Final

YOSEMITE VALLEY PLAN

Supplemental Environmental Impact Statement

volume II

Appendices

National Park Service
Yosemite National Park
California

United States Department of the Interior

Final

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Supplemental Environmental Impact Statement

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National Park Service
Yosemite National Park
California 95389
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Yosemite National Park • California

United States Department of the Interior

Scot Miller

The cover photographs for all volumes of this document were taken by nature and scenic photographer Scot Miller. Since his first visit to Yosemite in 1990, Miller has tried to capture the magnificence and grandeur of the park. Through his photography he hopes to inspire others to have an appreciation and understanding of Yosemite's uniqueness, along with its value as a national treasure worth preserving for future generations. He currently lives in Carrollton, Texas.

Lawrence Ormsby

The illustrations in this document were drawn in pencil and pen and ink by Lawrence Ormsby, partner in Ormsby and Thickstun Interpretive Design. For more than two decades, Ormsby has worked with National Park Service interpreters and historians to prepare illustrations for interpretive publications and exhibits. This year he received the National Park Service Director's Award for his illustration and cartography work in *A Land in Motion: California's San Andreas Fault*. He currently lives in Cave Creek, Arizona.

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Cover photos by Scot Miller

Gallon Film and Half Dome (front cover)

El Capitan and Yosemite Valley (back cover)

Table of Contents

VOLUME II: APPENDICES

(Items in gray are not in this volume)

VOLUME IA

Executive Summary

Chapter 1: Purpose of and Need for the Action

Chapter 2: Alternatives, Including the Preferred Alternative

Chapter 3: Affected Environment

VOLUME IB, PART 1

Chapter 4: Environmental Consequences

- **Alternative 1**
- **Alternative 2**

VOLUME IB, PART 2

- **Alternative 3**
- **Alternative 4**
- **Alternative 5**
- **Unavoidable Adverse Impacts**
- **Irreversible and Irretrievable Commitments of Resources**
- **Relationship of Short-Term Uses and Long-Term Productivity**

Chapter 5: Consultation and Coordination

Chapter 6: List of Preparers

Bibliography

Glossary

Acronyms and Abbreviations

Index

VOLUME IC: PLATES

Location, Resource, and Merced Wild and Scenic River Plates (9 plates)

Alternative 1 (8 plates)

Alternative 2 (9 plates)

Alternative 3 (7 plates)

Alternative 4 (8 plates)

Alternative 5 (9 plates)

(Items in black are in this volume)

VOLUME II: APPENDICES

Appendix A Applicable Laws, Regulations, and Executive Orders

Appendix B Merced Wild and Scenic River

Appendix C Yosemite Valley Geologic Hazard Guidelines

Appendix D Cultural Resources Programmatic Agreement

Appendix E Adverse Effects and Standard Mitigation Measures for Historic Properties

Appendix F Vegetation Restoration Objectives for Selected Areas in Yosemite Valley

Appendix G Transportation Assumptions

Appendix H Considering Cumulative Effects

Appendix I Air Quality Data

Appendix J Socioeconomic Analysis Methods

Appendix K Biological Assessment on the *Final Yosemite Valley Plan/SEIS*

Appendix L Biological Opinion

Appendix M Sequencing

Appendix N Floodplain Statement of Findings for the *Final Yosemite Valley Plan/SEIS*

(Items in gray are not in this volume)

VOLUME III: PUBLIC COMMENTS AND RESPONSES

Introduction

Chapter 1: Public Concerns and Modification of the Draft Plan

Chapter 2: Purpose and Need

Chapter 3: Alternatives

Chapter 4: Affected Environment and Environmental Consequences

Chapter 5: Public Concerns from the Draft Merced River Plan/EIS and Responses Relating to Yosemite Valley Planning

Chapter 6: Response Demographics

Chapter 7: Organized Response Campaigns

Chapter 8: The Content Analysis Process

Chapter 9: Comment Letters from Federal and State Agencies and Tribes

appendix A

Applicable Laws, Regulations, and Executive Orders

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX A – APPLICABLE LAWS, REGULATIONS, AND EXECUTIVE ORDERS

This appendix describes the key pieces of legislation that form the legal context for development of the *Final Yosemite Valley Plan/SEIS*. These pieces of legislation have guided development of this document and would continue to guide its implementation.

National Park Service Enabling Legislation

Act of June 30, 1864, 13 Stat. 325, 16 USC §48. Authorizes a grant to California for the "Yo-Semite Valley," and for land embracing the "Mariposa Big Tree Grove." This tract was "to be held for public use, resort, and recreation" by the state of California, and to "be inalienable for all time."

Act of August 25, 1916 (National Park Service Organic Act), PL 64-235, 16 USC §1 et seq. As amended. On August 15, 1916, Congress created the National Park Service with the National Park Service Organic Act. This act, as reaffirmed and amended in 1970 and 1978, establishes a broad framework of policy for the administration of national parks:

> *"The Service thus established shall promote and regulate the use of the Federal areas known as National Parks, Monuments, and Reservations… by such means and measures as to conform to the fundamental purpose of the said Parks, Monuments, and Reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

General Legislation and Regulations

Americans with Disabilities Act, PL 101-336, 104 Stat. 327, 42 USC §12101. This act states that all new construction and programs will be accessible to individuals with disabilities. Additionally, National Park Service Special Directive 83-3 states that accessibility will be proportional to the degree of development (i.e., areas of intense development such as visitor centers, museums, drive-in campgrounds, etc., will be entirely accessible, and areas of lesser development such as backcountry trails and walk-in campgrounds may have fewer accessibility features). All development proposed in the *Final Yosemite Valley Plan/SEIS* must be consistent with this act.

Architectural Barriers Act of 1968, PL 90-480, 82 Stat. 718, 42 USC §4151 et seq. This act establishes standards for design/construction or alteration of buildings to ensure that physically disabled persons have ready access to and use of such buildings. The act excludes historic structures from the standards until they are altered. All development proposed in the *Final Yosemite Valley Plan/SEIS* must be consistent with this act.

California Wilderness Act of 1984 (PL 98-425). In 1984, Congress officially included most of Yosemite National Park in the National Wilderness Preservation System and named it the Yosemite Wilderness. Many other California wilderness areas were established or expanded with the passage of this act. Inclusion of an area in the National Wilderness Preservation System does

not change the jurisdictional responsibility for the land. The National Park Service continues to manage the Yosemite Wilderness under the additional requirements for the Wilderness Act of 1964. Though the project area for the *Final Yosemite Valley Plan/SEIS* does not include designated Wilderness, indirect impacts on designated Wilderness have been evaluated.

Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) (40 CFR Parts 1500-1508). The Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA) establish the process by which federal agencies fulfill their obligations under the NEPA process. The Council on Environmental Quality regulations ascertain the requirements for environmental assessments and environmental impact statements that document the NEPA process. The Council on Environmental Quality regulations also define such key terms as "cumulative impact," "mitigation" and "significantly" to ensure consistent application of these terms in environmental documents. This environmental impact statement was prepared as directed in the Council on Environmental Quality regulations.

National Environmental Policy Act (NEPA) of 1970. PL 91-190, 83 Stat. 852, 42 USC §4341 et seq. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment. Regulations implementing NEPA are set forth by the Council on Environmental Quality. The NEPA process guides the overall planning process for the *Final Yosemite Valley Plan/SEIS*.

Rehabilitation Act of 1973, PL 93-112, 87 Stat. 357, 29 USC §701 et seq. As amended by the Rehabilitation Act Amendments of 1974, 88 Stat. 1617, this act sets forth a broad range of services and basic civil rights for individuals with disabilities. It prohibits discrimination against persons with visual, hearing, mobility, and mental impairments. All development proposed in the *Final Yosemite Valley Plan/SEIS* must be consistent with this act.

Wild and Scenic Rivers Act of 1968 as amended (PL 90-542; 16 USC 12371-1287). This act identifies distinguished rivers of the nation that possess remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values; preserves the rivers' free-flowing condition; and protects their local environments. The Merced River in Yosemite National Park was designated a Wild and Scenic River in 1987. All actions proposed in this plan will protect and enhance the values that are recognized by the Merced Wild and Scenic River designation.

Wilderness Act of 1965 (PL 88-577). The Wilderness Act protects congressionally-designated wilderness areas from roads, dams, and other permanent structures; from timber cutting and the operation of motorized vehicles and equipment; and, since 1984, from new mining claims and mineral leasing. Though the *Final Yosemite Valley Plan/SEIS* does not directly impact designated Wilderness, indirect impacts on wilderness will be identified and addressed.

Natural Resources Legislation

Clean Air Act, as amended, PL Chapter 360, 69 Stat. 322, 42 USC §7401 et seq. Section 118 of the Clean Air Act requires all federal facilities to comply with existing federal, state, and local air pollution control laws and regulations. The National Park Service works in conjunction with

the Mariposa County Air Pollution Control District to ensure that all construction activities meet requirements.

Federal Water Pollution Control Act (commonly referred to as the Clean Water Act) of 1977 (33 USC 1251 et seq.). The Clean Water Act provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters. Section 404 of the act prohibits the discharge of fill material into navigable water of the United States, including wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency. The placement of fill in wetlands should be avoided if there are practicable alternatives. Compliance with Section 401 and 404 of the Clean Water Act will be completed as necessary prior to any new construction proposed in this plan.

Clean Water Act Amendments of 1987. The 1987 amendments to the act required that the Environmental Protection Agency establish regulations for the issuance of municipal and industrial stormwater discharge permits as part of the National Pollutant Discharge Elimination System. The final Environmental Protection Agency regulations were published in November 1990. These regulations apply to any construction activities that disturb more than five acres of land.

A Notice of Intent to comply with the state's General Construction Activity Stormwater Permit will be submitted to the State Water Resources Control Board, and a Stormwater Pollution Prevention Plan will be developed and approved for all proposed construction projects that affect more than 5 acres.

Comprehensive Environmental Response, Compensation, and Liability Act (commonly referred to as CERCLA or the Superfund Act) PL 96-510, 94 Stat. 2767, 42 USC §9601 et seq. Congress enacted CERCLA to address growing concerns about the need to clean up uncontrolled, abandoned hazardous waste sites and to address future releases of hazardous substances into the environment. Applicable sites in Yosemite National Park are managed under the National Park Service CERCLA program.

Endangered Species Act of 1973, as amended, PL 93-205, 87 Stat. 884, 16 USC §1531 et seq. The Endangered Species Act protects threatened and endangered species, as listed by the U.S. Fish and Wildlife Service, from unauthorized take, and directs federal agencies to ensure that their actions do not jeopardize the continued existence of such species. Section 7 of the act defines federal agency responsibilities for consultation with the U.S. Fish and Wildlife Service and requires preparation of a Biological Assessment to identify any threatened or endangered species that is likely to be affected by the proposed action. The National Park Service initiated and maintained formal consultation with the U.S. Fish and Wildlife Service throughout the *Final Yosemite Valley Plan/SEIS* process and prepared a Biological Assessment (see Appendix K) in order to meet obligations under the Endangered Species Act.

Porter-Cologne Water Quality Control Act (California Water Code, Section 13020). Under the authority of the Porter-Cologne Act and federal Clean Water Act, Regional Water Quality Control Boards act as regional agencies for the State Water Resources Control Board and are responsible for regional enforcement of water quality laws and coordination of water quality control activities. The regional board for the Yosemite area is the Central Valley.

Resource Conservation and Recovery Act, as amended (RCRA), PL 94-580, 30 Stat. 1148, 42 USC §6901 et seq. This act establishes a regulatory structure for the management of solid and hazardous waste from the point of generation to disposal. In particular, applicable provisions include those that address underground storage tanks and sites contaminated with elements identified under Federal and State Resource Conservation and Recovery Act regulations.

Cultural Resources Legislation

Antiquities Act of 1906, PL 59-209, 34 Stat. 225, 16 USC §432 and 43 CFR 3. This act provides for the protection of historic or prehistoric remains, "or any antiquity," on federal lands. It protects historic monuments and ruins on public lands. It was superseded by the Archeological Resources Protection Act (1979) as an alternative federal tool for prosecution of antiquities violations in the National Park System.

Archeological Resources Protection Act of 1979, PL 96-95, 93 Stat. 712, 16 USC §470aa et seq. and 43 CFR 7, subparts A and B, 36 CFR. This act secures the protection of archeological resources on public or Indian lands and fosters increased cooperation and exchange of information between private, government, and the professional community in order to facilitate the enforcement and education of present and future generations. It regulates excavation and collection on public and Indian lands. It requires notification of Indian tribes who may consider a site of religious or cultural importance prior to issuing a permit. The act was amended in 1988 to require the development of plans for surveying public lands for archeological resources and systems for reporting incidents of suspected violations.

National Historic Preservation Act of 1966, as amended, PL 89-665, 80 Stat. 915, 16 USC §470 et seq. and 36 CFR 18, 60, 61, 63, 68, 79, 800. The National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed in or eligible for listing in the National Register of Historic Places. The Advisory Council on Historic Preservation has developed implementing regulations (36 CFR 800), which allow agencies to develop agreements for consideration of these historic properties. Yosemite National Park, in consultation with the Advisory Council, the California State Historic Preservation Officer (SHPO), American Indian tribes and the public, has developed a Programmatic Agreement for planning, design, construction, operations and maintenance activities. This Programmatic Agreement provides a process for compliance with National Historic Preservation Act, and includes stipulations for identification, evaluation, treatment, and mitigation of adverse effects for actions affecting historic properties. The National Park Service will follow stipulations of this Programmatic Agreement for all future planning and design projects, including development of the Indian Cultural Center and all out-of-Valley development described in the final plan. The Programmatic Agreement allows the National Park Service to implement standard mitigating measures for some actions, if the State Historic Preservation Officer and the public are notified and provided an opportunity to comment (see Appendix D).

American Indian Religious Freedom Act, PL 95-341, 92 Stat. 469, 42 USC §1996. This act declares policy to protect and preserve the inherent and constitutional right of the American Indian, Eskimo, Aleut, and Native Hawaiian people to believe, express, and exercise their

traditional religions. It provides that religious concerns should be accommodated or addressed under NEPA or other appropriate statutes.

Native American Grave Protection and Repatriation Act, PL 101-601, 104 Stat. 3049, 25 USC §3001-3013. This act assigns ownership or control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on federal lands or tribal lands to lineal descendants or culturally affiliated Native American groups.

Executive Orders

Executive Order 11593: Protection and Enhancement of the Cultural Environment. This Executive Order instructs all federal agencies to support the preservation of cultural properties. It directs them to identify and nominate cultural properties under their jurisdiction to the National Register of Historic Places and to "exercise caution… to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered."

Executive Order 11988: Floodplain Management. This Executive Order requires federal agencies to avoid, to the extent possible, adverse impacts associated with the occupancy and modification of floodplains, and to avoid development in floodplains whenever there is a practical alternative. If a proposed action is found to be in the applicable regulatory floodplain, the agency shall prepare a floodplain assessment, known as a Statement of Findings. A Statement of Findings has been prepared for the *Final Yosemite Valley Plan/SEIS* in accordance with National Park Service, Special Directive 93-4 (Floodplain Management Guideline) and is included as Appendix N.

Executive Order 11990: Protection of Wetlands. This Executive Order established the protection of wetlands and riparian systems as the official policy of the federal government. It requires all federal agencies to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Should adverse impacts on wetlands be identified, a Wetland Statement of Findings would be prepared and included in subsequent compliance (such as an environmental assessment or environmental impact statement) for the specific project.

Presidential Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. This Executive Order requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. Impacts on minority and low-income populations have been identified and are addressed in Vol. IA, Chapter 3, Affected Environment and Vol. IB, Chapter 4, Environmental Consequences.

Presidential Executive Order 12902: Energy Efficiency and Water Conservation. This Executive Order directs each agency involved in the construction of a new facility to design and construct it to use energy efficiently, conserve water, and employ renewable energy technologies.

The requirements of this Executive Order would be met during the design phase for any new facilities proposed in the *Final Yosemite Valley Plan/SEIS.*

Executive Order 13101: Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition. This Executive Order requires that federal agencies increase the procurement of environmentally preferable or recovered materials. Agencies are directed to set annual goals to maximize the number of recycled products purchased relative to nonrecycled alternatives. In addition, each agency is to establish a program for promoting cost-effective waste prevention and recycling at each of its facilities. The requirements of this executive order would be met during development and implementation phases of the *Final Yosemite Valley Plan/SEIS.*

Executive Order No. 13112: Invasive Species. This Executive Order prevents the introduction of invasive species and directs federal agencies to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species. Actions proposed in the *Final Yosemite Valley Plan/SEIS* include measures to prevent the introduction and spread of invasive species.

Department of the Interior – Director's Orders

Director's Orders provide guidance for implementing certain aspects of National Park Service policy. Copies of those that have been completed may be obtained by contacting the NPS Office of Policy or by accessing the National Park Service web site at *www.nps.gov/refdesk/DOrders/*. The following Director's Orders may be relevant to the *Final Yosemite Valley Plan/SEIS* planning process:

Completed Director's Orders

1. The Directives System
2. Park Planning
9. Law Enforcement Program
16A. Reasonable Accommodation for Applicants and Employees with Disabilities
17. National Park Service Tourism
18. Wildland Fire Management
20. Agreements
21. Donations and Fundraising
28. Cultural Resource Management
32. Cooperating Associations
41. Wilderness Preservation & Management
50B. Occupational Safety and Health
77-1. Wetland Protection
83. Public Health

National Park Service Guidelines

NPS-12 National Environmental Policy Act Guidelines

NPS-77 Natural Resources Management Guidelines

appendix B

Merced Wild and Scenic River

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX B – MERCED WILD AND SCENIC RIVER

This appendix contains an overview of the management elements of the *Merced Wild and Scenic River Comprehensive Management Plan/Final Environmental Impact Statement* (referred to hereafter as the *Merced River Plan*). The *Merced River Plan* is a programmatic plan and, unlike the *Final Yosemite Valley Plan/SEIS*, does not specify detailed actions. The *Merced River Plan* uses management elements to prescribe future conditions, typical visitor activities and experiences, and permitted park facilities and management activities in the Merced River corridor. By using the management elements, the *Merced River Plan* applies a consistent set of decision-making criteria and considerations, including: boundaries, classifications, updated Outstandingly Remarkable Values, the Section 7 determination process, the River Protection Overlay, management zones and prescriptions, and the Visitor Experience and Resource Protection (VERP) framework.

