate impacts*: Effects are detectable and within water quality standards, but historical baseline or desired water quality conditions are being altered on a short-term basis.

- *Major impacts*: Effects are detectable and significantly and persistently alter historical baseline or desired water quality conditions. Limits of water quality standards are locally approached, equaled, or slightly singularly exceeded on a short-term and temporary basis.

Alternative A
Under the No Action Alternative, both base flows and flood flows would continue to cause erosion and channelization in lower Las Vegas Wash. Portions of the canyon walls may also slump or topple into the Wash. Sediment and turbidity would remain high in the Wash, and these sediments would continue to be deposited into Lake Mead. The eventual failure of the existing structures upstream would exacerbate these effects. Water quality in both the Wash and in the Las Vegas Bay of Lake Mead would be negatively impacted.

Cumulative Effects: Upstream grade control structures and riparian restoration efforts have curbed erosion and reduced sedimentation in upper portions of the Wash, which in turn has benefited water quality in Lake Mead. In addition to addressing sedimentation, upland wetland vegetation also improves water quality by filtering pollutants and contaminants that enter the Wash from the Las Vegas Valley. Failure to take similar actions downstream would cumulatively offset some of these benefits.

Conclusion: The continued sedimentation that occurs under Alternative A would be a minor adverse impact to water resources.

Alternative B
Under Alternative B, construction of the new grade control structures would result in a short-term increase of in-stream sediment and turbidity immediately downstream of the grade control structure locations. Following construction, the new structures would slow the flow of water and capture some of the sediment, which in turn would reduce turbidity in the Wash and lessen the amount of sediment deposited into Lake Mead. The structures would also allow the establishment of greater amounts of wetland vegetation in the Wash,

and this vegetation helps to improve water quality by removing pollutants and contaminants.

Cumulative Effects: Benefits to water quality under Alternative B contribute cumulatively to benefits that have already been realized by habitat improvements completed upstream in Las Vegas Wash.

Conclusion: Reductions in sediment, turbidity, and contaminant levels under Alternative B would be a moderate beneficial effect to water resources.

Wetlands and Floodplains

Laws, Regulations, and Policies

Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) direct federal agencies to avoid the adverse impacts associated with the occupancy and modification of floodplains and the destruction or modification of wetlands. The policies, requirements, and standards by which the NPS will implement these Executive Orders are provided in Director's Orders 77-1 (Wetland Protection) and 77-2 (Floodplain Management). The NPS strives to protect the beneficial values served by floodplains and has adopted a goal of no net loss of wetlands. NPS policy requires that a Statement of Findings be prepared for any action that has an adverse effect on wetlands or floodplains.

Criteria and Thresholds for Impact Analysis

The following impact thresholds were established for analyzing impacts to wildlife and wildlife habitat in the project area:

- *Negligible impacts*: There is no change in the ability of a floodplain to convey floodwaters, or its values and functions. The project does not contribute to flooding. Wetlands are not affected or the effects are below or at the lower levels of detection.

- *Minor impacts*: Changes in the ability of a floodplain to convey floodwaters, or its values and functions, are measurable and local. The project does not contribute to flooding. The effects to wetlands are detectable and relatively small in terms of area and the nature of the change. The action affects a limited number of individuals of plant or wildlife species within the wetland. No mitigation is needed.

- *Moderate impacts*: Changes in the ability of a floodplain to convey floodwaters, or its values and functions, are measurable and local. The project could contribute to flooding. The impact can be mitigated by modification of proposed facilities in floodplains. The effects to wetlands are readily apparent over a relatively small area, but the impact can be mitigated by restoring previously degraded wetlands. The action has a measurable effect on plant or wildlife species within the wetland, but all species remain indefinitely viable.

- *Major impacts*: Changes in the ability of a floodplain to convey floodwaters, or its values and functions are measurable and widespread. The project contributes to flooding. The impact cannot be mitigated by modification of proposed facilities in floodplains. The effects to wetlands are readily apparent over a relatively large area. The action has measurable consequences for the wetland area that cannot be mitigated. Wetland species are at risk of extirpation from the area.

Alternative A
Under the No Action Alternative, there would be no construction in the floodplain. However, the floodplain would continue to degrade and widen as the wash channel erodes. Channelization would increase with time, which could reduce the amount of fringe wetlands in the project area.

Cumulative Effects: As degradation and channelization worsens in the project area, erosion potential upstream would increase, expanding the geographic extent of impacts to wetlands and floodplains.

Conclusion: Since the ability of the floodplain to convey floodwaters would not be affected and the change in wetland vegetation would occur in a localized area, impacts under Alternative A would be minor.

Alternative B
Under Alternative B, up to six new grade control structures would be constructed in a floodplain, but since these structures serve to stabilize the Wash, they would preserve the natural and beneficial values served by the floodplain. The structures would neither contribute to flooding nor impede the floodplains ability to convey floodwater. Some wetland vegetation may be removed during construction activities, but once complete, slower flows in the project area would be conducive to greater amounts of wetland vegetation, and the structures themselves would support the colonization of additional vegetation, as has been observed upstream. Since this alternative results in beneficial effects to wetlands and floodplains, a Statement of Findings is not required.

Cumulative Effects: Alternative B contributes cumulatively to the beneficial effects to wetlands and floodplains that have occurred as a result of restoration activities upstream in Las Vegas Wash, where over 77 acres of wetland vegetation have already been created.

Conclusion: Grade control structures would stabilize the floodplain and improve wetland habitat, resulting in moderate beneficial effects.

Air Quality

Laws, Regulations, and Policies
Air pollution sources within parks must comply with all federal, state, and local regulations. Lake Mead NRA is designated as a Class II Air Quality area under the Clean

Air Act of 1990. The main purpose of this act is to protect and enhance the nation's air quality to promote the public health and welfare. The Act establishes specific programs to provide protection for air resources and values, including the program to prevent significant deterioration of air quality in clean air regions of the country. Although Lake Mead NRA is designated as a Class II Air Quality area, the Park strives to maintain the highest air quality standards, and project work within the recreation area is completed in accordance with regional standards. However, the Park does not possess sufficient autonomous authority to address issues of air quality improvements when air pollution originates outside the boundary.

NPS Management Policies (2006) directs parks to seek to perpetuate the best possible air quality to preserve natural and cultural resources, sustain visitor enjoyment and human health, and preserve scenic vistas. Parks are directed to comply with all federal, state, and local air quality regulations and permitting requirements. In cases of doubt as to the impacts of existing or potential air pollution on park resources, the NPS "will err on the side of protecting air quality and related values for future generations."

Criteria and Thresholds for Impact Analysis

The following impact thresholds were established for analyzing impacts to air quality in the project area:

- *Negligible impacts*: There are no visible impacts, and there is no smell of emissions. Impacts are not detectable, are well below air quality standards or criteria, and are within historic or desired air quality conditions.

- *Minor impacts*: There are visible impacts during brief periods of time. Dust from the use of dirt roads is visible during brief periods. Impacts are detectable, but are below air quality standards or criteria and within historic or desired air quality conditions. Mitigation is able to alleviate the impacts.

- *Moderate impacts*: There are visible impacts during extended periods. Dust from the use of dirt roads is visible for an extended area. Impacts are detectable, but are at or below air quality standards or criteria and within historic or desired air quality conditions. Mitigation is able to alleviate the impacts.

- *Major impacts*: Visible impacts are detectable for extended periods of time in a large area. Dust from the use of dirt roads and equipment is visible for an extended amount of time. Impacts are detectable; air quality is frequently altered from the historical baseline or desired air quality conditions; air quality standards or criteria are frequently and/or continuously exceeded. Mitigation is unable to alleviate the conditions.

<u>Alternative A</u>

Under the No Action Alternative, there would be no construction or use of equipment that would affect air quality in or near the project area.

Cumulative Effects: There would be no cumulative effects to air quality under Alternative A.

Conclusion: There would be no effect to air quality under Alternative A.

Alternative B

Under Alternative B, air quality would be impacted by construction activities. Movement of vehicles and equipment in the Wash and along the access routes would generate dust and exhaust in the project area. This impact would be partially mitigated by spraying water to keep dust down. There would be no effect to air quality from the project once construction is complete.

Cumulative Effects: Dust and exhaust are inevitable impacts of construction and development projects, both within Lake Mead NRA and in the surrounding communities. The park, and in particular the area around Las Vegas Wash, is highly influenced by the air quality in the Las Vegas Valley, so the actions of Alternative B would constitute only a small incremental cumulative effect to air quality.