The *Draft Merced Wild and Scenic River Comprehensive Management Plan/Environmental Impact Statement* was released in January 2000. Over 2,400 public comments were received and responded to in preparation of the *Merced River Plan*, released in July 2000.

Management Elements of the Merced River Plan

To apply the management element framework to future decisions regarding specific actions, the National Park Service would use the management elements as a set of decision-making criteria with which to evaluate projects in terms of visitor use, facility siting, and design, and other potential actions in the Merced River corridor. For actions that meet these mandatory criteria, the National Park Service would apply additional considerations to further evaluate the actions. All proposed actions would be evaluated against the criteria and considerations. Also, existing facilities in the Merced River corridor would be evaluated when major reconstruction is needed, a facility is no longer of use, or a management initiative occurs (such as those based on planning efforts or new information). In addition, the National Park Service would follow the requirements of other regulatory processes, such as the National Environmental Policy Act and the National Historic Preservation Act.

CRITERIA AND CONSIDERATIONS

The following criteria, which integrate the management elements of the *Merced River Plan*, must be met:

- Actions within the boundaries of the river corridor must protect and enhance the Outstandingly Remarkable Values.
- Actions must be consistent with the classification of that river segment.
- Actions must protect the Outstandingly Remarkable Values, regardless of where an Outstandingly Remarkable Value is located. When Outstandingly Remarkable Values lie within the boundary of the Wild and Scenic River, the Outstandingly Remarkable Value must be protected and enhanced. When Outstandingly Remarkable Values are in conflict

with each other, the net effect of the actions to Outstandingly Remarkable Values must be beneficial.

- Actions that are considered "water resources projects" under Section 7 of the Wild and Scenic Rivers Act (i.e., occurring on the bed or banks of the Merced River) must follow a Section 7 determination process to determine whether they have a direct and adverse impact on the values for which the river was designated Wild and Scenic. Proposed actions outside the river corridor in Merced River tributaries will also undergo Section 7 determination to determine whether they affect the values for which the river was designated Wild and Scenic.
- Actions within the River Protection Overlay must comply with the River Protection Overlay conditions.
- Actions must be compatible with the appropriate management zone and its prescriptions.
- Actions must be compatible with desired visitor experience and resource conditions under the VERP framework.

If a proposed action meets the above criteria, the National Park Service would also make additional considerations to minimize an impact by locating facilities outside the river corridor if there is a feasible alternative; designing facilities or actions to minimize or mitigate impacts to the river; and avoiding, minimizing, or otherwise mitigating negative impacts to visitor experience.

BOUNDARIES

Boundaries define the area to be protected under the Wild and Scenic Rivers Act. The boundaries of the Merced River corridor vary by segment and have been derived from several sources of data. The Wild and Scenic Rivers Act allows for river corridor boundaries that average no more than 320 acres of land per river mile, measured from the ordinary high water mark on both sides of the river. Boundaries, however, do not limit the protection of Outstandingly Remarkable Values, which must be protected whether they are inside or outside the corridor boundaries.

Based on the *Merced River Plan*, a quarter-mile boundary is applied to the entire corridor, except in the El Portal Administrative Site. In the El Portal Administrative Site segment (Segment 4), the boundary is the 100-year floodplain or the extent of the 100-foot River Protection Overlay (whichever is greater) from the park boundary downstream to the administrative site boundary (see Vol. IC, plate G-2). (Note: This applies only for lands under National Park Service jurisdiction. The U.S. Forest Service has not delineated a boundary on lands under its jurisdiction along the El Portal segment of the Merced River.)

CLASSIFICATIONS

In the *Merced River Plan*, east Yosemite Valley (Nevada Fall to Sentinel Beach), El Portal, and Wawona are classified as "recreational." See chapter 3 or 4 under the Wild and Scenic section for a standard sentence to describe scenic or recreational. The recreational classification reflects the current extent of developed areas and facilities in these segments. The impoundment segments (very short segments between Yosemite Valley and the Gorge, and on the South Fork above Swinging Bridge) are classified as recreational due to the presence of small dams that interfere

with the free-flowing condition of the river. The west Valley and the Gorge segments are classified as scenic.

In addition, the *Merced River Plan* allows for the removal of the Cascades Diversion Dam and the Wawona Impoundment. If either of these structures were removed, the classifications of the segments would be changed to reflect surrounding classifications (e.g., from recreational to scenic).

Outstandingly Remarkable Values

Outstandingly Remarkable Values are defined by the Wild and Scenic Rivers Act as those characteristics that make the river worthy of special protection. These can include scenery, recreation, fish and wildlife, geology, history, culture, and other similar values, which are to be considered in determining eligibility for Wild and Scenic River designation.

Two vital questions establish the criteria for selection of Outstandingly Remarkable Values:

- Is the value river-related or river-dependent?
- Is the value rare, unique, or exemplary in a regional or national context?

Both of the above criteria must be satisfied in order for a characteristic to be included as an Outstandingly Remarkable Value. Table B-1 lists Outstandingly Remarkable Values of the Merced River as identified in the *Merced River Plan*.

Table B-1
The Outstandingly Remarkable Values of the Merced River (Main Stem and South Fork)

Segment Number and Name	Outstandingly Remarkable Values (by category)
Main Stem Merced River	*Scientific* – These segments of the river corridor constitute a highly significant scientific resource because the watershed is largely within designated Wilderness in Yosemite National Park.
1) Wilderness	*Scenic* – This segment includes views from the river and its banks of the glaciated river canyon, exposed bedrock riverbed, Merced Lake and Washburn Lake, the Bunnell Cascades, the confluence of tributaries, a large concentration of granite domes, and the Clark and Cathedral Ranges. *Geologic Processes/Conditions* – This segment traverses a U-shaped, glacially carved canyon separated by cascades and soda springs below Washburn Lake. *Recreation* – This segment provides outstanding opportunities for solitude along the river, with primitive and unconfined recreation. There is a spectrum of levels of recreational use. River-related recreational opportunities include day hiking, backpacking, horseback riding and packing, camping, and enjoyment of natural river sounds. Untrailed tributaries provide enhanced opportunities for solitude. *Biological* – This segment includes a nearly full range of intact Sierran riverine environments, high-quality riparian, meadow, and aquatic habitats (such as the meadow at Washburn Lake), and special-status species such as mountain yellow-legged frog. *Cultural* – This segment includes portions of a prehistoric trans-Sierra route in use for thousands of years and many prehistoric sites. There are many historic resources such as homestead sites, trails, river crossings, High Sierra Camp sites, and structures. *Hydrologic Processes* – The segment is characterized by a free-flowing river and excellent water quality. The river gradient drops from 13,000 to 6,000 feet in elevation. There are examples of natural conditions, including glacial remnants, a logjam in Little Yosemite Valley that is hundreds of years old, and numerous cascades.

Table B-1 The Outstandingly Remarkable Values of the Merced River (Main Stem and South Fork)	
Segment Number and Name	**Outstandingly Remarkable Values (by category)**
2) Valley	*Scenic* – This segment provides magnificent views from the river and its banks of waterfalls (Nevada, Vernal, Illilouette, Yosemite, Sentinel, Ribbon, Bridalveil, and Silver Strand), rock cliffs (Half Dome, North Dome/Washington Column, Glacier Point, Yosemite Point/Lost Arrow Spire, Sentinel Rock, Three Brothers, Cathedral Rock, and El Capitan), and meadows (Stoneman, Ahwahnee, Cook's, Sentinel, Leidig, El Capitan, and Bridalveil). There is a scenic interface of river, rock, meadow, and forest throughout the segment. *Geologic Processes/Conditions* – This segment contains a classic, glaciated, U-shaped valley, providing important examples of a mature meandering river; hanging valleys such as Yosemite and Bridalveil Creeks; and evidence of glaciation (e.g., moraines below El Capitan and Bridalveil Meadows). *Recreation* – This segment offers opportunities to experience a spectrum of river-related recreational activities, from nature study and sightseeing to hiking. Yosemite Valley is one of the premier outdoor recreation areas in the world. *Biological* – Riparian areas and low-elevation meadows are the most productive communities in Yosemite Valley. The high quality and large extent of riparian, wetland, and other riverine areas provide rich habitat for a diversity of river-related species, including special-status species, neotropical migrant songbirds, and numerous bat species. *Cultural* – This segment contains evidence of thousands of years of human occupation reflected in a large number of archeological sites and continuing traditional use today. Nationally significant historic resources are found here, such as designed landscapes and developed areas, historic buildings, and circulation systems (trails, roads, and bridges) that provide visitor access to the sublime views of natural features that are culturally valuable. *Hydrologic Processes* – This segment is characterized by a meandering river, world-renowned waterfalls, an active flood regime, oxbows, unique wetlands, and fluvial processes.
3a) Impoundment (would become part of Segment 3b, Gorge – classified as "scenic," if Cascades Diversion Dam were removed)	*Geologic Processes/Conditions* – This segment contains the dramatic transition from the U-shaped, glaciated Yosemite Valley to the V-shaped river gorge. Biological – This segment contains rich riparian habitat.
3b) Gorge	*Scenic* – This segment provides views from the river and its banks of the Cascades, spectacular rapids among giant boulders, Wildcat Fall, Tamarack Creek Fall, the Rostrum, and Elephant Rock. *Geologic Processes/Conditions* – This segment is characterized by a classic V-shaped river gorge with a continuous steep gradient. *Recreation* – This segment provides a spectrum of river-related recreational opportunities, such as picnicking, fishing, photography, and sightseeing. *Biological* – This segment is characterized by diverse riparian areas and associated special-status species that are largely intact and almost entirely undisturbed by humans. *Cultural* – This segment contains cultural resources, including prehistoric sites and historic sites and structures such as those relating to historic engineering projects. *Hydrologic Processes* – This segment is characterized by exceptionally steep gradients (2,000-foot elevation drop in approximately six miles).

Table B-1 The Outstandingly Remarkable Values of the Merced River (Main Stem and South Fork)	
Segment Number and Name	**Outstandingly Remarkable Values (by category)**
4) El Portal	*Geologic Processes/Conditions* – This segment contains a transition from igneous to metasedimentary rocks (metasedimentary rocks are among the oldest in the Sierra Nevada). *Recreation* – This segment provides a range of river-related recreational opportunities, in particular white-water rafting and kayaking (class III to V) and fishing. *Biological* – This segment contains riverine habitats such as riparian woodlands and associated federal and state special-status species, including Tompkin's sedge and Valley elderberry longhorn beetle and its critical habitat (elderberry shrub). Expanses of north-facing habitat allow unlimited access to the riparian zone for wildlife species. *Cultural* – This segment contains some of the oldest archeological sites in the Yosemite area, as well as many historic Indian villages and traditional gathering places. River-related historic resources include structures related to early tourism and industrial development. Hydrologic Processes – This segment is characterized by continuous rapids.
South Fork Merced River	*Scientific* – These segments of the river corridor constitute a highly significant scientific resource because the watershed is largely within designated Wilderness in Yosemite National Park.
5) Wilderness	*Scenic* – This segment provides views from the river and its banks of unique river features, including large pothole pools within slick rock cascades, old growth forest, and meadows. *Geologic Processes/Conditions* – This segment is characterized by glaciated valleys in the high country and V-shaped canyons above Wawona. Moraine meadows and soda springs above Gravelly Ford are also unique, river-related geologic features. *Recreation* – This segment provides outstanding opportunities for river-related solitude, enjoyment of natural river sounds, and primitive and unconfined recreation. This segment of the river is predominantly without trails, with the exception of four bridgeless trail crossings in the upper reaches of the segment. *Biological* – This segment includes a nearly full range of riverine environments typical of the Sierra Nevada. Examples of river-related federal and state special-status species include Wawona riffle beetle and mountain yellow-legged frog.
	Cultural – This segment includes river-related prehistoric sites and resources and reflects historic stock use and cavalry activities. *Hydrologic Processes* – This segment is characterized by a free-flowing river and excellent water quality.
6) Impoundment (would become part of segment 7 Wawona if an alternative water source were secured and impoundment were removed)	*Scenic* – This segment provides views from the river and its banks of the river and Wawona Dome. *Hydrologic Processes* – This segment has excellent water quality.
7) Wawona	*Scenic* – This segment provides views from the river and its banks of Wawona Dome. *Recreation* – This segment offers opportunities to experience a spectrum of river-related recreational activities, from nature study and photography to hiking. *Biological* – This segment contains a diversity of river-related species, wetlands, and riparian habitats. There are federal and state special-status species in this segment, including Wawona riffle beetle. *Cultural* – This segment contains evidence of thousands of years of human occupation, including numerous prehistoric and historic Indian villages, historic sites, structures, and landscape features related to tourism, early Army and National Park Service administration, and homesteading.
8) Below Wawona	*Scenic* – This segment provides views from the river and its banks of continual white-water cascades in the deep and narrow river canyon in a untrailed, undisturbed environment. *Geologic Processes/Conditions* – This segment contains a transition from Paleozoic Era igneous to Cretaceous Period metasedimentary rocks (metasedimentary rocks are among the oldest in the Sierra Nevada).

Table B-1 The Outstandingly Remarkable Values of the Merced River (Main Stem and South Fork)	
Segment Number and Name	**Outstandingly Remarkable Values (by category)**
	Recreation – This segment provides outstanding opportunities for river-related solitude, enjoyment of natural river sounds, and primitive and unconfined recreation in an untrailed, undisturbed environment. River-related recreational opportunities include hiking, fishing, and white-water kayaking. *Biological* – This segment is characterized by diverse riparian areas that are intact and largely undisturbed by humans. River-related federal and state special-status species in this segment include Wawona riffle beetle. *Cultural* – This segment contains archeological sites and historic resources such as trail segments representing early cavalry activity. *Hydrologic Processes* – This segment is characterized by a free-flowing river with continual white-water cascades.

Section 7 Determination Process

"Water resources projects," that is, those that are within the bed or banks of the Merced River and therefore affect the river's free-flowing condition, are subject to Section 7 of the Wild and Scenic Rivers Act (16 USC 1278).[1] As the designated "river manager" for the Merced River for the segments addressed by the *Merced River Plan*, the National Park Service must carry out a Section 7 determination on all proposed water resources projects to ensure that they do not directly and adversely impact the values for which the river was designated.[2]

The National Park Service is responsible for making the final determination as to whether a proposed water resources project would have a direct and adverse impact to the values for which the river was designated Wild and Scenic. The agency should coordinate its evaluation process with other agencies that are required to review and comment on the project. Depending on the type and location of the project, this may include the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, the U.S. Forest Service, the Bureau of Land Management, and the U.S. Army Corps of Engineers. Review of Section 7 projects would also be coordinated with other environmental review processes, such as those required by the National Environmental Policy Act and the National Historic Preservation Act, as appropriate.

The National Park Service would undertake the following steps as part of its Section 7 determination process for nonemergency projects. In emergency situations (e.g., a broken sewer pipe in or near the river), a Section 7 determination must be carried out as soon as possible after the project is completed. Changes to mitigate impacts from an emergency project should be implemented, when necessary, based on the findings of the Section 7 analysis.

[1]"Water resources projects" include nonlicensed Federal Energy Regulatory Commission projects, such as dams, water diversions, fisheries habitat and watershed restoration, bridges and other roadway construction/reconstruction, bank stabilization, channelization, levees, boat ramps, and fishing piers, that occur within the bed and banks of a designated Wild and Scenic River (IWSRCC 1999).

[2]This description of the Section 7 determination process is adapted from a technical report by the Interagency Wild and Scenic Rivers Coordinating Council (IWSRCC 1999).

1. The National Park Service would describe the purpose and need of the proposed project, its location, duration, magnitude, and relationship to past and future management activities.
2. The National Park Service would analyze the potential impacts of the proposed project on the values for which the river was designated. This analysis should follow the guidelines provided by the *Wild and Scenic Rivers Reference Guide* of the Interagency Wild and Scenic Rivers Coordinating Council (1999) and other applicable guidance.
3. The National Park Service would define the likely duration of the projected impacts.
4. The National Park Service would assess the effects of the projected impacts on the achievement or timing of achievement of the management goals of the *Merced River Plan* (based on the Wild and Scenic Rivers Act).
5. The National Park Service would use this analysis to make a Section 7 determination. This determination would document the effects of the proposed activity, including any direct and adverse effects on the values for which the river was designated.
6. Projects determined to cause direct and adverse impacts to the values for which the river was designated could be redesigned and resubmitted for a subsequent Section 7 determination.
7. The National Park Service would also follow Section 7 procedures to determine whether projects above or below the designated river or on its tributary streams would invade the area or unreasonably diminish the scenic, recreational, or fish and wildlife values present in the designated corridor.

River Protection Overlay

The areas immediately adjacent to the river channel, along with the river channel itself, are particularly important to the health and proper functioning of the river ecosystem. These areas allow for the main channel to link with backwater areas, tributaries, and groundwater systems; provide for increased channel diversity; and contribute sources of needed nutrients and woody debris to the river.[3] Additionally, they can help protect surrounding development from potential flood damage and can be used to filter runoff water draining into the river.

To ensure that the river channel itself and the areas immediately adjacent to the river are protected, the *Merced River Plan* includes a management tool called the River Protection Overlay. The River Protection Overlay would provide a buffer area for natural flood flows, channel formation, riparian vegetation, and wildlife habitat and would protect riverbanks from human-caused impacts and associated erosion. The River Protection Overlay is intended to apply the requirements of the Wild and Scenic Rivers Act, including the protection and enhancement of the Outstandingly Remarkable Values and the preservation of the free-flowing condition of the river, at a higher standard than that of the underlying management zones. It is intended as a primary mechanism to achieve the goals of the *Merced River Plan*. The River Protection Overlay

[3]In most circumstances, trees or other large woody debris falling into the river are recognized as part of the natural processes and would be left in the river to aid in the recovery of aquatic and riparian habitat.

is also intended to be the location of highest priority for restoration of hydrologic processes and biotic habitats within the river corridor.

Within the River Protection Overlay, future actions shall be consistent with the following conditions:

1. Nonessential facilities (including, but not limited to, riprap, levees, diversion walls, impoundments, bridges, bridge abutments, roads, campsites, buildings, utilities, and other structures) should not be located in the River Protection Overlay, except when they meet the following two criteria: (1) where required for access to or across the river, for health and safety, or for the maintenance of historic properties; and (2) where it is impractical to locate them outside the River Protection Overlay.

   - Existing facilities meeting these criteria may remain, and they may be replaced, repaired, or relocated within the River Protection Overlay, but only if the replacement, repair, or relocation does not directly and adversely affect the Outstandingly Remarkable Values.

   - New facilities and development may be constructed in the River Protection Overlay only when meeting these criteria and when located where they do not materially impair the natural function of the river, impede linkages to tributary inflow and backwater areas, or disrupt contribution of woody debris to the river, and where they do not have a direct and adverse impact on the Outstandingly Remarkable Values.

2. Actions to construct, replace, repair, or relocate essential facilities (i.e., primary roads and bridges, wastewater collection and treatment, domestic water supply, electrical distribution, and similar facilities required to keep the park open) and facilities that directly protect and enhance the Outstandingly Remarkable Values (e.g., raft launch facilities to preserve the spectrum of recreational experiences and to concentrate use in a hardened area), within the bed and banks of the river, may be permitted provided that:

   - Project design minimizes impacts to the free-flowing condition of the river, interference with linkages to tributary inflow and backwater areas, and disruption of contribution of woody debris to the river.

   - The project incorporates mitigation measures to avoid or reduce impacts.

3. Facilities and development covered by paragraphs 1 or 2, above, that occur within the bed or banks of the river, and that affect the free-flowing condition of the river must also comply with Section 7 of the Wild and Scenic Rivers Act.

4. Other existing facilities that are not addressed by paragraphs 1 or 2 should be removed and must be removed, at the earliest practicable opportunity, when major rehabilitation is needed or when a facility is no longer of use.

The specific areas included with the River Protection Overlay may shift over time to follow the movement of the river channel itself. The width of the River Protection Overlay is determined by site topography and vegetation and includes the area needed to encompass riparian and adjacent upland vegetation and habitat. The River Protection Overlay, in areas above 3,800 feet, includes the river channel itself and extends 150 feet on both sides of the river measured from the ordinary high water mark; and in areas below 3,800 feet includes 100 feet on both sides of the river

measured from the ordinary high water mark. Generally, a wider band is required along the river in the flatter, open valleys, while a narrower buffer provides adequate protection in the steeper, V-shaped river gorges of the lower elevations. This transition occurs approximately at the 3,800-foot elevation mark, in the gorge area below Yosemite Valley on the main stem of the Merced River, and downstream of Wawona on the South Fork. Approximately 70 miles of the river would have a 150-foot River Protection Overlay, including Yosemite Valley and Wawona. Approximately 11 miles of the river would have a 100-foot River Protection Overlay, including the El Portal Administrative Site. (For a graphic representation of the River Protection Overlay, see Vol. IC, Plates G-1, G-2, and G-3).

Management Zoning Prescriptions

This section defines the management zones used for the Merced River corridor. Management zoning is a technique used by the National Park Service to classify park areas and prescribe future desired resource conditions, visitor activities, and facilities. A management zone is defined in the National Park Service's Visitor Experience and Resource Protection (VERP) framework as:

> A geographical area for which management directions or prescriptions have been developed to determine what can and cannot occur in terms of resource management, visitor use, access, facilities or development, and park operations. Each zone has a unique combination of resource and social conditions, and a consistent management prescription. Different actions will be taken by the National Park Service in different zones with regard to the type and levels of use and facilities (NPS 1997i).

Management zoning is one of the elements in the *Merced River Plan* that helps protect and enhance Outstandingly Remarkable Values. Management zoning prescribes certain uses and facilities that are not allowed in an area. In the absence of zoning, additional development and higher-intensity uses could impact Outstandingly Remarkable Values over the long term. Management zoning also provides opportunities for restoration of Outstandingly Remarkable Values in areas where lower use and facility levels are prescribed. Management zoning protects the spectrum of recreational opportunities (an Outstandingly Remarkable Value) by allowing for visitor access and use of facilities in more resilient locations, and different intensities of use along the corridor.

Management zones are schematically represented on plates G-1, G-2, and G-3 in Vol. IC.

Zoning Categories

The management zones for the Merced River corridor fall into three general categories: (1) Wilderness zones, (2) Diverse Visitor Experience zones, and (3) Developed zones. For each of these three categories, there are individual management zones that provide for certain levels and types of visitor experiences, resource conditions, facilities, and uses. Existing uses or facilities that are not compatible with the management prescriptions of their zones could be removed, relocated, or modified over time. Management zones generally allow for the repair, maintenance, and reconstruction of established facilities (such as structures, utilities, roads, and bridges) unless specifically noted. All zones also allow for scientific research and monitoring activities,

particularly related to the analysis of visitor experience and resource protection of the river corridor.

Relationship to River Protection Overlay

The River Protection Overlay is applied over the zoning categories throughout the length of the river corridor. In all cases, where the management prescription and the River Protection Overlay are in conflict, the prescription that provides the greater protection and enhancement of the Outstandingly Remarkable Values takes precedence.

Application of Management Zoning

Each zone prescribes the *maximum* level of activities and facilities. In practice, lower levels of visitor use and facilities may be provided than are allowed for in the zoning prescriptions. Typical uses in lower-intensity zones are generally acceptable uses for higher-intensity zones. For example, areas zoned for overnight lodging may be used for less-developed activities such as walk-in camping or could include protected natural areas. These decisions would be based on site-specific conditions as assessed through routine management activities. The zones, delineated conceptually on plates G-1, G-2, and G-3 of Vol. IC, are also fairly broad to allow future managers to direct development within the zone. Within a given zone, there may be some areas used for higher-intensity facilities or activities, while other areas within the same zone are left natural and open.[4]

Uses or activities allowed in a management zone may be subject to limitations over time. If ongoing monitoring (as implemented through the VERP framework) indicates that impacts on the resource or visitor experience are no longer at an acceptable level, previously designated areas may be further restricted. Management zone prescriptions can also be temporarily superceded by contingencies, such as the need to respond to emergencies. For example, trails, roads, and facilities may be temporarily closed because of fire, rockfall, or flood.

CATEGORY 1: WILDERNESS ZONES

Approximately 34 miles of the main stem and 19 miles of the South Fork of the Merced Wild and Scenic River corridors flow through designated Wilderness and are managed under the guidance and requirements of the 1964 Wilderness Act and the California Wilderness Act of 1984. As such, these segments will continue to be managed to preserve an environment in which the natural world, along with the processes and events that shape it, are largely unchanged by human use, and to allow for various forms of exploration in an environment primarily free of modification. Access limits are imposed to control human-induced change, and management actions such as education, regulation, and restoration will occur as appropriate to protect natural and cultural resources and designated Outstandingly Remarkable Values. Visitor use and enjoyment is encouraged as long as such use does not result in levels of human impact that compromise wilderness and river values. Visitors would encounter a variety of opportunities for solitude, primitive and unconfined recreation, and

[4]The purpose of management zoning is to provide overall guidance for decision-making over the long term. Zoning does not attempt to predict or prescribe every conceivable use or facility decision. Small, isolated "spot" zones were not utilized to distinguish particular facilities or use areas.

physical challenge. The presence of park staff would be limited, focused on locations of heavy use such as camping areas.

The Wilderness zones would be managed to protect the natural hydrologic and ecologic processes of the Merced River and its immediate environment. Other than trails and designated overnight areas, the Wilderness zones would exhibit natural conditions, with high-quality riparian, meadow, and aquatic habitats. There would be high diversity of native plant and animal species and relatively minimal disturbance and human impact. The Merced River would remain free of impoundments, and natural processes, such as deposits of woody debris into the river, would occur without human interference. Water quality in the area would be very high.

There are four Wilderness zones:

- Zone 1A: Untrailed
- Zone 1B: Trailed Travel
- Zone 1C: Heavy Use Trail
- Zone 1D: Designated Overnight

WILDERNESS ZONE MANAGEMENT OBJECTIVES

The overall management objectives for the Wilderness zones are as follows[5]:

- Manage for protection of Outstandingly Remarkable Values, with an emphasis on protection and enhancement of natural resource Outstandingly Remarkable Values
- Manage for ecosystem integrity
- Preserve natural biodiversity
- Allow natural processes to prevail
- Mitigate, reduce, or eliminate human-caused impacts
- Manage for a high-quality wilderness visitor experience
- Protect all wilderness values (ecological, geological, scientific, educational, scenic, or historical in nature)
- Apply the “minimum requirement” guidance concept in all administrative operational functions in accordance with the Wilderness Act
- Manage for the preservation of cultural resources

Zone 1A. Untrailed

VISITOR EXPERIENCE AND RESOURCE PROTECTION

The Untrailed zone would be primarily free of signs of modern human presence, with extremely high opportunity for solitude due to the remoteness of the area and lack of trails. Management activities in this zone would be minimal, allowing resources and natural processes to exist in their most pristine state. The Untrailed zone would be managed with very low

[5]These objectives are consistent with the *Wilderness Management Plan* (1989).

tolerance for resource degradation from visitor use, and management action could be taken to change visitor use patterns if such degradation occurred.

Visitor experience would be primarily based on hiking through often difficult terrain. There would be no formal trails or directional markers in this zone. There would be few, if any, human encounters, and wilderness skills and knowledge could be necessary to safely navigate these areas. Natural and cultural resources could be observed, but there would be no formal interpretation or visitor accommodations. This area would provide substantial opportunities for scientific study of natural processes in undisturbed conditions.

The difficulty of access characterized by the Untrailed zone would serve to reduce visitor use, thereby protecting and enhancing biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values. Opportunities for solitude, primitive and unconfined recreation, and enjoyment of natural river sounds are among the recreational Outstandingly Remarkable Values prominent in this zone.

Activities – The following activities would be typical in this zone:

- Overnight camping 100 feet or more from a water body, by permit
- Hiking
- Rock climbing and mountaineering
- Swimming and wading
- Fishing[6]
- Photography and nature study

Facilities – The following facilities would be allowed in this zone:

- Limited numbers of legal and appropriately dispersed campsites

The following are examples of facilities that would not be allowed in this zone:

- Support facilities such as food storage, ranger stations, and compost toilets
- Utilities
- Bridges
- Formal trails
- Interpretive signs or programs
- Commercial overnight facilities

Zone 1B. Trailed Travel

VISITOR EXPERIENCE AND RESOURCE PROTECTION

The Trailed Travel zone would be characterized by light to moderate use focused on marked and maintained trails. Opportunities for solitude would range from moderate to high. There would be some management presence to accommodate resource protection and visitor use. The

[6]Fishing is allowed subject to California Department of Fish and Game regulations in all management zones.

Trailed Travel zone would be managed with very low tolerance for resource degradation from visitor use, and management action could be taken to change visitor use patterns if such degradation occurred.

Most visitors would experience this area by hiking, although a small percentage of visitors have traditionally used pack animals and could continue to do so. Visitor encounters would be infrequent, except in areas common for campsites and at key trail junctions. While there would be opportunities for challenge and adventure, the well-marked and maintained trails would allow visitors with a diversity of hiking abilities to experience the wilderness.

Through limitations on development and access, the Trailed Travel zone would protect and enhance biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values. Opportunities for solitude, primitive and unconfined recreation, and enjoyment of natural river sounds are among the recreational Outstandingly Remarkable Values prominent in this zone.

Activities – The following activities would be typical in this zone:

- Overnight camping 100 feet or more from a water body or trail, by permit
- Hiking
- Rock climbing and mountaineering
- Stock use as allowed in the *Wilderness Management Plan*
- Swimming and wading
- Fishing
- Photography and nature study
- Very limited interpretive programs (e.g., guided walks for small groups)

Facilities – The following facilities would be allowed in this zone:

- Marked and maintained trails (walls and water bars could be used to provide for protection of resources)
- Limited numbers of legal and appropriately dispersed campsites
- Historic features
- Occasional directional and regulatory signs, and safety signs only as necessary
- Footbridges only at trail crossings where necessary for resource protection and visitor access (in compliance with the *Wilderness Management Plan*)

The following are examples of facilities that would not be allowed in this zone:

- Large campsites with facilities
- Commercial overnight facilities
- Utilities

Zone 1C. Heavy Use Trail

VISITOR EXPERIENCE AND RESOURCE PROTECTION

The Heavy Use Trail zone would be characterized by high levels of use on marked and maintained trails and associated areas. Due to high use levels, opportunities for solitude at peak times would be more limited on trails in this area. In some locations, sections of paved or rocked trails and fencing could be used to direct visitor use away from sensitive ecosystems. The Heavy Use Trail zone would be managed with a low tolerance for resource degradation due to visitor use, and management action could be taken to redirect use if such degradation occurred.

Most visitors would experience this area by hiking, although a small percentage of visitors have traditionally used pack animals and could continue to do so. Encounters with other visitors could be frequent during certain periods of the day or at key trail junctions, vistas, and other high-use locations. The well-marked and maintained trails would allow for visitors with a diversity of hiking abilities to experience the wilderness.

Through limitations on development, the Heavy Use Trail zone would protect and enhance biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values. While opportunities for solitude would be lower than in the less-traveled Untrailed and Trailed Travel zones, this zone would provide ready access to wilderness hiking and backpacking near the Merced River.

Activities – The following activities would be typical in this zone:

- Hiking
- Rock climbing and mountaineering
- Stock use as allowed in the *Wilderness Management Plan*
- Photography and nature study
- Swimming and wading
- Fishing
- Very limited interpretive programs (e.g., guided walks for small groups)

Facilities – The following facilities would be allowed in this zone:

- Marked and maintained trails. (Some trails could have remnant paving, soil amendments, or hardened surfaces. Stairs, walls, fencing, and other trail features could be constructed for visitor use management and protection of sensitive areas.)
- Directional, regulatory, and safety signs
- Footbridges only at trail crossings where necessary for resource protection and visitor access (in compliance with the *Wilderness Management Plan*)

The following are examples of facilities that would not be allowed in this zone:

- Campsites
- Commercial overnight facilities

Zone 1D. Designated Overnight

VISITOR EXPERIENCE AND RESOURCE PROTECTION

The Designated Overnight zone would be characterized by the heaviest overnight use of all areas of the Wilderness zones. Designated overnight areas would be centered at destination locations with facilities for resource protection and visitor use, specifically at the Little Yosemite Valley Campground, Moraine Dome Campground, Merced Lake Campground, and the Merced Lake High Sierra Camp (a potential Wilderness addition). Opportunities for solitude would range from low to moderate depending on the season. Social interaction would be common. The presence of National Park Service staff would be moderate to high in order to prevent or mitigate most adverse impacts. The Designated Overnight zone would be managed with a low tolerance for resource degradation due to visitor use. Facilities such as signs and fencing could be used to prevent unacceptable impacts. Campsites would be located away from any sensitive natural or cultural areas, including meadows, streams, lakes, and historic and archeological sites, to minimize impacts.

Most visitors would experience this area by hiking and/or staying overnight. Small percentages use pack animals and could continue to do so. Visitor encounters with others would be frequent during much of the hiking seasons. The well-marked trails and facilities would allow for a diversity of users to experience the wilderness.

The Designated Overnight zone concentrates visitor facilities in a localized area, allowing for higher protection and enhancement of biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values outside this zone. This zone also ensures that historic structures such as the High Sierra Camp could remain for continued use or for interpretive purposes. Signs, fencing, and other features could be used to direct visitors away from sensitive biological and cultural Outstandingly Remarkable Values, as necessary.

Activities – The following activities would be typical in this zone:

- Overnight camping only within a campground setting, by permit
- Hiking
- Wilderness skiing
- Photography and nature study
- Very limited interpretive programs (e.g., occasional ranger talks, guided walks)
- Stock use as allowed in the *Wilderness Management Plan*
- Use of High Sierra Camps as allowed in the *Wilderness Management Plan*

Facilities – The following facilities would be allowed in this zone:

- High Sierra Camps as allowed in the *Wilderness Management Plan*
- Designated campsites of moderate size
- Food storage and campfires, subject to regulation
- Compost toilets and toilet enclosures (as necessary to protect resources)

- Structures such as the Little Yosemite Valley Campground and Ranger Station, Merced Lake Campground, and Merced Lake High Sierra Camp (to concentrate use and reduce or mitigate ecosystem degradation, or for interpretation as a cultural resource)[7]
- Marked and maintained trails. (Some trails could have remnant paving, soil amendments, or hardened surfaces. Stairs, walls, fencing, and other trail features could be constructed for visitor use management and protection of sensitive areas.)
- Directional, safety, informational, and regulatory signs, and minimal interpretive signs when required for protection of resources
- Utilities associated with above facilities

The following are examples of facilities that would **not** be allowed in this zone:

- New commercial overnight facilities
- Campsites outside of designated areas

Category 2: Diverse Visitor Experience Zones

The Merced River corridor serves as an important recreational resource, providing opportunities for nature study, hiking, picnicking, swimming, fishing, and other activities for many of the 4 million people who visit Yosemite National Park each year. The Merced River corridor also serves as a continuous visual element of the landscape, setting off significant features such as waterfalls, granite domes, and peaks.

Natural resource management in these zones would strive to protect and enhance the natural functioning of ecological and hydrological systems while accommodating moderate levels of visitor use. The Category 2 zones are designed to protect and enhance biological, hydrologic, geologic, scenic, cultural, and scientific Outstandingly Remarkable Values, as well as the recreational Outstandingly Remarkable Values. This would be achieved by maintaining, wherever possible, the integrity of an overall ecological unit (such as a meadow, woodland, or wetland), while allowing for some human alteration of the landscape. Riparian, aquatic, and meadow communities in the river corridor play a particularly critical role in a variety of ecosystem processes and are also contributing cultural landscape resources. Restoration of the ecological and hydrological systems in these areas would focus on enhancing the diversity and stability of natural functions. Resource degradation would be minimized by the careful design and siting of facilities that direct visitor and administrative activities to locations able to withstand heavy use. Monitoring of visitor impacts on natural and cultural resources would help ensure adaptive and timely management responses to potential resource degradation.