Conclusion: Alternative B generates dust and exhaust during construction periods only, and only in the localized project area which is not heavily used. Therefore, impacts to air quality would be minor.

Cultural Resources

Laws, Regulations, and Policies

Numerous legislative acts, regulations, and NPS policies provide direction for the protection, preservation, and management of cultural resources on public lands. Further, these laws and policies establish what must be considered in general management planning and how cultural resources must be managed in future undertakings resulting from the approved plan regardless of the final alternative chosen. Applicable laws and regulations include the NPS Organic Act of 1916, the Antiquities Act of 1906, the National Historic Preservation Act of 1966 (1992, as amended), the National Environmental Policy Act of 1969, the Archeological Resources Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. Applicable agency policies relevant to cultural resources include Chapter 5 of NPS Management Policies (2006) and Director's Order 28: Cultural Resource Management (1998).

Section 106 of the National Historic Preservation Act requires that federal agencies with direct or indirect jurisdiction over undertakings take into account the effect of those undertakings on properties that are listed on, or eligible for listing on, the National Register of Historic Places. Section 110 of the act further requires federal land managers to establish programs in consultation with the State Historic Preservation Office to identify, evaluate, and nominate properties to the national register. This act applies to all federal undertakings or projects requiring federal funds or permits.

Criteria and Thresholds for Impact Analysis
The following impact thresholds were established for analyzing impacts to cultural resources in the project area:

- *Negligible impacts*: The impact is at the lowest level of detection, with neither adverse nor beneficial consequences. The determination of effect under Section 106 would be no effect.

- *Minor impacts*: The alteration of a feature or features can be completed according to Secretary of Interior standards and does not diminish the integrity of the resource. The determination of effect under Section 106 would be no adverse effect.

- *Moderate impacts*: The alteration of a feature or features diminishes the integrity of the resource. The determination of effect under Section 106 would be adverse effect, but measures are identified to mitigate the impacts.

- *Major impacts*: The alteration of a feature or features diminishes the integrity of the resource. The determination of effect under Section 106 would be adverse effect, and no measures are developed to mitigate the impacts.

Alternative A
Under the No Action Alternative, there would be no construction or use of equipment that would have the potential to impact buried or undiscovered cultural resources within the project area.

Cumulative Effects: There would be no cumulative effects to cultural resources under Alternative A.

Conclusion: There would be no effect to cultural resources under Alternative A.

Alternative B
Under Alternative B, up to six new grade control structures would be built in the Wash. The excavation needed for the placement of riprap would be shallow and therefore would not disturb original sediment that could contain cultural resources. Sheet piles to support the structures would be driven into the ground to a depth of approximately 25 feet, but impacting buried cultural resources would not be likely.

Cumulative Effects: Cultural resources in Las Vegas Wash have been impacted by numerous cycles of degradation and aggradation. Sediments potentially containing archaeological material are continually removed from one area and deposited in another by flood events, making the likelihood of finding intact cultural resource sites extremely remote.

Conclusion: There are no impacts to cultural resources anticipated under Alternative B.

Soundscapes

Laws, Regulations, and Policies

A variety of laws, regulations, and policies direct and guide the management of natural soundscapes as an inherent value of national parks to be conserved and as a resource to be enjoyed, including NPS Management Policies 4.9 (Soundscape Management), and Director's Order 47: Soundscape Preservation and Noise Management (2000). In accordance with policy derived from basic NPS mandates, the NPS will preserve, to the greatest extent possible, the natural soundscapes of parks. The natural soundscape is considered a park resource having inherent value, as well as having properties that may be enjoyed by people.

Criteria and Thresholds for Impact Analysis

The impacts on soundscapes were evaluated in terms of frequency, magnitude, and duration of unnatural sound affecting the natural environment, park resources and values, and visitor experience. The following were used in interpreting the level of impact to soundscapes:

- *Negligible impacts*: The effects to the natural sound environment are short-term and at or below the level of detection. The changes are so slight that they are not of any measurable or perceptible consequence to park resources or to visitor experience.

- *Minor impacts*: Effects to the natural sound environment are detectable, although the effects are short-term, localized, and are small and of little consequence to park resources or to visitor experience. Mitigation measures, if needed to offset adverse effects, are simple and successful.

- *Moderate impacts*: Effects to the natural sound environment are readily detectable and long-term, but localized. Mitigation measures, if needed to offset adverse effects, are extensive and likely successful.