The Diverse Visitor Experience zones would be managed to protect and enhance the hydrologic and ecologic processes of the Merced River and its immediate environment. Riparian areas and meadows should remain largely intact, supporting a diversity of native vegetation and wildlife species. However, localized areas could be developed with trails, roads,

[7]As provided for in the California Wilderness Act of 1984, if overnight use of the Merced Lake High Sierra Camp were restricted through a future, more detailed level of planning (e.g., update to the *Wilderness Management Plan*), the designation would change from potential Wilderness addition to "designated Wilderness."

and parking areas and a greater amount of resource protection features (e.g., fencing and boardwalks) to allow for visitor access. Higher levels of resource impacts (e.g., trampling and soil erosion) and a greater amount of resource protection features might be expected in limited areas within the Day Use and Attraction zones to accommodate high numbers of visitors. The free flow of the river would remain primarily unimpeded. Water quality in the area should be of high quality.

Four management zones are defined for the Diverse Visitor Experience zone category:

- Zone 2A: Open Space (and Undeveloped Open Space)
- Zone 2B: Discovery
- Zone 2C: Day Use
- Zone 2D: Attraction

Objectives

The overall management objectives for the Diverse Visitor Experience zones are:

- Manage for protection, enhancement, and restoration of Outstandingly Remarkable Values, sensitive resources, and natural processes
- Provide opportunities for varied levels of recreational use
- Provide quality interpretive and educational programs
- Direct visitors to locations able to withstand heavy use
- Manage major attraction areas to allow visitors to enjoy the resource with minimal environmental damage
- Manage for the protection and maintenance of cultural resources, including historical and archeological sites

2A. Open Space

Visitor Experience and Resource Protection

The Open Space zone would be characterized by relatively undisturbed natural areas that receive only incidental or casual use. Maintenance of these conditions would allow for the protection and enhancement of the biological, hydrologic, scenic, cultural, and scientific Outstandingly Remarkable Values while providing access to diverse visitor activities.

The visitor experience in this zone would be self-directed, with few visitor or management encounters, which would contribute to the diversity of experiences in the recreation Outstandingly Remarkable Value. The Open Space zone would be managed with very low tolerance for resource degradation from visitor use to protect and enhance biological, hydrologic, scenic, cultural, and scientific Outstandingly Remarkable Values. Visitation levels may be controlled by parking limitations and by the lack of shuttle bus stops. These limits on use and facilities would allow natural areas to remain relatively unimpaired and to receive continued protection, restoration, and enhancement.

There would be limited trails and interpretive facilities. These would direct visitors away from hazardous areas and sensitive Outstandingly Remarkable Values, such as unique wetlands, and promote understanding of natural processes. These areas would be generally quiet with limited facilities. The areas could be relatively easy to access or could require considerable walking and skill to access. Though not directly accessible by vehicles or from parking areas, noise from nearby vehicles could affect visitor experiences in this zone.

Resource protection activities in this zone would include preservation of cultural resources and restoration of natural processes impacted by contemporary development, restoration of natural flood cycles and river channel dynamics to sustain native plant and wildlife species, and use of fire management practices called for in the *Fire Management Plan* to enhance biological and hydrologic Outstandingly Remarkable Values. This zone also encourages the protection and enhancement of cultural resource Outstandingly Remarkable Values, including archeological sites, by limiting development and access. Restoration of natural resources such as wetlands and meadows would also contribute to the restoration of the cultural landscape.

Activities – The following activities would be typical in this zone:

- Hiking and walking
- Photography and nature study
- Stock use in specified locations
- Swimming and wading
- Fishing
- Rock climbing
- Very limited interpretive programs (e.g., guided walks for small groups)

Facilities – The following facilities would be allowed in this zone:

- Realigned or relocated vehicular roads that do not adversely affect Outstandingly Remarkable Values
- Limited turnouts for short-term parking and scenic viewing or shuttle bus stops
- Limited unpaved trails for hiking
- Limited interpretive signs to protect natural or cultural resources or to promote understanding of natural processes
- Boardwalks, fencing, and other features to direct travel appropriately to avoid sensitive resources, such as meadows
- Bridges where necessary for access, improved circulation, safety, and resource protection
- Utilities (wells, utility lines, pump stations, and other facilities where they are screened from view)
- Minimal utility crossings of the river, only where necessary to support park operations

The following are examples of facilities that would **not** be allowed in this zone:

- New roads or paved trails

- Day-visitor parking
- Support facilities, such as restrooms and picnic tables
- Interpretive centers
- Food services
- Bicycle paths
- Nonmotorized watercraft launch/removal facilities
- Campgrounds and lodging

2A+. Undeveloped Open Space

The Undeveloped Open Space zone would be managed as *de facto* wilderness, primarily free from signs of human presence due to its inaccessibility. This zone would be used to protect those areas outside designated Wilderness that have limited or no trail access, such as the area west of the Wawona Campground along the South Fork. While Undeveloped Open Space areas would remain in pristine condition, visitors could experience some human influence due to noise from nearby roads. Typical activities would be hiking, rock climbing, swimming, nature study, and fishing. Access would require considerable effort because there are no trails.

This zone would be managed in a similar manner as the Untrailed zone (1A), protecting and enhancing biological, geologic, hydrologic, cultural, scenic, and scientific Outstandingly Remarkable Values through limitations on development and access. The following facilities normally allowed in the Open Space zone (2A) would **not** be allowed in this zone. Other prescriptions from the Open Space zone would apply.

- Roads, either existing or new
- Turnouts
- Interpretive or directional signs
- Trails, boardwalks, or fencing
- Bridges
- Utilities

2B. Discovery

Visitor Experience and Resource Protection

The Discovery zone would be characterized by relatively quiet natural areas where visitor encounters are low to moderate, which would contribute to the diversity of experiences in the recreation Outstandingly Remarkable Value. However, during high-use periods, some concentrated use and more frequent visitor encounters could occur on trails that link destination points through the Discovery zone. The Discovery zone would be managed with low tolerance for resource degradation from visitor use, emphasizing the protection and enhancement of biological, hydrologic, scenic, cultural, and scientific Outstandingly Remarkable Values as well as emphasizing low-intensity types of use in recreation Outstandingly Remarkable Values. Limits on use and facilities would allow natural areas to

remain relatively unimpaired, when they are not close to one of the few access roads. There would likely be trail access and interpretive signs at principal features and gathering areas, but the visitor experience would be largely self-directed. Areas in the Discovery zone could be used by individuals or smaller organized groups. Access to these areas could require a moderate level of physical exertion, although some locations would be served by an access road and parking turnouts.

Within the Discovery zone, visitors would be likely to experience a variety of resources, including distant and close-range scenic views as well as opportunities to wade, swim, or fish in the river and to observe wildlife and plants. If use levels impacted resources, resource protection measures could be used, such as fencing and signs to direct travel from sensitive resources, well-marked trails and boardwalks, recycling and trash containers, relocation of shuttle bus stops in this or adjacent zones, or other measures as needed.

Resource protection activities in this zone would include restoration of natural processes impacted by past or current human use, restoration of natural flood cycles and river channel dynamics to sustain native plant and wildlife species, and use of fire management practices called for in the *Fire Management Plan* to enhance biological and hydrologic Outstandingly Remarkable Values. This zone also encourages the protection and enhancement of cultural resource Outstandingly Remarkable Values, including archeological sites, by limiting development and access. Restoration of natural resources such as wetlands and meadows would also contribute to the restoration of the cultural landscape.

Activities – The following activities would be typical in this zone:

- Hiking and walking
- Bicycling
- Photography and nature study
- Stock use in specified locations
- Swimming and wading
- Fishing
- Rock climbing
- Picnicking, relaxing, and gathering at informal locations
- Limited interpretive opportunities (e.g., informal ranger contacts, guided walks for small groups)

Facilities – The following facilities would be allowed in this zone:

- Vehicular roads and improved trails (could be realigned or relocated where they do not adversely affect Outstandingly Remarkable Values)
- Small turnouts for trail access parking, scenic viewing, or shuttle stops
- Trails for hiking and through-trails for bicycling
- Minimal restroom facilities as needed to protect resources

- Fences, boardwalks, platforms, and other features to direct travel around sensitive resources
- Interpretive, directional, and safety signs
- Bridges where necessary for access, improved circulation, safety, and/or resource protection
- Utilities such as well sites, utility lines, pump stations, and other facilities (where screened from view)
- Minimal utility crossings of the river, only where necessary to support park operations

The following are examples of facilities that would **not** be allowed in this zone:

- Day-visitor parking
- Picnic facilities
- Nonmotorized watercraft launch and removal facilities
- Interpretive centers
- Food services
- Campgrounds and lodging

2C. Day Use

Visitor Experience and Resource Protection

The Day Use zone is intended to be applied to popular park destinations, where visitors could spend significant periods of time enjoying the park resources in a relatively accessible setting. The Day Use zone enhances opportunities for visitors to enjoy more intensive recreational activities near the Merced River and could support a range of active recreational opportunities such as swimming, picnicking, and rafting, which would contribute to the diversity of experiences in the recreation Outstandingly Remarkable Value. Visitors would expect moderate to high numbers of encounters with other park users and crowding on certain peak days. Large groups could use these areas. Day Use areas could be accessible by automobile, shuttle bus, and by bicycle, with interpretive trails or other marked trails leading to waterfalls, beaches, and scenic views. In order to accommodate heavier and more concentrated activity, facilities such as parking areas, restrooms, fencing of sensitive areas, picnic tables, and recycling and trash receptacles would be allowed.

Resource protection activities in this zone would be comparable to those described in zones 2A and 2B. However, due to the larger volume of visitors, the Day Use zone would be managed with moderate tolerance for resource degradation from visitor use in specified areas. To protect and enhance cultural, biological, and hydrologic Outstandingly Remarkable Values, more extensive resource protection measures could be needed to direct visitor use away from sensitive resources. Examples could include boardwalks adjacent to meadows or fencing to prevent trampling and overuse. By encouraging higher levels of visitor use in the Day Use zone, adjacent Open Space and Discovery zones would experience the desired lower levels of visitor

use for these areas. Some Day Use areas also protect historic resources, such as continued use of the Wawona Golf Course.

Activities – The following activities would be typical in this zone:

- Hiking and walking
- Photography and nature study
- Picnicking and social gathering
- Bicycling
- Stock use in specified locations
- Swimming and wading
- Rock climbing
- Fishing
- Use of non-motorized watercraft
- Full range of interpretive programs (e.g., ranger-led walks, talks)

Facilities – The following facilities would be allowed in this zone:

- Roads and improved trails (could be realigned or relocated where they do not adversely impact Outstandingly Remarkable Values)
- Day-visitor parking
- Turnouts for parking or scenic lookouts
- Bicycle trails
- Shuttle bus stops
- Support facilities (e.g., restrooms, picnic tables, telephones)
- Marked, maintained, and paved trails, including bicycle paths and interpretive trails
- Fences, boardwalks, walls, signs, and other features to direct travel appropriately around sensitive resources
- Nonmotorized watercraft launch and removal facilities
- Interpretive, directional, and safety signs and exhibits
- Utilities such as well sites, utility lines, pump stations and other facilities (where screened from view)
- Utility crossings of the river (where necessary to support park operations)
- Bridges where necessary for access, improved circulation, safety, and/or resource protection

The following are examples of facilities that would **not** be allowed in this zone:

- Interpretive centers
- Food services
- Campgrounds and lodging

2D. Attraction

Visitor Experience and Resource Protection

The Attraction zone would be applied to main park features that attract large numbers of visitors, such as viewing areas for Bridalveil Fall. Due to the large number of visitors, this zone would be managed with moderate tolerance for resource degradation in specified areas, not to exceed established standards. The visitor experience in this zone would be highly structured, with well-marked and often paved trails or other trails to guide visitors, which would contribute to the diversity of experiences in the recreation Outstandingly Remarkable Value. Visitors could expect a high level of encounters with other visitors in these moderately to very busy areas. Attraction areas could be accessible by automobile, shuttle bus, bicycle, and/or trail.

To accommodate high levels of visitor use, substantial facilities such as restrooms, parking lots, bus access and parking, and picnic tables could be provided at the entry point of the attraction area or another appropriate site. Facilities would be concentrated within the attraction area to minimize the extent of development and impacts. As a result, many areas within an Attraction zone would have a well-used trail, but minimal developed uses away from the entry "hub" or access point. Trails could be paved, fenced, and well signed to reduce potential resource impacts. Visitor use in sensitive areas would be formalized and concentrated to avoid resource damage.

By encouraging higher levels of visitor use in the Attraction zone, adjacent Open Space and Discovery zones would experience the desired lower levels of visitor use for these areas. This zone also would ensure that visitors have the opportunity to enjoy the park's most popular features, some of which are designated scenic, recreational, or cultural Outstandingly Remarkable Values (e.g., views of granite domes, Wawona Covered Bridge).

Activities and Uses – The following uses would be typical in this zone:

- Hiking and walking
- Photography and nature study
- Sightseeing
- Stock use in specified locations
- Swimming and wading
- Fishing
- Rock climbing
- Bicycling (only in specified locations, to ensure visitor safety and resource protection)
- Full range of interpretive programs (e.g., ranger-led walks, talks)

Facilities – The following facilities would be allowed in this zone:

- Roads (could be realigned or relocated where they do not adversely impact Outstandingly Remarkable Values)
- Day-visitor parking (to accommodate visitor access and administrative needs at high use areas)

- Bicycle trails
- Shuttle bus stops
- Support facilities such as restrooms, picnic tables, telephones, stables, and limited food services (where appropriate)
- Marked maintained and paved trails, including bike paths, and interpretive trails. (Trails could be hardened to direct visitors and minimize resource damage. Fences, boardwalks, walls, signage, and other features could be used to direct travel.)
- Interpretive centers
- Interpretive signs, exhibits, displays, and kiosks
- Utilities such as wells, utility lines, pump stations and other facilities (where screened from view)
- Bridges where necessary for access, improved circulation, safety, and/or resource protection
- Limited utility crossings of the river (where necessary to support park operations)

The following are examples of facilities that would **not** be allowed in this zone:

- Nonmotorized watercraft launch and removal facilities
- Campgrounds and lodging

Category 3: Developed Zones

Carefully designed and located facilities are needed to meet the diverse needs of the many people who visit Yosemite National Park each year. The use of limited Developed zones provides sites for the facilities that enable the park to support its year-round visitor and employee populations and serve the needs of visitors. These include lodging, utilities, housing, and transportation facilities. Most of the developed zones are located in areas that are currently, or that were previously, altered by development.

The purpose of the Developed zones is to direct high-impact activities and facilities to areas better able to withstand heavy use and/or already developed locations in order to further protect and enhance the hydrologic, biological, geologic, cultural, scenic, scientific, and recreation Outstandingly Remarkable Values in other parts of the corridor. The facilities allowed for in the Developed zones, such as campsites, lodging, day-visitor parking, and operational facilities, are necessary to properly manage park visitors, many of whom are coming to experience the scenic, recreational, and other Outstandingly Remarkable Values of the Merced Wild and Scenic River.

While these zones could absorb the most concentrated visitor and administrative use, resource impacts would be minimized through design and siting of facilities, and the application of mitigation and restoration measures. These measures could include temporary or permanent fencing to reduce or exclude use in sensitive resources, revegetation with native species, and/or the prevention of the establishment of non-native species. Visitor use would be managed to reduce the potential impacts of concentrated use.

There are three Developed zones:

- Zone 3A: Camping
- Zone 3B: Visitor Base and Lodging
- Zone 3C: Park Operations and Administration (includes day-visitor parking)

Developed Zone Management Objectives

The overall management objectives for the Developed zones include:

- Manage for protection and enhancement of Outstandingly Remarkable Values
- Concentrate support facilities to reduce development pressure on the remainder of the river corridor
- Provide overnight accommodations, support services, and amenities for visitors
- Provide quality interpretive and educational programs
- Provide support facilities for park operations
- Provide transportation facilities designed for sustainability
- Manage for the protection of cultural resources and cultural Outstandingly Remarkable Values
- Implement natural resource mitigation and restoration to the greatest extent feasible

3A. Camping

Visitor Experience and Resource Protection

The Camping zone would provide visitors with opportunities for both vehicle-access camping and walk-in camping. Vehicle-access camping areas would include campsites with adjacent parking, providing convenient access to various facilities. Support facilities such as picnic tables and restrooms would be provided at camping areas. The Camping zone primarily supports the recreational Outstandingly Remarkable Values by ensuring access to diverse recreational activities near the Merced River. Most areas designated as Camping zones have been previously developed, including historic resources such as Camp 4 (Sunnyside Campground), which would be preserved under this zone. By concentrating relatively high-impact development to localized areas, this zone helps to protect and enhance natural and cultural resource Outstandingly Remarkable Values in the zone as a whole and in other parts of the river corridor.

Walk-in camping would provide an opportunity for visitors to camp away from vehicles, but retain access to facilities such as restrooms, water, and picnic tables. Campsites would be accessed by relatively short and well-marked trails with directional and informational signs. In walk-in camping areas, visitors would have the opportunity to engage more directly with the natural environment of the Merced River corridor without the visual impacts of entry roads, parking lots, vehicles, or other major facilities.

While the Camping zone would allow for both vehicle-access and walk-in camping, the less-intensive walk-in camping would be directed to more sensitive areas (e.g., North Pines), while

vehicle-access camping would be directed to areas better able to withstand heavy use (e.g., Upper Pines). In both vehicle-access and walk-in camping areas, visitor encounters would be moderate to high in the relatively dense clusters of campsites. The Camping zone would be managed with moderate to high tolerance for resource impacts in localized areas. While a certain level of hardening for parking sites and trampling by campers is expected, use would be directed away from sensitive areas. River access would be provided via marked and potentially hardened trails to direct visitors to areas better able to withstand heavy use, such as annually (or regularly) flooded deposition bars.