- *Major impacts*: Effects to the natural sound environment are obvious, long-term, and have substantial consequences to park resources, visitor experience, or to other resources in the region. Extensive mitigation measures are needed to offset any adverse effects, and their success is not guaranteed.

<u>Alternative A</u>

Under the No Action Alternative, there would be no construction or use of equipment that would change soundscapes in or near the project area.

Cumulative Effects: There would be no cumulative effects to soundscapes under Alternative A.

Conclusion: There would be no effect to soundscapes under Alternative A.

Alternative B
Under Alternative B, soundscapes would be impacted by construction activities. Noise would be generated by the vehicles hauling materials to the project site and by the equipment used to build the structures. There would be no effects to soundscapes from the project once construction is complete.

Cumulative Effects: Noise is an inevitable impact of construction and development projects, both within Lake Mead NRA and in the surrounding communities. The Wash itself is dominated by natural sounds such as water, but surrounding areas are subject to noise generated by traffic, boats, and other visitor-related activities. The actions of Alternative B would constitute a small incremental cumulative effect to soundscapes.

Conclusion: Alternative B generates noise during construction periods only, and only in the localized project area which is not heavily used. Therefore, impacts to soundscapes would be minor.

Visual Resources

Laws, Regulations, and Policies
The enabling legislation of Lake Mead NRA specifically addresses the preservation of the scenic features of the area. The NPS manages the natural resources of the park, including highly valued associated characteristics such as scenic views, to maintain them in an unimpaired condition for future generations.

The intent of this analysis is to identify how each alternative would affect the overall visual character of the area. The assessment of potential visual impacts involves a subjective judgment concerning the degree of landscape modification allowable before a threshold of impact is exceeded. Human preference for landscape types or characteristics is not uniform across cultures and populations, but there are common preferences among visitors to federal lands, and natural-looking landscapes are considered to be the most appealing.

In determining impacts on the visual resource, the NPS considered the visual sensitivity of the area and the level of visual obtrusion each alternative would have on the existing landscape. Visual sensitivity is dependent on the ability of the landscape to absorb the potential impact and the compatibility of the change with the overall visual character of the area. Absorption relates to how well the project will blend into the landscape, taking into account factors such as form, line, and color. Compatibility considers the character of the visual unit and how much contrast is created by the project.

Criteria and Thresholds for Impact Analysis
The following impact thresholds were established for analyzing impacts to visual resources in the project area:

- *Negligible impacts*: The impact is at the lower level of detection and causes no measurable change. The effects of the project do not dominate the landscape

and are essentially imperceptible. The ability of the landscape to absorb the effects is very high, and the change is compatible with the existing visual character of the area.

- *Minor impacts*: The impact is slight but detectable and the change would be small. The project effects are subordinate to the surrounding landscape and relatively low in dominance. The ability of the landscape to absorb the effects is high, and the change is compatible with the existing visual character of the area. If mitigation is needed to offset adverse effects, it is simple and likely to be successful.

- *Moderate impacts*: The impact is readily apparent and the change attracts attention and alters the view, and the dominance of the effects on the landscape is high. The ability of the landscape to absorb the impact is low, and the change is moderately compatible with the existing visual character of the area. Mitigation measures are necessary to offset adverse effects and are likely to be partially successful.

- *Major impacts*: The impact is severe and the change would be highly noticeable. The effects of the project dominate the landscape. The ability of the landscape to absorb the impact is very low, and the impact has very little compatibility with the overall visual character of the area. Extensive mitigation measures are needed to offset adverse effects, and their success is not guaranteed.

Alternative A

Under Alternative A, changes in the visual appearance of the project area may occur as continued channelization and erosion alters flow patterns and vegetation growth in the Wash. Streams and washes are dynamic by nature, and any changes that occur under No Action would represent a continuation of what has been occurring in the Wash for many years.

Cumulative Effects: There would be no cumulative effects to visual resources under Alternative A.

Conclusion: Visual changes in the project area (specifically to vegetation and streamflow patterns) would be gradual and a result of ongoing physical processes, so impacts to visual resources under Alternative A would be negligible.

Alternative B

Under Alternative B, additional grade control structures would regulate flow down the lower portion of Las Vegas Wash, which in turn would affect the amount and type of vegetation supported in the project area. Whether this would represent a positive or negative change in the visual appearance of the habitat may be subjective, but increased wetland habitat is generally considered desirable within a harsh desert setting. This alternative would also introduce human-made structures into an area where they do not

currently exist, but the structures are created of large rock and would ultimately be able to support emergent vegetation, helping them blend into the environment.

Cumulative Effects: Actions taken under Alternative B are similar to those occurring upstream outside the park boundary and thus contribute cumulatively to restoration goals, and their associated visual changes, throughout the entire Las Vegas Wash ecosystem.

Conclusion: The effects of Alternative B on visual resources, whether positive in the form of habitat enhancements or negative in the form of human-made structures, represent a small change relative to the surrounding landscape, and thus would be considered minor.

Park Operations

Criteria and Thresholds for Impact Analysis

Park operations refer to the ability of the park to adequately protect and preserve vital park resources and to provide for an enjoyable visitor experience. Operational efficiency is influenced not only by park staff, but also by the adequacy of the existing infrastructure used in the day to day operation of the park. Analysis of impacts to park operations must consider (1) employee and visitor health and safety, (2) the park's mission to protect and preserve resources, and (3) existing and needed facilities and infrastructure. The following impact thresholds were established for analyzing impacts to park operations in the project area:

- *Negligible impacts*: Park operations are not affected, or the effects are at low levels of detection and do not have an appreciable effect on park operations.

- *Minor impacts*: The effect is detectable and likely short-term, but is of a magnitude that does not have an appreciable effect on park operations. If mitigation is needed to offset adverse effects, it is simple and likely to be successful.

- *Moderate impacts*: The effects are readily apparent, likely long-term, and result in a substantial change in park operations in a manner noticeable to staff and to the public. Mitigation measures are necessary to offset adverse effects and are likely to be successful.

- *Major impacts*: The effects are readily apparent, long-term, and result in a substantial change in park operations in a manner noticeable to staff and the public. Changes are markedly different from existing operations. Extensive mitigation measures are needed to offset adverse effects, and their success is not guaranteed.

<u>Alternative A</u>

No Action would result in the eventual failure of the Northshore Bridge. Park operations based out of Echo and Callville Bay would no longer have direct access to park facilities

served by Lakeshore Road or to Henderson or Boulder City (including park headquarters). The only connectivity (other than by boat) would be via Lake Mead Boulevard and through Las Vegas, a detour of over 30 miles. Routine trips would not be practical, and operations, whether related to maintenance, law enforcement, or visitor services, would be forced to become more insular.

Cumulative Effects: Reduced connectivity creates additional impacts to park operations which are already challenged by reduced staffing levels, budget erosion, deferred maintenance, and changing visitor expectations.

Conclusion: Although normal park operations would still be carried out, there would be a substantial change in the connectivity of different areas, so impacts to park operations would be moderate.

Alternative B

Under Alternative B, park staff would be responsible for management and oversight of the construction of new grade control structures. Phased construction (one structure constructed approximately every 5 years) would alleviate some of the effects of this workload. After construction, park staff may need to conduct occasional maintenance and repairs to the structures, as well as to the access road.

Cumulative Effects: Alternative B contributes to the park's workload of maintaining roadways and mitigating the effects of fluctuating water levels. With over 200 miles of paved roads in the park, roadway maintenance is an ongoing program. The 100-foot drop in Lake Mead over the last decade created significant challenges in repairing and extending 12 launch ramps and maintaining road access to the water's edge. The addition of new grade control structures in the Wash would add a minor cumulative effect to park operations.

Conclusion: Impacts from construction would be short-term, and impacts from long-term maintenance would be infrequent, so the overall impact of Alternative B on park operations would be minor.

Safety and Visitor Use and Experience

Laws, Regulations, and Policies

NPS Management Policies (2006) states that the enjoyment of the park's resources is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate, high-quality opportunities for visitor enjoyment.

Part of the purpose of Lake Mead NRA is to offer opportunities for recreation, education, inspiration, and enjoyment. Consequently, one of the park's management goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of the park's facilities, services, and appropriate recreational opportunities.