Activities – The following activities would be typical in this zone:

- Overnight camping within designated campsites
- Hiking and walking
- Swimming and wading
- Fishing
- Sightseeing and photography
- Picnicking
- Bicycling (only in specified locations, to ensure visitor safety)

Facilities – The following facilities would be allowed in this zone:

- Designated campsites (could be equipped with fire rings, picnic tables, nearby restroom facilities, and Recreational Vehicle hookups)
- Roads and parking areas
- Shuttle bus stops
- Marked, maintained, and paved trails (fences, boardwalks, walls, footbridges, signs, and other features could be used to protect resources)
- Maintenance and administrative facilities needed to support campgrounds
- Directional, safety, informational, regulatory, or interpretive signs
- Bridges where necessary for access, improved circulation, safety, and/or resource protection
- Utilities such as wells, utility lines, pump stations, and other facilities (where screened from view)
- Interpretive facilities such as an amphitheaters

The following are examples of facilities that would **not** be allowed in this zone:

- Lodging, food services, stores
- Administrative offices not associated with camping
- Maintenance facilities not associated with camping

3B. Visitor Base and Lodging

VISITOR EXPERIENCE AND RESOURCE PROTECTION

The Visitor Base and Lodging zone includes areas developed for visitor overnight use as well as support facilities and services such as orientation facilities, eating establishments, gift shops, and equipment rental. Most areas designated as Visitor Base and Lodging zones have been previously developed, including historic resources such as The Ahwahnee, Wawona Hotel, and LeConte Memorial Lodge, which would be preserved under this zone. The visitor could expect a bustling atmosphere in these areas, with high incidence of visitor encounters during peak-use times. Facilities and lodging areas would be easily accessible by shuttle bus, automobile, trail, and bicycle.

With its relatively intense level of development, a higher degree of resource impacts may be tolerated in localized areas within the Visitor Base and Lodging zone. Future projects in this zone would be designed to minimize the footprint of developed areas and to protect and restore adjacent natural and cultural resources. River access would be provided via marked and potentially hardened trails to direct visitors to areas most able to withstand heavy use, such as annually (or regularly) flooded deposition bars. Structures such as fences, boardwalks, or walls could be provided to reduce impacts on riparian areas from casual river access generated by nearby lodging facilities.

The Visitor Base and Lodging zone primarily supports the recreational Outstandingly Remarkable Values by providing for visitor uses, facilitated by development such as visitor centers, museums, and lodging, which enable visitors to access the park and learn about its natural and cultural resources. Additionally, by concentrating relatively high-impact development to localized areas, this zone would help to protect and enhance natural and cultural resource Outstandingly Remarkable Values in the zone as a whole and in other parts of the river corridor.

Activities – The following activities would be typical in this zone:

- Lodging
- Hiking and walking
- Swimming and wading
- Fishing
- Sightseeing and photography
- Bicycling (only in specified locations, to ensure resource protection and visitor safety)
- Shopping
- Dining
- Full range of formal interpretation (e.g., slide shows, visitor center, walks)
- Marked, maintained, and paved trails

Facilities – The following facilities would be allowed in this zone:

- Bicycle trails

- Visitor overnight accommodations (lodges, motel-type units, cabins, tent cabins)
- Fences, boardwalks, walls, signs, and other features to direct use and protect resources
- Visitor services (e.g., visitor center, museums, eating establishments, gift shops, equipment rental)
- Roads and parking areas
- Bus turnouts, stops, and parking
- Bridges where necessary for access, improved circulation, safety, and/or resource protection
- Utilities such as wells, pump stations, utility lines, and other facilities (screened from view)
- Interpretive facilities, such as amphitheaters
- Supporting operational facilities, such as employee housing, only where it is ancillary to the primary use (i.e., a small percentage of the total available area)

The following are examples of facilities that would **not** be allowed in this zone:

- Administrative offices not associated with visitor base or lodging operations
- Maintenance facilities and major utilities not associated with visitor base or lodging operations
- Day-visitor parking/transit center

3C. Park Operations and Administration

Visitor Experience and Resource Protection

The limited use of the Park Operations and Administration zone would provide locations for facilities that support the efficient functioning of the park. Many areas designated as 3C have been previously developed, including historic resources such as the Chapel in Yosemite Valley, which would be preserved under this zone. The 3C zone would also provide opportunities for the management of private vehicles and public transit in the park, as well as interpretive centers that help visitors learn about the park's natural and cultural resources. Visitor use and experience of these zones would be limited. These areas would likely be relatively busy, with heavy impacts from vehicles, and would be managed with a high tolerance for resource impacts in localized areas. New facilities would use sustainable design and construction principles to protect adjacent natural and cultural resources, and would be subject to the criteria and considerations (see the beginning of this chapter).

The Park Operations and Administration zone would primarily support access to the recreational Outstandingly Remarkable Values of the Merced River by providing space for necessary park operations purposes as well as for day-visitor parking. Additionally, by concentrating relatively high-impact development in localized areas, this zone would help to protect and enhance natural and cultural resources in the zone as a whole and in other parts of the river corridor.

Activities – The following activities would be typical of this zone:

- Administrative activities by park staff
- Maintenance and repair activities by park operations staff
- Transportation/transit-related activities
- Visitor orientation and interpretation near parking/transit areas
- Picnicking near parking/transit areas
- Bicycling (only in specified locations, to ensure visitor safety)
- Marked, maintained, and paved trails, including bicycle paths and interpretive trails

Facilities – The following facilities would be allowed in this zone:

- Day-visitor parking/transit center
- Roads, paved and unpaved (in strictly administrative areas, roads could be dirt or paved and closed to nonadministrative traffic)
- Support facilities (including park administrative offices, employee housing, storage, construction staging areas, and utilities such as wastewater treatment plants, sprayfields for reclaimed water, domestic water supply, power plants, and other facilities)
- Interpretive facilities
- Visitor support facilities such as restrooms, picnic tables, telephones, food services, bicycle rental, small gift shops, showers, and lockers for visitors and employees
- Park information and orientation signs, exhibits, and kiosks
- Bridges where necessary for access, improved circulation, safety, and/or resource protection

The following are examples of facilities that would **not** be allowed in this zone:

- Campgrounds and lodging for visitors

Visitor Experience and Resource Protection

Purpose

The Visitor Experience and Resource Protection (VERP) framework is a tool developed by the National Park Service to address user capacities and is adopted by the *Merced River Plan* to meet the requirements of the Wild and Scenic Rivers Act. The VERP framework protects both park resources and visitor experience from impacts associated with visitor use, and helps managers address visitor use issues. The nine elements of the VERP framework are an ongoing, interactive process of determining desired conditions,[8] selecting and monitoring indicators and standards that reflect these desired conditions, and taking management action when the desired conditions are not being realized. VERP is a decision making *framework*, but does not diminish management's role in decision making; in fact, management would have to make crucial decisions in determining desired conditions, choosing appropriate management

[8]"Desired conditions" encompasses desired cultural resource conditions, desired natural resource conditions, and desired visitor experiences.

action, and assessing occasional overlap between protecting park resources and providing for visitor experiences. For the purposes of this plan, the VERP framework would be used as a form of adaptive management.[9] Where uncertainty exists about impacts associated with visitor use, knowledge and understanding of visitor use issues would improve and evolve over time, and management actions would adapt accordingly. Continual hypothesis testing, data collection, and data analysis would likely result in refinement of desired conditions and, accordingly, refinement of indicators and standards. The implementation of the VERP framework for the Merced Wild and Scenic River corridor would focus on protecting the Outstandingly Remarkable Values and would dovetail with future implementation of the VERP framework outside the river corridor.

Overview of the VERP Framework

The VERP framework consists of nine elements, four of which are key: (1) determination of desired conditions, which are part of the management zone prescriptions; (2) selection of indicators and standards that reflect the desired conditions; (3) monitoring of the indicators and standards; and (4) implementation of management action when the desired conditions are violated or when conditions are deteriorating and preventive measures are available. Together, these elements would help park managers make decisions about visitor use and resource protection.

Desired Conditions and Management Zones

The VERP framework relies on the concept of desired conditions, which are contained in the management zone prescriptions and identify how different areas in the river corridor would be managed. Each management zone prescribes a set of desired resource conditions, desired visitor experiences, and types and levels of uses. The *Merced River Plan* management zoning is designed to protect and enhance the Outstandingly Remarkable Values and free-flowing condition of the Merced River. Desired conditions would focus on the Outstandingly Remarkable Values and guide the protection and enhancement of those Outstandingly Remarkable Values, and could be refined over time as knowledge and understanding of conditions and issues improve.

Indicators and Standards

A major premise of VERP is that desired conditions, which are qualitative in nature, can be translated into measurable indicators and standards. Indicators and standards reflect desired conditions and enable park management to determine whether or not desired conditions are being realized. “Indicators” which are measurable variables, are determined first; “standards” are the acceptable measurements (i.e., values) for that indicator. Specific indicators and standards would be developed for desired conditions for each combination of management zone and ecological type. Resource indicators measure impacts from visitor use to the cultural, biological, and/or physical resources. Social indicators measure impacts to the visitor experience

[9]Adaptive management is a process that allows the development of a plan when some degree of biological and socioeconomic uncertainty exists. It requires a continual learning process, a reiterative evaluation of goals and approaches, and redirection based on an increased information base and changing public expectations (Baskerville 1985).

caused by interactions with other visitors. Indicators should be specific, objective, reliable, related, responsive, nondestructive, sensitive to visitor use, and should address Outstandingly Remarkable Values. Standards should be quantitative, measurable, and feasible.

MONITORING

Detailed monitoring protocols would be developed for each standard to ensure accurate, valid data. Monitoring would begin as soon as a standard is selected and a monitoring protocol is developed.

MANAGEMENT ACTIONS

If monitoring revealed that a standard associated with a indicator were being violated, then desired conditions would not be realized and management action would be initiated. Management action could determine that the violation of the standard was caused by natural variation and that the standard needed to be adjusted or a new indicator and standard selected to better reflect desired conditions. Actions to manage or limit visitor use would be implemented when the standard was violated due to impacts associated with visitor use.

VERP PHASING PLAN

Yosemite National Park began development of the parkwide VERP framework in 1998 and continues to develop desired conditions, indicators, standards, and monitoring protocols. The VERP framework outlined herein for the Merced River corridor will be developed and implemented within five years after the final Record of Decision on the *Merced River Plan* and would dovetail with the larger, parkwide VERP program.

WHAT VERP IS NOT

It is worth noting what VERP will not do.

- VERP does not specify the total number of visitors that the river corridor, as a whole, can accommodate at one time. Such an aggregate figure would mask problems at “hot spots” and would not provide managers with useful guidance for addressing use-related problems.
- As a framework for addressing user capacity, VERP is not driven by the capacity of existing infrastructure. Expanding or constructing facilities does not necessarily mitigate visitor use impacts to visitor experience or resources.
- VERP, as applied in the Merced Wild and Scenic River corridor, may not directly transfer to other areas of Yosemite National Park. It may be implemented elsewhere in the park at some future date; desired conditions, indicators, and standards are being developed with this possible expansion in mind. However, due to an emphasis on Outstandingly Remarkable Values and other factors, it is possible that future implementation of VERP outside of the Merced Wild and Scenic River corridor will not dovetail perfectly.
- VERP does not address impacts that do not result directly from visitor use. Impacts from park operations and management activities (e.g., fire management), natural variability

(e.g., high water), development (e.g., construction, demolition), and other causes not directly associated with visitor activities are managed through other methods.

- VERP is not static. Visitor use patterns, desired visitor experiences, and resource conditions change with time. VERP is an iterative process of monitoring, evaluation, and adjustment.

appendix C

Yosemite Valley Geologic Hazard Guidelines

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX C – YOSEMITE VALLEY GEOLOGIC HAZARD GUIDELINES

Background

Rockfalls and other associated forms of mass movement, such as rockslides, debris flows, and rock avalanches, are natural processes that continue to shape Yosemite Valley. During historical time (1850-present), more than 400 rockfalls or other forms of mass movement have been documented. Several people have been killed by such geologic hazards and many others injured. Many trails, roads, and buildings have also been destroyed or seriously damaged by such processes.

For land-use planning in Yosemite Valley, the U.S. Geological Survey and the National Park Service have cooperated to document potential geologic hazards, primarily rockfalls, debris flows, and rock avalanches (hereafter referred to as rockfall) in the Valley. The documentation consisted of a review of archival records, aerial photographic interpretation, and field mapping (USGS 1992). Most recently the National Park Service requested the U.S. Geological Survey to conduct additional field work and to assess the previous information in order to produce a report on the rockfall potential within the Valley (USGS 1998). In the report, there were two areas of potential rockfall identified. The first area lying closest to the Valley walls was identified as the Talus Slope Zone, where the majority of materials are deposited during a mass movement event. The second area identified was the Rock Fall Shadow Line Zone which extends out from the Talus Slope zone and is the area in which individual rocks may travel out from the Talus. These zones indicate the closer one approaches the Valley walls, the greater the potential for damage by a mass movement event.

The frequency and magnitude of rockfall within the Valley can and does vary considerably. Singular events involving stones or rocks less than one cubic meter occur on a fairly regular basis depending upon weather conditions, freeze/thaw conditions, moisture conditions, and rock composition/condition. Events of greater magnitude up to 100,000 cubic meters may occur on an interval of over ten years (USGS 1998). The location of these movements can also be fairly random within the Valley.

It is not possible to avoid all rockfall related risks in a narrow valley like Yosemite Valley. This means that some facilities located in the Valley will be exposed to risk of damage by rockfall. The National Park Service is currently revising its *Management Policies* pertaining to geologic resources and hazards. Excerpts from the most recent *Draft Management Policies*, January, 2000 state that:

- The National Park Service will work to protect park visitors, staff, and infrastructure from geologic hazards.
- The National Park Service will allow natural geologic processes to proceed unimpeded. Geologic processes will be addressed during planning and other management activities in an effort to reduce hazards that can threaten the safety of park visitors and staff and the long-term viability of park infrastructure.

- Park managers will work closely with specialists at the U.S. Geological Survey and elsewhere, and with local, state, and federal disaster management officials, to devise effective geologic hazard identification and management strategies. Although the magnitude and timing of future geologic hazards are difficult to forecast, park management will strive to understand future hazards and, once understood, minimize their potential impact on visitors, staff, and developed areas. The National Park Service will work to avoid placing new facilities in geologically hazardous areas. Managers will examine the feasibility of phasing out, relocating, or providing alternative facilities for park developments subject to hazardous processes.
- The National Park Service will strive to avoid locating new facilities in areas where they may be damaged or destroyed by natural geologic and hydrologic processes, unless no practicable alternative exists and safety and hazard probability factors have been considered.

Using this management guidance, the following guidelines were developed for new and existing structures within Yosemite Valley.

Guidelines

The 1916 Organic Act requires the National Park Service to provide for public enjoyment of the parks while conserving the scenery, natural and historic objects, and wildlife of parks in a manner that will leave them unimpaired for the enjoyment of future generations. Balancing these policies requires National Park Service managers to exercise judgment and discretion, particularly when making decisions about visitor safety and protection. Therefore, Yosemite National Park's decisions about locating and relocating facilities are an exercise of discretion. Each decision will be based on the park's balancing of the policy of promoting public enjoyment including minimizing safety hazards, with other policies such as: minimizing human intrusion on natural and historic resources and wildlife; conserving cultural resources, scenery, aesthetics, and visitors' natural park experiences; minimizing environmental impact; and operating within limits of available financial and human resources.

In evaluating the uses of existing facilities within the Valley, the National Park Service should first determine the historical significance of each facility and determine its Occupancy Category (figure C-1).

EXISTING FACILITIES

A. The National Park Service should work to remove structures or uses in the Essential and Hazardous categories from the Talus Slope and Shadow Line zones, unless no practicable alternative exists and if safety and hazard probability factors have been considered. If historic structures are identified as Essential or Hazardous Occupancy categories, or if the National Park Service determines there are other policy reasons for leaving the structures, the structure may remain if contingency planning is completed to provide for the function in the event a rockfall or other geologic incident occurs.

B. The National Park Service should evaluate structures and uses in the Special Occupancy category in the Talus Slope zone. Such evaluations should include safety and hazard

considerations and other policies. If the evaluation shows there are policy reasons to retain these structures and/or uses in their existing locations, they may remain at the discretion of the National Park Service.

C. The National Park Service should evaluate safety and hazard considerations and other policies relevant to structures and uses in the Standard and Miscellaneous Occupancy categories. If the evaluation indicates there are policy reasons to retain these structures and/or uses in their existing locations, the structures may remain at the discretion of the National Park Service.

In evaluating the placement and uses of new facilities within the Valley, the National Park Service should first determine those facilities' Occupancy Category (figure C-1).

NEW FACILITIES

A. The National Park Service should place new structures or uses in the Essential, Hazardous, and Special Occupancy (occupant loads greater than 300) categories outside the Talus Slope and Shadow Line zones, unless no practicable alternative exists and all safety and hazard probability factors have been considered.

B. The National Park Service should place structures in the Standard Occupancy category outside the Talus Slope zone, unless no practicable alternative exists and all safety and hazard probability factors have been considered.

C. Miscellaneous structures may be placed in any area if there is no practicable alternative. Before locating new miscellaneous structures in the Talus Slope zone, the National Park Service should conduct a site-specific review that includes safety and hazard considerations.

Figure C-1
Occupancy Categories for Yosemite National Park Facilities

Essential Facilities

- Fire station (National Park Service & concessioner)
- Visitor protection/search and rescue
- Medical clinic
- Jail
- Court
- Communications center
- High voltage

Hazardous Facilities

- Fuel storage

Special Occupancy Facilities

- Assembly facilities (occupancy load of greater than or equal to 300)
  - Eating and drinking establishments
  - Auditoriums
  - Visitor center
- Education facilities (occupancy load of greater than or equal to 300)

Standard Occupancy Facilities

- Assembly facilities (occupancy load of less than 300)
  - Eating and drinking establishments
  - Auditoriums
  - Visitor contact stations
- Education facilities (occupancy load of less than 300)
- Offices
- Post office
- Retail sales
- Maintenance facilities
- Hotels
- Dormitories
- Multi-family housing
- Single-family housing

Miscellaneous Structures

- Unoccupied storage structures
- Restrooms
- Picnic areas
- Campground

appendix D

Cultural Resources Programmatic Agreement

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX D – CULTURAL RESOURCES PROGRAMMATIC AGREEMENT

PROGRAMMATIC AGREEMENT AMONG THE NATIONAL PARK SERVICE AT YOSEMITE, THE CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND THE ADVISORY COUNCIL ON HISTORIC PRESERVATION REGARDING PLANNING, DESIGN, CONSTRUCTION, OPERATIONS AND MAINTENANCE, YOSEMITE NATIONAL PARK, CALIFORNIA.