Criteria and Thresholds for Impact Analysis

Public scoping input and observation of visitation patterns, combined with an assessment of what is available to visitors under current management, were used to estimate the effects of the actions in the various alternatives of this document. The impact on the ability of the visitor to safely experience a full range of Lake Mead NRA resources was analyzed by examining resources and objectives presented in the park's significance statement. The potential for change in visitor experience proposed by the alternatives was evaluated by identifying projected increases or decreases in use of the areas impacted by the proposal, and determining how these projected changes would affect the desired visitor experience. The following impact thresholds were established for analyzing impacts to safety and visitor use and experience:

- *Negligible impacts*: Safety would not be affected, or the effects are at low levels of detection and do not have an appreciable effect on visitor or employee health and safety. The visitor is not affected, or changes in visitor use and experience are below or at the level of detection. The visitor is not likely be aware of the effects associated with the alternative.

- *Minor impacts*: The effect is detectable, but does not have an appreciable effect on health and safety. Changes in visitor use and experience are detectable, although the changes would be slight. Some visitors are aware of the effects associated with the alternative, but the effects are slight and not noticeable by most visitors.

- *Moderate impacts*: The effects are readily apparent and result in substantial, noticeable effects to health and safety on a local scale. Changes in visitor use and experience are readily apparent to most visitors. Visitors are aware of the effects associated with the alternative and might express an opinion about the changes.

- *Major impacts*: The effects are readily apparent and result in substantial, noticeable effects to health and safety on a regional scale. Changes in visitor use and experience are readily apparent to all visitors. Visitors are aware of the effects associated with the alternative and are likely to express a strong opinion about the changes.

<u>Alternative A</u>

No Action would result in the eventual failure of the Northshore Bridge, but it is not possible to know when this would occur. The failure event could have catastrophic consequences to visitors on or near the bridge or in the Wash below. Beyond the concerns for visitor safety, once the bridge was no longer in service, visitor experience would be compromised by the reduced access to northern areas of the park, including destinations such as Callville Bay, Echo Bay, Redstone, Rogers and Blue Point Springs, and Pinto Valley and Jimbilnan Wilderness areas. Access for many visitors would be through the Lake Mead Boulevard entrance, which would involve a detour of over 30

miles. In addition, visitors to the Wash itself would experience no improvement in the area's habitat quality.

Cumulative Effects: Park visitors have already been impacted by declining lake levels, which has forced the closure of certain launch ramps and the relocation of some marinas. With Las Vegas Bay no longer in service for launching, Callville Bay, on the other side of the bridge, has become an even more desirable location. Visitors have now been paying entrance fees for several years and expect a quality experience. Loss of the Northshore Bridge would be a substantially negative contribution to cumulative effects on the visitor experience.

Conclusion: Since up to 2,000 vehicles per day may use the Northshore Bridge during busy periods, loss of the bridge under Alternative A would constitute a major adverse impact to visitor use and experience.

Alternative B

Under Alternative B, stabilization of the bridge would ensure the safety of visitors traveling along this segment of Northshore Road. It would also ensure more direct access between park destinations on either side of the bridge. Habitat improvements in the Wash would improve the quality of the experience for visitors who use it as a wildlife viewing area or for other recreational pursuits.

Cumulative Effects: Extensive road improvements have been made, and continue to be made, in the vicinity of Las Vegas Wash. Besides the proposed stabilization of the bridge, past improvements on Lakeshore, Northshore, and Callville Bay Road, and future improvements to Echo Bay Road all cumulatively improve visitor travels. Habitat improvements in the Wash add to habitat restoration efforts in both riparian and upland areas all over the park.

Conclusion: Due to the number of visitors that use the Northshore Bridge and the access it provides to important park destinations, stabilization of the bridge under Alternative B would constitute a major beneficial effect to visitor use and experience.

CHAPTER 5: PUBLIC AND AGENCY INVOLVEMENT

A public scoping period occurred from April 24 to May 30, 2012. A scoping press release (Appendix A) was sent to television stations, newspapers, magazines, and radio stations in Las Vegas, Henderson, Boulder City, Pahrump, Overton, Logandale, Laughlin, Nevada; Meadview, Kingman, Phoenix, and Bullhead City, Arizona; and Needles and Los Angeles, CA. The press release was also posted on the Lake Mead NRA internet website, on the NPS Planning, Environment, and Public Comment (PEPC) internet website, and in the public lobby of Lake Mead Headquarters (currently serving as the Lake Mead Visitors Center). The Las Vegas Review Journal published a story on the proposal on May 2, 2012. Park staff also presented the proposed project at a meeting of the Las Vegas Wash Coordination Committee on July 24, 2012. The Las Vegas Wash Coordination Committee submitted a comment letter during the scoping period, expressing its support of the project.