WHEREAS, the National Park Service (NPS) at Yosemite National Park (YOSE) has determined that planning, design, construction, operations and maintenance may have an effect on properties included in, or eligible for inclusion in, the National Register of Historic Places, and has consulted with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (Council) pursuant to Section 800.13 of the regulations (36 CFR Part 800), implementing Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f; hereinafter NHPA); and

WHEREAS, the NPS, the Council, and National Conference of State Historic Preservation Officers (NCSHPO) executed a Nationwide Programmatic Agreement on July 17, 1995 that establishes a framework for taking historic properties into account and is supplemented by this agreement; and

WHEREAS, the NPS completed a 1980 General Management Plan (GMP) that provides the management direction for YOSE; and

WHEREAS, the NPS, SHPO and Council executed a November 1, 1979, Memorandum of Agreement (MOA) that is still in effect to cover actions specified in the 1980 GMP; and

WHEREAS, a Concessions Services Plan and a Yosemite Valley Plan exist or are underway to implement proposals of and amend the 1980 General Management Plan; and

WHEREAS, the NPS has on staff or has access to qualified cultural resource specialists who meet, at a minimum, the appropriate qualifications set forth in the Department of the Interior's "Professional Qualifications Standards" (36 CFR Part 61, Appendix A) to carry out programs for cultural resource management. These include cultural resource management advisors described in Stipulation III (C)(3) of the nationwide programmatic agreement; and

WHEREAS, the terms in 36 CFR Section 800.2 "Definitions" are applicable throughout this Programmatic Agreement, including "Historic Property" to mean any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in, the National Register of Historic Places. Historic Properties include artifacts and remains that are related to and located within such properties, cultural landscapes, as defined in National Register Bulletins 18 and 30, and traditional cultural properties, as defined in National Register Bulletin 38. "Indian Tribes" refers to American Indian tribes, bands, organized groups, or communities recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians, and who are culturally affiliated with YOSE lands and resources; and

WHEREAS, YOSE has consulted with Indian Tribes (American Indian Council of Mariposa County, Inc., the Tuolumne Me-Wuk Tribal Council, the Mono Lake Indian Community, the Bridgeport Paiute Tribe, the Chukchansi Nation, the Northfork Mono Rancheria and the Northfork Mono Indian Museum) and has provided these parties the opportunity to participate in the development of, and to concur in the terms of, this Agreement; and

WHEREAS, YOSE has consulted with the National Trust for Historic Preservation (National Trust) and has invited the National Trust to concur in this agreement; and

WHEREAS, YOSE has notified the public of the formulation of this agreement and provided them an opportunity to comment;

NOW, THEREFORE, the NPS, SHPO, and Council agree that YOSE shall carry out its responsibilities under the NHPA, as amended, for those undertakings/actions specified in Stipulation II below.

Stipulations

YOSE shall ensure that the following measures are carried out:

I. POLICY

YOSE shall manage and preserve the historic properties of the park through undertakings and research, consistent with good management and stewardship. These efforts are, and will remain, in keeping with the NHPA, the National Environmental Policy Act of 1969 (NEPA), and other applicable laws, executive orders, regulations and policies. YOSE shall implement its programs with public review and in consultation with other federal agencies, the SHPO, Indian Tribes, city and county governments and their respective authorities, as appropriate.

A. Guidelines, standards, and regulations that are relevant to this Agreement and that shall provide guidance and performance standards for management of historic properties include:

NPS/ACHP	The Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act [Section 110 Guidelines]
ACHP	Treatment of Archeological Properties: A Handbook
FHWA	Manual for Uniform Traffic Control Services
NPS	Maintenance Management Program, Operations Manual, Parts 1&2
NPS	Museum Handbook, Parts 1&2
NPS	Director's Order 2: Park Planning
NPS-6	Interpretive and Visitor Services Guidelines
NPS-12	NEPA Compliance Guidelines
NPS-28	Cultural Resource Management Guideline
NPS-38	Historic Property Leasing Guidelines

NPS-76 Housing Design and Rehabilitation Guidelines

USDI Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines

USDI The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings

USDI The Secretary of the Interior's Standards for Historic Preservation Projects with Guidelines for Applying the Standards

USDI The Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes

US Uniform Federal Accessibility Standards (49 FR 31528-31617)

US Americans with Disabilities Act Accessibility Guidelines

(56 FR 45731-45778)

US Native American Graves Protection and Repatriation Act Regulations: Final Rule (43 CFR Part 10)

As needed, additional guidelines may be developed for the built or designed landscapes of YOSE. Proposed new guidelines developed by YOSE shall be submitted to the SHPO for review and comment. The SHPO shall have 30 days after receiving the proposed guidelines to respond to specific treatments described in the guidelines.

B. YOSE shall use the following Cultural Resource Identification and Professional or Technical Plans and Studies in management:

NPS YOSE Hazard Tree Plan

NPS YOSE Fire Management Plan

NPS YOSE Wilderness Management Plan

NPS YOSE Resource Management Plan

NPS YOSE Archeological Synthesis and Research Design

NPS Cultural Landscape Report, Yosemite Valley

NPS Ethnographic Evaluation of Yosemite Valley, the Native American Cultural Landscape

NPS Historic Resource Study, Yosemite National Park

NPS List of Classified Structures, YOSE

NPS Wilderness Historic Resource Study

NPS Archeological Inventory, Testing, Data Recovery and Monitoring Reports

NPS Ethnographic Studies

NPS YOSE Interpretive Prospectus

II. APPLICABILITY

This agreement is applicable to all individual actions relating to:

A. Routine maintenance and park operations

B. Individual actions proposed in the 1980 *General Management Plan*, that will be attached in Appendix C, and individual actions proposed in implementing plans including, but not limited to:

- 1992 Concessions Services Plan
- Yosemite Valley Plan (in preparation)

C. Design projects

D. Specific management plans

III. SCOPE OF AGREEMENT

A. This Agreement applies to undertakings at YOSE that have not been covered by previous agreements, and that are under the direct or indirect supervision of the NPS including undertakings performed by NPS lessees, permittees, concessionaires, cooperators and park partners.

B. The NPS shall ensure that the lessees, permittees, concessionaires, cooperators and park partners are notified that they are subject to the terms of this Agreement.

IV. RELATIONSHIP TO OTHER PLANS

A. This Agreement incorporates provisions of, but does not supersede, the 1979 MOA executed for the 1980 GMP. Provisions of that agreement will continue to be implemented as written.

B. This Agreement supplements the 1995 Nationwide Programmatic Agreement among the NPS, the Council, and the National Conference of State Historic Preservation Officers.

V. PARTICIPATION OF INDIAN TRIBES

A. YOSE shall consult with Indian Tribes in such a manner as to meaningfully involve them in decisions affecting resources of concern.

B. Within one year of the execution of this Agreement, YOSE shall develop an agreement that sets forth the process by which Indian Tribes will be involved in considering the impacts of undertakings on Historic Properties at YOSE that are of interest to them. This protocol will:

1. Define when consultation between the YOSE and tribes is necessary
2. Identify individuals or offices directly involved in the consultation process
3. Outline key elements of the consultation process
4. Outline the process to be followed in case of inadvertent discovery of human remains or other items subject to the NAGPRA

C. Until this agreement is in place, YOSE shall continue to consult with Indian Tribes according to 36 CFR Part 800 and, when appropriate, the provisions of NAGPRA.

VI. PUBLIC PARTICIPATION

A. YOSE shall consult with the signatories to this Agreement and with other Interested Parties or Persons to determine if there are organizations or individuals that may be concerned with actions described in Stipulation VIII below, and shall provide notice to the public of the undertakings subject to the stipulations of this Agreement through the public participation process of the National Environmental Policy Act (NEPA) and its implementing regulations set forth in 40 CFR Parts 1500-1508. Any member of the public may participate as an Interested Person in the consultation for a particular action upon notifying YOSE of their interest. YOSE, SHPO and Council, if participating, shall jointly determine when such Interested Persons shall be invited to participate as a consulting party for individual undertakings in accordance with 36 CFR Section 800.5(e)(1)(iv). YOSE shall take into account the views of such parties regarding any adverse effect of an undertaking described in Stipulation VIII below.

B. Documentation regarding identification and National Register evaluation of historic properties, when not subject to confidentiality concerns, will be available for inspection at YOSE, SHPO, or NPS Pacific West Regional Office.

VII. CONSIDERATION OF HISTORIC PROPERTIES

Pursuant to the NHPA and in the earliest stages of the planning process, YOSE shall identify, evaluate, determine effects to, and treat historic properties in conformance with all applicable regulations, policies and guidelines listed in Stipulation I above.

A. Identification

1. YOSE shall consult with Indian Tribes and Interested Persons, as appropriate, on activities to locate and inventory Historic Properties, in accordance with Section 110 of the NHPA, and 36 CFR Section 800.4 .
2. If no Historic Properties are identified, YOSE shall maintain documentation of the inventory for purposes of review under Stipulation XVIII and no further action will be necessary.
3. If Historic Properties are identified, and consistent with any confidentiality protocols provided by the Tribe(s) and/or described in Section 304, NHPA, all final reports resulting from the Historic Properties surveys stipulated above shall be submitted to SHPO.

B. National Register Evaluation

1. YOSE, in consultation with SHPO, shall follow the procedures in 36 CFR Section 800. 4 (c) (1 through 3) to evaluate the historical significance of all properties that may be affected by an undertaking. If YOSE and SHPO do not agree on the National Register eligibility of any property, or if the Council so requests, YOSE shall obtain a formal determination of eligibility from the Keeper of the National Register pursuant to 36 CFR

Section 800.4 (c) (4). If SHPO does not respond within the review period described in Stipulation IX below, YOSE may assume SHPO concurrence with YOSE determinations.

2. As part of the 1980 GMP planning process, NPS evaluated and SHPO concurred in National Register eligibility determinations of certain properties in Yosemite. These determinations are itemized in the Case Report accompanying the 1979 MOA (summary list to be appended within six months). In addition, subsequent studies have evaluated properties under National Register criteria. These determinations will be reviewed, on a case by case basis by YOSE cultural resource staff or advisors, for new information or changed circumstances. Previous National Register determinations will be revisited by YOSE staff or cultural resources advisors if new information, such as recognition of new property types (e.g., cultural landscapes and traditional cultural properties) or change in historic context(s), is forthcoming or if SHPO so requests.

3. If traditional cultural properties are identified through the process outlined in Stipulation VII (A), YOSE shall seek the participation of all Indian Tribes (or other groups as appropriate) who ascribe traditional cultural values to those properties in applying the National Register criteria. Except as provided by any confidentiality protocols developed by Indian Tribes, and/or those described in Section 304, NHPA, YOSE shall ensure that documentation of determinations, including the SHPO's comments, are made available for inspection according to provisions stated in Stipulation VI.

C. Assessment of Effect

YOSE shall determine the effect of any undertaking subject to this Agreement using the Criteria of Effect and Adverse Effect (36 CFR Part 800). At its discretion, YOSE may consult with the signatories to this Agreement or with other Interested Persons regarding effect determinations for individual undertakings.

1. Repetitive, Low Impact Activities

   Repetitive, low impact activities defined in Appendix B will be undertaken with no additional review by YOSE cultural resource staff. The project proponent shall maintain records of actions for inspection according to Stipulation XVII below.

2. Actions Having No Effect or No Adverse Effect

   Activities determined by YOSE to have "No Effect" or "No Adverse Effect" to Historic Properties, as defined in 36 CFR Part 800, may be implemented and will be documented for purposes of this Agreement by YOSE without further review by the Council or SHPO, provided:

   a) that the undertaking is not subject to provisions of Stipulation VIII(B);

   b) that the applicable YOSE management office has submitted a proposed undertaking to the YOSE Section 106 Coordinator for review and concurrence 15 work days prior to the start of the undertaking;

c) that the YOSE Section 106 Coordinator has reviewed the undertaking to ensure that identification and evaluation of Historic Properties in the area of potential effect has been completed according to Stipulation VII (A) and (B) above, and that adequate information has been compiled to identify and evaluate the effects of proposed undertakings on Historic Properties;

d) that YOSE ensures that decisions regarding proposed undertakings are made and carried out in conformance with the standards and guidelines in Stipulation I above;

e) that YOSE shall ensure that recovery of archeological data is based on the existing YOSE Archeological Research Design and Archeological Synthesis and Revised Research Design;

f) that YOSE has consulted with the appropriate Indian Tribe(s) regarding possible effects to Native American archeological or traditional cultural properties;

g) that YOSE has determined that the proposed action either does not affect or does not adversely affect Historic Properties based on the criteria of adverse effect found in 36 CFR Section 800.9; and

h) Monitoring, when appropriate, shall be summarized in a brief letter report. If Historic Properties are discovered during implementation, a detailed monitoring report shall be prepared. Large-scale ground disturbing activities shall be monitored in accordance with a monitoring plan. The monitoring plan shall include, at minimum, the following elements:

   i. a detailed summary of properties that may be exposed during construction activities, based on archival research;

   ii. treatment strategies (i.e., documentation, data recovery excavations, protection, etc.) for anticipated property types;

   iii. specific guidelines for any necessary work stoppages;

   iv. the locations of Historic Properties to be avoided and the means by which they will be avoided;

   v. specific areas and phases of construction which will be monitored;

   vi. a schedule for submitting progress reports of monitoring activities to the SHPO;

   vii. a process for dealing with types of properties not anticipated in the monitoring plan, including names of individuals or offices to be contacted in the event of discovery

   viii. reporting requirements, to be followed upon project completion

   ix. specific procedures to be followed in the event of discovery of human remains

   x. Indian tribal monitoring procedures

VIII. RESOLUTION OF ADVERSE EFFECTS

YOSE shall make every reasonable effort to avoid adverse effects to Historic Properties identified according to Stipulation VII (A) through project design, facilities' location, or other means. Avoidance alternatives will be documented during the NEPA process.

When avoidance of a Historic Property is not feasible or prudent, and the undertaking does not involve properties or actions described in (B) below, YOSE, as part of its examination of treatment options, may decide to implement one or more Standard Mitigating Measures (SMM) described in (A) below. YOSE shall notify the following parties in writing of the decision to implement SMM:

- the SHPO
- Indian Tribe(s) (when American Indian properties are involved)
- members of the public who have made their interest in the undertaking known according to provisions outlined in Stipulation VI.

Consultation with the Council will not be undertaken when YOSE decides to implement SMM. If the SHPO, any Indian Tribe or any Interested Person does not object, within 14 calendar days of the notification, to YOSE's decision to treat the adverse effect according to the SMM, YOSE will proceed without further involvement of these parties. Should the SHPO, Indian Tribe, or Interested Person(s) object to the implementation of SMM as set forth above, YOSE shall make every effort to resolve the objection. If YOSE decides not to implement SMM, or YOSE and the objecting party are unable to resolve the objection, YOSE shall consult in accordance with (B) below, Required Consultation.

A. Standard Mitigating Measures

1. Recordation

   a) Individual, nationally significant Historic Properties will be documented according to the standards of the Historic American Buildings Survey or Historic American Engineering Record, as appropriate. The level of documentation for these Historic Properties shall be determined by the NPS. Copies of documentation will be deposited in the YOSE archives, SHPO, and Library of Congress.

   b) The following categories of structures, whether significant at the national, state, or local level, will be documented by black and white 5 x 7 photographic prints, and a Historic Record that includes narrative history and original drawings where available. Copies of documentation will be deposited in the YOSE archives and with SHPO:

      - Contributing elements in a historic district (unless individually eligible)
      - Individual elements of linear resources, such as ditches, roads, trails
      - Minor elements of a complex (e.g., sheds, garages)
      - Individual elements of cultural landscapes
      - Individual Historic Properties of state and local significance

2. Salvage

   If a Historic Property will be demolished, YOSE historical architect, curator and/or preservation specialist will conduct a documented inspection to identify architectural elements and objects that may be reused in rehabilitating similar historic structures, or that may be added to the YOSE museum collection.

3. Interpretation

   YOSE will ensure that the story of human interaction with nature and changes in that interaction is a central theme in the interpretation of the Yosemite story. This interpretation will include a history of alteration of the human environment and reasons for that change.

4. National Register Reevaluation

   Within 120 working days after adverse alteration, relocation, or demolition of a Historic Property, YOSE shall consult with SHPO regarding the Property's continued eligibility for the National Register. The results of this consultation, with accompanying documentation, shall be forwarded to the Council and Keeper of the National Register. Should YOSE and SHPO disagree, YOSE shall seek a determination from the Keeper in accordance with 36 CFR Section 800.4 (C)(4).

B. Required Consultation

   YOSE shall consult, according to 36 CFR Section 800.5(e) with the SHPO, Indian Tribe(s) (as appropriate) and Interested Persons as defined and identified under Stipulation VI (as appropriate), and shall invite the Council's participation regarding any action that:

1. may affect a National Historic Landmark
2. may affect a human burial
3. adversely affect a traditional cultural property
4. generates significant public controversy
5. involves a disagreement among YOSE, the SHPO, any Indian Tribe, or any Interested Persons regarding proposed use SMMs

IX. REVIEW PERIODS

A. YOSE shall submit the results of all identification efforts, NRHP eligibility determinations, discovery plans, and treatment plans to SHPO, Indian Tribes, and Council (as necessary) for a 30 calendar day review and comment period, unless otherwise agreed to. Opportunity for review by Interested Persons is as identified in Stipulation VI. This period shall begin upon receipt of adequate documentation by the reviewing party. If any reviewing party does not respond to YOSE within 30 calendar days of receipt of adequate documentation, YOSE may assume that that party does not object to the findings and recommendations as detailed in the submission. If any party does not respond, does not object, or proposes changes that YOSE accepts, no further review by that party will be required and YOSE may proceed according to its findings and recommendations.