On June 18, 2012, representatives from the National Park Service, U.S. Fish and Wildlife Service, Nevada Department of Wildlife, and Bio-West environmental consultants met at Las Vegas Wash to review the project and its potential effects on federally listed species. As a result of that meeting, the NPS initiated consultation with the Fish and Wildlife Service under Section 7 of the Endangered Species Act, a process which was completed in October of 2012 with a determination that the project was not likely to adversely affect federally threatened or endangered species.

A press release announcing the availability of this environmental assessment is sent to the above entities and is posted on the park and PEPC websites. In addition, the announcement is posted in the public lobby of Lake Mead Headquarters in Boulder City.

Lake Mead NRA's mailing list is comprised of 244 federal, state, and local agencies; individuals; businesses; and organizations. The environmental assessment is distributed to those individuals, agencies, and organizations likely to have an interest in this project. Entities on the park mailing list that do not receive a copy of the environmental assessment receive a letter notifying them of its availability and methods of accessing the document.

The environmental assessment is published on the Lake Mead NRA internet website at (http://www.nps.gov/lame) and on the NPS PEPC internet website at http://parkplanning.nps.gov/. Copies of the environmental assessment are available at area libraries, including: Boulder City Library, Clark County Community College (North Las Vegas), Clark County Library, Las Vegas Public Library, Green Valley Library (Henderson), James I. Gibson Library (Henderson), Sahara West Library (Las Vegas), Mohave County Library (Kingman, AZ), Sunrise Public Library (Las Vegas), University of Arizona Library (Tucson, AZ), University of Nevada Las Vegas James R. Dickinson Library, Meadview Community Library, Moapa Valley Library (Overton, NV), Mesquite

Library, Mohave County Library (Lake Havasu City, AZ), Laughlin Library, Searchlight Library, and Washington County Library (St. George, UT).

Comments on this environmental assessment must be submitted during the 30-day public review and comment period. Comments on the EA can be submitted on the PEPC website at http://parkplanning.nps.gov/ or may be submitted in writing to the following address:

National Park Service, Lake Mead NRA
Attention: Environmental Compliance Office
601 Nevada Way
Boulder City, Nevada 89005

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

CHAPTER 6: LIST OF PREPARERS

Preparer:

Michael Boyles, Environmental Compliance Specialist, Lake Mead NRA

Contributors:

Travis Anderson, Park Engineer, Lake Mead NRA
Vanessa Truitt, Geographer, Lake Mead NRA
Toshi Yoshida, Biologist, Lake Mead NRA

CHAPTER 7: REFERENCES

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APPENDIX A: SCOPING PRESS RELEASE

National Park Service
U.S. Department of the Interior

LAKE MEAD NATIONAL RECREATION AREA News Release

For Immediate Release: April 24, 2012
Release No.: 2012-14
Contact: Michael Boyles 702-293-8978

NPS SEEKS PUBLIC COMMENT ON PROPOSED FLOW REGULATION IN LOWER LAS VEGAS WASH

The National Park Service is seeking public comment on a proposal to regulate flows in the lower end of Las Vegas Wash in order to reduce erosion that threatens the bridge over the Wash on Northshore Road. The proposal is in response to a study completed by the Federal Highway Administration, suggesting that active management of the channel and additional grade control structures are needed to protect the bridge and maintain access across the Wash to the northern portions of Lake Mead National Recreation Area.

Las Vegas Wash was once an ephemeral drainage, but beginning in the late 1960s it transitioned into a perennial stream as a result of the development of the Las Vegas Valley and increased effluent discharge into the Wash. Greater flows have resulted in channelization of the Wash and increased erosion. In 2002, the National Park Service constructed three grade control structures in response to this erosion, but with the drawdown of Lake Mead over the last several years, additional downstream structures are needed to combat the problem.

An environmental assessment is being prepared to analyze the effects of alternative methods of completing the project. Comments and recommendations regarding the scope of the environmental assessment, the issues it should cover, the alternatives to consider, and other resource concerns will be accepted through May 30, 2012. They may be submitted by U.S. Mail to Lake Mead National Recreation Area, Compliance Office, 601 Nevada Way, Boulder City, NV 89005 or via the internet at http://parkplanning.nps.gov/.

- NPS -

As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

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