B. Should any party object to findings or recommendations in any submittal within the time period specified in (A) above, YOSE shall consult with the objecting party to resolve the objection. If the objection is not resolved, YOSE shall consult according to Stipulation XIV, Dispute Resolution.

X. DISCOVERY

A. Native American Human Remains

1. YOSE shall ensure that any Native American burials or Native American human remains, funerary objects, sacred objects and objects of cultural patrimony discovered during implementation of an undertaking, archeological fieldwork, or other actions, are treated with appropriate respect and according to federal law, including, but not limited to, the Native American Graves Protection and Repatriation Act, Public Law 101-601 (NAGPRA) and its implementing regulations (43 CFR Part 10, Native American Graves Protection and Repatriation Act Regulations). Actions described herein do not constitute compliance with provisions of NAGPRA.

2. If objections are raised by any Indian Tribe regarding treatment of human remains or cultural items as defined under NAGPRA, the objection shall be resolved in accordance with NAGPRA. YOSE shall notify SHPO and Council of any such dispute if so requested by involved tribes.

B. Other Historic Properties

YOSE shall notify the SHPO and Indian Tribe(s), as appropriate, as soon as practicable if it appears that an undertaking will affect a previously unidentified property that may be eligible for inclusion in the National Register, or affect a known Historic Property in an unanticipated manner. YOSE shall stop all potentially harmful activities (if ongoing) in the vicinity of the discovery and shall take all reasonable steps to avoid or minimize harm to the property until YOSE concludes consultation. If the newly discovered property has not previously been included in or determined eligible for listing in the National Register, YOSE may assume that the property is eligible for purposes of this Agreement. YOSE shall notify the SHPO at the earliest possible time and consult with the SHPO to develop actions that will take the effects of the undertaking into account. YOSE will notify SHPO of any time constraints, and YOSE and SHPO will mutually agree upon time frames for this consultation. YOSE shall provide the SHPO (and Indian Tribe[s], as appropriate) with written recommendations that take the effects of the undertaking into account. If the SHPO does not object to YOSE's recommendations within the agreed upon time frame, YOSE will implement the recommendations. If SHPO or the Indian Tribe(s) object to the proposed treatment, and these objections cannot be resolved, YOSE shall follow procedures outlined in Stipulation XIV, Dispute Resolution.

XI. NATURAL DISASTERS

In the past YOSE has experienced major floods, fires, earthquakes, wind damage from storms, earth slides, and other natural disasters/emergencies which are likely to recur in the future. For a

period not exceeding 45 days after the conclusion of the emergency (plus any extension agreed upon by YOSE, SHPO and Council) YOSE will proceed as follows:

A. YOSE will, without SHPO consultation, undertake emergency actions pursuant to the terms of this Agreement to stabilize Historic Properties and prevent further damage.

B. YOSE cultural resource specialists shall work closely with the emergency operations team, participate in discussions regarding emergency response activities and monitor work that has the potential to affect Historic Properties.

C. YOSE staff shall consult with the appropriate Indian Tribe(s) regarding emergency actions.

D. All work having the potential to affect Historic Properties shall be documented.

E. Every effort will be made to avoid known or discovered Historic Properties during emergency response activities. However, in those rare cases where this is impossible or could impede emergency responses, photographic and written documentation of affected Historic Properties shall be completed.

F. All such emergency measures shall be undertaken in a manner that does not foreclose future preservation or rehabilitation, unless YOSE determines that integrity has been permanently lost.

G. Within 90 days after the conclusion of the disaster or emergency period, YOSE shall submit to the SHPO, Council and the Federal Preservation Officer, NPS a report that documents how any effect of disaster or emergency response operations on Historic Properties were taken into account.

XII. EMERGENCY REPAIRS

A. In the event that damage to or failure of park infrastructure poses an immediate threat to life or health, YOSE will undertake emergency repairs with on-site monitoring by appropriate cultural resource specialists.

B. Should Historic Properties be discovered during emergency repair activity, all work that could result in adverse effects shall cease provided the Superintendent or designated representative determines work cessation will not impede emergency repairs. If the work stoppage at the discovery site will impede emergency repairs, emergency repair will continue and YOSE officials shall immediately notify the SHPO by telephone and provide the following information:

   1. finding of a required emergency
   2. description of the emergency and steps necessary to address the situation
   3. description of the discovery and its apparent significance
   4. description of the emergency and potential effect on the discovery feature
   5. efforts to consider Historic Properties

C. Repairs and emergency treatment of any discovered properties shall be documented by YOSE on a Preservation Assessment Form or its equivalent. This form, along with a

description of the emergency situation, signed by the requesting park official and the cultural resource specialist accomplishing the monitoring, shall be provided to the SHPO within 15 days of the emergency repair.

XIII. PERMITS

A. Permits and other legal agreements including, but not limited to, special use permits, leases, concessions, contracts and easements (hereinafter "Permits") for use of lands or structures in YOSE reflect a diversity of utilities and uses. All such Permits shall contain terms and conditions YOSE deems appropriate to protect and preserve Historic Properties.

B. YOSE shall require that any undertaking proposed and implemented by a permittee/licensee, which may affect a Historic Property, shall meet the guidelines and standards set forth in Stipulation I above, and is reviewed by YOSE in accordance with Stipulation VII (c). Any permittee/licensee who proceeds with an undertaking without project review and approval, and who forecloses the obligation of YOSE to fulfill terms of this agreement, may be subject to appropriate sanctions in accordance with the terms of the permit/license.

XIV. DISPUTE RESOLUTION

A. Should SHPO or Council object within 30 calendar days to any matter submitted by YOSE for review pursuant to this Agreement, YOSE shall consult with the objecting party to resolve the objection. If after 30 calendar days YOSE or the objecting party determines that the objection cannot be resolved, YOSE shall forward all documentation relevant to the dispute to the Council. Within 30 calendar days after receipt of all pertinent documentation, the Council will either:

   1. provide YOSE with recommendations, which YOSE shall take into account in reaching a final decision regarding the dispute; or

   2. notify YOSE that it will comment pursuant to 36 CFR Section 800.6(b), and proceed to comment. Any Council comment provided in response to such a request shall be taken into account by YOSE in accordance with 36 CFR Section 800.6(c)(2) with reference only to the subject of the dispute; YOSE's responsibility to carry out all actions under this Agreement that are not the subjects of the dispute will remain unchanged.

B. Should any Indian Tribe object to the manner in which the terms of this Agreement are implemented, YOSE shall take the objection into account and consult with the objecting party for 30 calendar days. If YOSE determines that the objection cannot be resolved, YOSE shall refer the objection to the Council according to Section A of this Stipulation.

C. Should any Interested Persons or a member of the public object to the manner in which this Agreement is implemented, YOSE shall take the objection into account and consult with the objecting party for 30 calendar days. If YOSE determines that the objection cannot be resolved, YOSE shall refer the objection to the Council in accordance with Section A of this Stipulation.

D. Should the subject of an objection pertain to the eligibility of a property for listing in the National Register, YOSE shall consult with the objecting party for a 30-day period. If the

objection is not resolved within those 30 calendar days, YOSE shall refer the matter to the Keeper of the National Register for a final determination.

XV. FUTURE AGREEMENTS

Programmatic agreements or memoranda of agreement may be negotiated by YOSE, SHPO, and the Council, as appropriate, and may supplement this Agreement.

XVI. AMENDMENTS

Any signatory may request that this Agreement be amended, whereupon the parties will consult in accordance with 36 CFR Section 800.13. Where the parties cannot agree on executing an amendment, the matter shall be addressed pursuant to Stipulation XIV, Dispute Resolution. Any amendment agreed upon will be executed in the same manner as the original Agreement.

XVII. FAILURE TO CARRY OUT AGREEMENT

In the event YOSE does not or cannot carry out the terms of this Agreement, YOSE shall comply with the NPS Nationwide Programmatic Agreement with regard to individual undertakings covered by this Agreement.

XVIII. REVIEW OF AGREEMENT

A. On or before November 15 of each year for two years and biannually thereafter, so long as this Agreement is in effect, YOSE shall prepare and provide to the signatories and all parties invited to concur with this Agreement and the NPS Federal Preservation Officer a report describing how YOSE is carrying out its responsibilities under this Agreement. The report shall include, at a minimum, a list of “no effect and “no adverse effect” actions carried out in accordance with Stipulation VIII (B), above; efforts to identify and/or evaluate potential Historic Properties; monitoring efforts, and treatment of Historic Properties. YOSE shall ensure that this report is made available for public inspection pursuant to Stipulation VI, that potentially Interested Persons and members of the public are made aware of its availability, and that interested members of the public are invited to provide comments to the Council and SHPO as well as to YOSE. The SHPO, Council, and Indian Tribes may review the annual report and provide comments to YOSE. At the request of any party to this Agreement, YOSE shall supplement this process through meeting(s) to address comments and/or questions.

B. The SHPO and the Council may monitor activities carried out pursuant to this Agreement, and the Council will review such activities if so requested. YOSE shall cooperate with the SHPO and the Council in carrying out their monitoring and review responsibilities.

XIX. TERMINATION

YOSE, SHPO, or Council may terminate this Agreement by providing 30 calendar days’ written notice to the other parties provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the NPS shall comply with 36 CFR Sections 800.4 through 800.6 for individual undertakings covered by this Agreement.

XX. EXPIRATION

This Programmatic Agreement shall be null and void fifteen (15) years from date of execution of this Agreement by the Council.

Execution and implementation of this Programmatic Agreement evidences that YOSE has satisfied its Section 106 responsibilities for all individual undertakings referenced in this Agreement.

NATIONAL PARK SERVICE

By: Stan Albright — 3/17/99
Superintendent, Yosemite National Park — Date

Regional Director, Pacific West Region — 3/31/99
Date

CALIFORNIA STATE HISTORIC PRESERVATION OFFICER

By: Daniel Abeyta, acting — 4-26-99
State Historic Preservation Officer — Date

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: (for) Executive Director — 5/04/99
Advisory Council on Historic Preservation — Date

Appendix A: Secretary Of Interior's Professional Qualification Standards

The following requirements are those used by the National Park Service, and have been previously published in the Code of Federal Regulations, 36 CFR Part 61. The qualifications define minimum education and experience required to perform identification, evaluation, registration, and treatment activities. In some cases, additional areas or levels of expertise may be needed, depending on the complexity of the task and the nature of the historic properties involved. In the following definitions, a year of full-time professional experience need not consist of a continuous year of full-time work but may be made up of discontinuous periods of full-time or part-time work adding up to the equivalent of a year of full-time experience.

HISTORY

The minimum professional qualifications in history are a graduate degree in history or closely related field; or a bachelor's degree in history or closely related field plus one of the following:

1. At least two years of full-time experience in research, writing, teaching, interpretation, or other demonstrable professional activity with an academic institution, historic organization or agency, museum, or other professional institution; or
2. Substantial contribution through research and publication to the body of scholarly knowledge in the field of history.

ARCHEOLOGY

The minimum professional qualifications in archeology are a graduate degree in archeology, anthropology, or closely related field plus:

1. At least one year of full-time professional experience or equivalent specialized training in archeological research, administration or management;
2. At least four months of supervised field and analytic experience in general North American archeology; and
3. Demonstrated ability to carry research to completion.

In addition to these minimum qualifications, a professional in prehistoric archeology shall have at least one year of full-time professional experience at a supervisory level in the study of archeological resources of the prehistoric period. A professional in historic archeology shall have at least one year of full-time professional experience at the supervisory level in the study of archeological resources of the historic period.

ARCHITECTURAL HISTORY

The minimum professional qualifications in architectural history are a graduate degree in architectural history, art history, historic preservation, or closely related field, with coursework in American architectural history; or a bachelor's degree in architectural history, art history, historic preservation or closely related field plus one of the following:

1. At least two years of full-time experience in research, writing, or teaching in American architectural history or restoration architecture with an academic institution, historical organization or agency, museum, or other professional institution; or
2. Substantial contribution through research and publication to the body of scholarly knowledge in the field of American architectural history.

ARCHITECTURE

The minimum professional qualifications in architecture are a professional degree in architecture plus at least two years of full-time experience in architecture; or a State license to practice architecture.

HISTORIC ARCHITECTURE

The minimum professional qualifications in historic architecture are a professional degree in architecture or a State license to practice architecture, plus one of the following:

1. At least one year of graduate study in architectural preservation, American architectural history, preservation planning, or closely related field; or
2. At least one year of full-time professional experience on historic preservation projects.

Such graduate study or experience shall include detailed investigations of historic structures, preparation of historic structures research reports, and preparation of plans and specifications for preservation projects.

Appendix B: Repetitive Low Impact Activities

The following classes of undertakings are considered exempt from further review or consultation under the terms of this Agreement. NPS staff are not required to notify or consult with YOSE cultural resource staff about these classes of undertakings unless the project proponent has reason to believe that a specific exempt undertaking may affect historic properties. (NOTE: Items 1, 6, and 11 should be recorded in building files, and should include date, action taken, building location, type of paint used, etc.).

1. Maintenance (housekeeping, routine maintenance, and building monitoring) which includes:
   a) Painting of historic structures (exterior and interior) to match existing color or based on paint analysis by a historical architect or exhibit specialist (structures);
   b) Regrading of terrain adjacent to a building to achieve positive water runoff in areas not designated as archeologically sensitive;
   c) Housekeeping, routine maintenance, building monitoring and other such actions (such as replacement of individual window panes, replacement of window putty, repair/replacement of light switches, and rewiring existing fixtures in existing conduit) that do not incur damage to historic fabric;
   d) Roofing maintenance or replacement, when maintained or replaced in kind with original historic appearance and materials;

2. Routine grounds maintenance, such as grass cutting and treatment, maintenance of shrubs, and tree trimming;
3. Installation of environmental monitoring units, such as weather, water, air quality, and natural science monitoring units, provided that such installations are done in an unobtrusive manner and do not impact historic fabric or cultural landscapes;
4. Maintenance of existing roads or existing parking areas, including repaving and grading, within previously disturbed areas;
5. Maintenance of fire detection and suppression systems and security alarm systems, if done in an unobtrusive manner and without impacting historic fabric;
6. Rehabilitation, maintenance, or replacement of above-ground utility lines or transmission lines, unless it requires heavy equipment traffic with the potential for ground disturbance;
7. Health and safety activities such as non-destructive testing for radon gas, asbestos, lead-based paint, lead pipes, and hazardous materials and wastes;
8. Mitigation or abatement of hazardous materials, under the direction of the park exhibit specialist, including the following:
   a) Removal of damaged asbestos floor tile and replacement with appropriate historic or non-historic floor treatment;
   b) Carpeting over damaged asbestos floor tiles which do not contribute to the historic significance of a structure;
   c) Encapsulation of lead-based paint in window trim and molding where there is no change to color or appearance;
9. Maintenance operations for non-contributing buildings in a historic district, except excavations and borings in archeologically sensitive areas;
10. Conducting non-ground disturbing elements of an Integrated Pest Management (IPM) program for removal of pests such as termites, insects and rodents.
11. Fire hazard reduction activities that do not involve ground or surface disturbance and that do not have the potential to affect access to or use of resources by Native Americans;
12. Routine trail maintenance limited to brushing and light maintenance of existing trail tread with hand tools;
13. Felling of hazardous trees along trails, roadways, utility corridors, or within recreation areas, provided they are not designed elements of historic landscapes and provided that they are left in place and do not generate risk of indirect effects on historic properties from intense burning,
14. Removal of hazard trees from road prisms, so long as ground disturbance is not allowed off previously disturbed areas associated with road prisms;

15. Maintenance of existing facilities that does not involve new or additional ground disturbance (e.g., maintenance or replacement of cattle guards, gates, fences, guard rails, barriers, traffic control devices, light fixtures, curbs, sidewalks, etc.);
16. Maintenance (that does not add to nor change the configuration of the existing facilities) of existing electronic communication sites involving no ground disturbance.
17. Repair/removal of bridges when integrity has been lost.

appendix E

Adverse Effects and Standard Mitigation Measures for Historic Properties

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX E – ADVERSE EFFECTS AND STANDARD MITIGATION MEASURES FOR HISTORIC PROPERTIES

This table depicts actions adversely affecting historic sites, structures, and landscape elements, and the standard mitigating measures (as described in the Yosemite Programmatic Agreement, Appendix D) that the National Park Service proposes to use. Actions that do not adversely affect these historic properties are not listed here.

Alternative One		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)***
Superintendent's House (Residence 1)		
Superintendent's House (Residence 1) managed through benign neglect	Eventual loss of Superintendent's House (Residence 1) and garage; individually significant as well as contributing elements to the Yosemite Village Historic District	Salvage (recordation complete)
Orchards		
Lamon Orchard managed through benign neglect; salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Lamon Orchard; a contributing element in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage cuttings, interpretation
Curry Orchard managed through benign neglect; salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Curry Orchard; a contributing element in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage cuttings, interpretation
Hutchings Orchard managed through benign neglect; salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Hutchings Orchard; a contributing element in Yosemite Village Historic District	Recordation, salvage cuttings, interpretation

Alternative Two		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)**
Camp 4 (Sunnyside Campground)		
Relocate five sites; relocate parking	Loss of contributing elements to Sunnyside Campground Historic Site	Recordation
Yosemite Falls Area		
Realign and rehabilitate trails; rehabilitate, reconstruct, or remove bridges	Loss, rehabilitation, or reconstruction of up to seven footbridges and alteration of trail segments; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation
Yosemite Village		
Relocate Superintendent's House (Residence 1) and garage	Potential loss of National Register eligibility status of Superintendent's House (Residence 1) and garage; individually significant as well as contributing structures in Yosemite Village Historic District	Interpretation (recordation complete)
*Note: This table depicts only standard mitigating measures as stipulated in the Yosemite Programmatic Agreement. Other mitigating measures, such as relocating historic structures, are described in the text of the document and are not represented here. Other actions, such as rehabilitating and adaptively reusing historic structures, do not result in adverse effects and therefore are not represented here.		

Alternative Two		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)**
Remove some existing facilities (if unfeasible to reuse) and redesign National Park Service (NPS) Maintenance area to accommodate some NPS district operations, Pacific Bell, shuttle maintenance, and overnight parking	Possible loss of up to 14 structures: NPS warehouse, Camp 1 structures, NPS Operations Building (Fort Yosemite), NPS maintenance shop buildings and garages; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage
Remove Concessioner Headquarters Building, Yosemite Village Garage, apartment, and shop buildings, and Hospital Row apartments.	Loss of up to eight structures including the Concessioner Headquarters, Village Garage complex and the road west of garage, and the Hospital Row apartments, contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, interpretation, salvage
The Ahwahnee		
Remove Ahwahnee tennis courts and restore portion of Ahwahnee Meadow	Loss of contributing element (tennis courts) at The Ahwahnee historic property	Recordation, interpretation
Concessioner Stable		
Remove concessioner stable, and associated structures; relocate some structures to McCauley Ranch, if feasible	Loss of 16 structures: stable buildings, housing, and associated facilities; contributing elements in Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
Curry Village		
Remove 253 visitor tent cabins; construct new cabins with bathrooms	Loss of the majority of tent cabins and introduction of nonhistoric facilities in Camp Curry Historic District	Recordation, salvage, interpretation, National Register re-evaluation
Remove parking and historic fruit trees from Curry Orchard; remove the majority of comfort stations	Loss of Curry Orchard parking and Curry Orchard; loss of comfort stations; contributing elements in Yosemite Valley Cultural Landscape Historic District	Recordation, interpretation
Ecological Restoration, Including Bridge Removal		
Restore Valley meadows, and riparian corridor within Merced River Protection Overlay at former campsites (Upper and Lower River Campgrounds), picnic area, and river corridor at Yosemite Lodge	Loss of the road bisecting Camps 7 and 15; loss of meadow ditches and river control structures such as wing dams, check dams, etc.; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, interpretation
Remove Sugar Pine Bridge and, if necessary, Stoneman Bridge, and the raised causeway between Ahwahnee and Sugar Pine Bridges	Loss of Sugar Pine, and possibly, Stoneman Bridges (individually significant historic structures)	Salvage, interpretation, National Register re-evaluation (recordation complete)
Remove Happy Isles footbridge	Loss of Happy Isles footbridge (also known as the Old Happy Isles Bridge); a contributing element of the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
Circulation Changes		
Convert Southside Drive to two-way traffic (involves widening and minor realignment) between El Capitan Bridge and Curry Village	Modification of Southside Drive; a contributing circulation structure in the Yosemite Valley Cultural Landscape Historic District	Recordation
Orchards		
Manage and maintain (but no replanting) Lamon Orchard; salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Lamon Orchard; a contributing element in Yosemite Valley Cultural Landscape Historic District	Recordation, salvage of cuttings, interpretation

Alternative Two		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)**
Remove Curry Orchard; salvage cuttings and establish representative plants at appropriate facility outside of the park	Loss of Curry Orchard; a contributing element in Yosemite Valley Cultural Landscape Historic District	Recordation, salvage of cuttings, interpretation
Neither manage nor maintain Hutchings Orchard; salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Hutchings Orchard; a contributing element in Yosemite Village Historic District	Recordation, salvage of cuttings, interpretation
Cascades Area		
Remove Cascades Diversion Dam, Screenhouse, and four Cascades residences	Loss of six structures; contributing elements in the Yosemite Hydroelectric Power Plant Historic Property	Recordation, salvage, National Register property re-evaluation

Alternative Three		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)**
Camp 4 (Sunnyside Campground)		
Relocate five sites; relocate parking; add 32 sites adjacent to Camp 4 (Sunnyside Campground)	Loss of contributing elements to Sunnyside Campground Historic Site; construction of nonhistoric features adjacent to historic site	Recordation, interpretation
Yosemite Falls Area		
Realign and rehabilitate trails; rehabilitate, reconstruct, or remove bridges; relocate Clark Bench and Muir plaque	Relocation, rehabilitation, or loss of eight footbridges, alteration of trail segments, and relocation of small-scale features (bench and plaque); contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
Yosemite Village		
Remove Superintendent's House (Residence 1) and garage	Loss of Superintendent's House (Residence 1) and garage; individually significant as well as contributing elements in the Yosemite Village Historic District	Salvage (recordation complete)
Remove existing structures and redesign National Park Service (NPS) Maintenance area to accommodate some NPS district operations	Loss of up to 14 contributing structures: former NPS warehouse, Camp 1 structures, NPS Operations Building (Fort Yosemite), maintenance shop and garage buildings; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage
Construct new fire station in Yosemite Village Historic District housing area	Introduction of nonhistoric facility in Yosemite Village Historic District	Recordation
Remove Concessioner Headquarters Building; remove Ahwahnee Row housing, Y Apartments, Village Garage, associated apartment and shop buildings	Loss of 24 structures: Concessioner Headquarters; Village Garage; garage apartment and utility buildings; Ahwahnee Row houses, cottages and converted cabins, laundry room and garages; and Y Apartments; contributing elements in the Yosemite Valley Cultural Landscape District	Recordation, salvage, interpretation
The Ahwahnee		
Remove Ahwahnee tennis courts and restore portion of Ahwahnee Meadow	Loss of tennis courts; a contributing element in The Ahwahnee historic property	Recordation, interpretation

Alternative Three		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)**
Concessioner Stable		
Remove concessioner stable and associated structures	Loss of 16 structures: concessioner stable buildings, housing, and associated structures; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
Curry Village		
Remove 277 visitor tent cabins; remove Tresidder Residence, Cabin 90A/B, and Huff House; construct new cabins with bathrooms	Loss of the majority of tent cabins, Tresidder Residence, Huff House, and Cabin 90A/B; introduction of nonhistoric facilities in Camp Curry Historic District	Recordation, salvage, interpretation, National Register re-evaluation
Remove parking and fruit trees from Curry Orchard, and remove the majority of comfort stations	Loss of Curry Orchard and Curry Orchard parking, loss of comfort stations; contributing elements in Yosemite Valley Cultural Landscape Historic District	Recordation, interpretation
Ecological Restoration, Including Bridge And Orchard Removal		
Restore Valley meadows, and riparian corridor within Merced River Protection Overlay at former Upper and Lower River Campgrounds, picnic area, and river corridor at Yosemite Lodge	Loss of the road bisecting Camps 7 and 15; loss of meadow ditches and river control structures such as wing dams, check dams, etc.; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, interpretation
Remove Stoneman and Sugar Pine Bridges	Loss of Stoneman and Sugar Pine Bridges; individually significant historic structures	Salvage, interpretation, National Register re-evaluation (recordation complete)
Remove Housekeeping and Superintendent's Bridges	Loss of Housekeeping and Superintendent's Bridges; both contributing structures in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
Remove fruit trees from Hutchings Orchard	Loss of Hutchings Orchard; a contributing element in Yosemite Village Historic District	Recordation, salvage of cuttings, interpretation
Remove fruit trees from Lamon Orchard	Loss of Lamon Orchard; a contributing element in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage of cuttings, interpretation
Circulation Changes		
Realign and widen portions of Southside Drive	Modification of Southside Drive; a contributing circulation structure in the Yosemite Valley Cultural Landscape Historic District	Recordation
Merced River Gorge		
Remove Cascades Diversion Dam, Screenhouse, and four Cascades residences	Loss of six structures; contributing elements in the Yosemite Hydroelectric Power Plant historic property	Recordation, salvage, National Register re-evaluation

Alternative Four		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)**
Camp 4 (Sunnyside Campground)		
Remove five sites	Loss of contributing elements of Sunnyside Campground Historic Site	Recordation, interpretation, National Register re-evaluation
Yosemite Falls Area		
Realign and rehabilitate trails; rehabilitate, reconstruct, or remove bridges; relocate Clark Bench and Muir plaque	Loss, relocation or rehabilitation of seven footbridges; relocation of Clark Bench and Muir plaque, and modification of some trail segments; contributing elements (structures and small-scale features) in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage
Yosemite Village		
Remove Superintendent's House (Residence 1) and garage	Loss of Superintendent's House (Residence 1) and garage; individually significant as well as contributing elements in the Yosemite Village Historic District	Interpretation, (recordation complete)
Remove existing facilities and redesign National Park Service (NPS) Maintenance area to accommodate some NPS district operations	Loss of up to 13 contributing structures: former NPS warehouse, Camp 1 structures, maintenance shops, and garage buildings; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage
Construct new fire station in Yosemite Village Historic District housing area	Introduction of nonhistoric facility in Yosemite Village Historic District	Recordation
Remove Concessioner Headquarters Building; remove Ahwahnee Row housing; Y Apartments; Village Garage, associated shop buildings, and apartment	Loss of 24 structures: Concessioner Headquarters Building; Village Garage, garage apartment and shops, Ahwahnee Row houses, cottages and converted cabins, laundry room and garages; and Y Apartments; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
The Ahwahnee		
Remove Ahwahnee tennis courts and restore portion of Ahwahnee Meadow	Loss of tennis courts; contributing element in The Ahwahnee historic property	Recordation, interpretation
Concessioner Stable		
Remove Concessioner Stable and associated buildings	Loss of 16 structures; concessioner stable buildings, housing, and associated structures; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
Curry Village		
Remove 277 tent cabins; remove Tresidder Residence, Huff House, and Cabin 90A/B; construction of new cabins with bathrooms	Loss of the majority of tent cabins; loss of Tresidder Residence, Huff House, and Cabin 90A/B; introduction of nonhistoric facilities in Camp Curry Historic District	Recordation, salvage, interpretation, National Register re-evaluation
Remove parking from Curry Orchard and remove the majority of comfort stations	Loss of Curry Orchard Parking, loss of comfort stations; contributing elements in Yosemite Valley Cultural Landscape Historic District	Recordation, interpretation

Alternative Four		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)**
Ecological Restoration, Including Bridge Removal		
Restore Valley meadows, and riparian corridor within Merced River Protection Overlay; restore riparian and upland vegetation at former Upper and Lower River Campgrounds and river corridor at Yosemite Lodge	Loss of the road bisecting Camps 7 and 15; loss of meadow ditches and river control structures such as wing dams, check dams, etc.; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, interpretation
Remove Stoneman and Sugar Pine Bridges	Loss of Stoneman and Sugar Pine Bridges; individually significant historic structures	Salvage, interpretation, National Register re-evaluation (Recordation complete)
Remove Housekeeping and Superintendent's Bridges	Loss of Housekeeping and Superintendent's Bridges; contributing structures in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
Circulation Changes		
Widen and convert Southside Drive to two-way traffic from El Capitan Bridge to Curry Village	Modification of Southside Drive; a contributing circulation structure in the Yosemite Valley Cultural Landscape Historic District	Recordation
Orchards		
Manage Lamon Orchard through benign neglect; salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Lamon Orchard; a contributing element in Yosemite Valley Cultural Landscape Historic District	Recordation, salvage of cuttings, interpretation, National Register re-evaluation
Manage Curry Orchard through benign neglect; salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Curry Orchard; a contributing element in Yosemite Valley Cultural Landscape Historic District	Recordation, salvage of cuttings, interpretation
Manage Hutchings Orchard through benign neglect; salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Hutchings Orchard; a contributing element in Yosemite Village Historic District	Recordation, salvage of cuttings, interpretation
Merced River Gorge		
Remove Cascades Diversion Dam, Screenhouse, and four Cascades residences	Loss of six structures; contributing elements in the Yosemite Hydroelectric Power Plant historic property	Recordation, salvage, National Register District re-evaluation

Alternative Five		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)**
Camp 4 (Sunnyside Campground)		
Relocate five campsites; construct employee housing adjacent to Camp 4.	Loss of contributing elements and introduction of major noncontributing structures at Sunnyside Campground Historic Site	Recordation, interpretation, National Register re-evaluation
Yosemite Falls Area		
Realign and rehabilitate trails; rehabilitate, relocate, or remove bridges	Loss of three footbridges, rehabilitation of up to four footbridges, and modification of some trail segments; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage
Yosemite Village		
Remove Superintendent's House (Residence 1) and garage	Loss of Superintendent's House (Residence 1) and garage; individually significant as well as contributing elements in the Yosemite Village Historic District	Salvage (recordation complete)

Alternative Five		
Description of Action	**Adverse Effect**	**Standard Mitigation Measure(s)**
Remove existing facilities and redesign National Park Service (NPS) Maintenance area to accommodate NPS district operations, Pacific Bell, shuttle maintenance and overnight parking	Loss of up to 14 contributing structures (including former NPS warehouse, Camp 1 structures, NPS Operations Building [Fort Yosemite], maintenance shop buildings; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage
Remove Concessioner Headquarters Building; remove Ahwahnee Row houses, Y Apartments, Hospital Row apartments, Village Garage, associated shops, and apartment	Loss of 26 structures: Concessioner Headquarters Building, Village Garage, garage apartment and shop buildings, Ahwahnee Row houses, cottages and converted cabins, laundry room and garages, Hospital Row apartments, and Y Apartments; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
The Ahwahnee		
Remove Ahwahnee tennis courts and restore portion of Ahwahnee Meadow	Loss of tennis courts; contributing element in The Ahwahnee historic property	Recordation, interpretation
Concessioner Stable		
Remove concessioner stable and associated facilities	Loss of concessioner stable buildings, houses, and associated facilities; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, salvage, interpretation
Curry Village		
Remove 277 visitor tent cabins; remove Tresidder Residence, Huff House, and Cabin 90A/B; construct new cabins with bathrooms	Loss of the majority of tent cabins, Tresidder Residence, Huff House, and Cabin 90A/B; introduction of nonhistoric facilities in Camp Curry Historic District	Recordation, salvage, interpretation, National Register re-evaluation
Remove parking and orchard trees from Curry Orchard, and remove the majority of comfort stations	Loss of Curry Orchard Parking; loss of Curry Orchard; loss of comfort stations; contributing elements in Yosemite Valley Cultural Landscape Historic District	Recordation, salvage of cuttings, interpretation
Orchards		
Manage and maintain Lamon Orchard (but no replanting); salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Lamon Orchard; a contributing element in Yosemite Valley Cultural Landscape Historic District	Recordation, salvage of cuttings, interpretation
Neither manage nor maintain Hutchings Orchard; salvage cuttings and establish representative plants at appropriate facility outside of the park	Eventual loss of Hutchings Orchard; a contributing element in Yosemite Village Historic District	Recordation, salvage of cuttings, interpretation
Remove Curry Orchard	Loss of Curry Orchard; a contributing element in Yosemite Valley Cultural Landscape Historic District	Recordation, salvage of cuttings, interpretation
Ecological Restoration, Including Bridge Removal		
Restore Valley meadows, and riparian corridor within Merced River Protection Overlay at former campsites, picnic area, and river corridor at Yosemite Lodge	Loss of the road bisecting Camps 7 and 15; loss of meadow ditches and river control structures such as wing dams, check dams, etc.; contributing elements in the Yosemite Valley Cultural Landscape Historic District	Recordation, interpretation
Remove Ahwahnee and Sugar Pine Bridges	Loss of Ahwahnee and Sugar Pine Bridges; individually significant historic structures	Salvage, interpretation, National Register re-evaluation (recordation complete)

appendix F

Vegetation Restoration Objectives for Selected Areas in Yosemite Valley

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX F – VEGETATION RESTORATION OBJECTIVES FOR SELECTED AREAS IN YOSEMITE VALLEY

Appendix F presents four separate tables that outline the anticipated vegetation composition to which general areas would be restored as proposed in Alternatives 2, 3, 4, and 5. Upland vegetation, as well as the highly valued resources of California black oak, riparian, and meadow vegetation types would all be affected by proposed restoration actions. General areas of Yosemite Valley are grouped together to facilitate comparisons among the alternatives. Alternative 1 represents existing conditions and is not presented in these tables. It should be noted that acreage totals for each general area were rounded to the nearest 1 acre unless the area size was less than an acre. In that case, it is denoted as "trace". Totals for each vegetation type may differ slightly from those presented in Vol. IA, Chapter 2, Alternatives, due to rounding. Acres of restored wetland are represented by riparian and meadow acreages in the table below.

Alternative 2					
	Acres Restored				
Area	Upland	Black Oak	Riparian	Meadow	Total
The Ahwahnee	2	1	–	–	3
(tennis courts, utility area)					
Campgrounds	4	10	63	24	101
(Upper and Lower River, Lower and North Pines, Backpackers, Group, Yellow Pine, Camp 4 [Sunnyside Campground], dump station)					
Curry Village	6	2	2	trace	10
(portion of Curry Orchard, rockfall zone)					
Housekeeping Camp	1	3	9	–	13
(River Protection Overlay)					
Lower Yosemite Fall	–	–	trace	–	trace
(human-built rock rubble pile)					
Yosemite Lodge	2	2	16	20	40
(former cabin area)					
Yosemite Valley – General	trace	1	6	trace	8
(Swinging Bridge and Church Bowl Picnic Areas, Camp 6 (River Protection Overlay), Superintendent's House (Residence 1)					

Alternative 3					
	Acres Restored				
Area	Upland	Black Oak	Riparian	Meadow	Total
The Ahwahnee	2	1	–	–	3
(tennis courts, utility area)					
Campgrounds	4	13	61	25	103
(Upper and Lower River, Lower and North Pines, Backpackers, Group, Yellow Pine, Camp 4 [Sunnyside Campground], dump station)					
Curry Village	9	3	4	1	17
(Curry Orchard, rockfall zone)					
Housekeeping Camp	2	4	12	–	18
(River Protection Overlay, highly valued resources)					
Lower Yosemite Fall	–	2	trace	–	2
(human-built rock rubble pile, Hutching's Orchard)					
Yosemite Lodge	2	2	16	20	40
(former cabin area)					
Yosemite Valley – General	Trace	6	8	8	22
(Swinging Bridge and Church Bowl Picnic Areas, Camp 6, Superintendent's House (Residence 1), Lamon Orchard, kennel, former gas station)					

Alternative 4					
	Acres Restored				
Area	Upland	Black Oak	Riparian	Meadow	Total
The Ahwahnee	2	1	–	–	3
(tennis courts, utility area)					
Campgrounds	3	13	58	25	99
(Upper and Lower River, Lower and North Pines, Backpackers, Group, Yellow Pine, Camp 4 [Sunnyside Campground], dump station)					
Curry Village	9	–	3	–	12
(rockfall zone)					
Housekeeping Camp	2	4	12	–	18
(River Protection Overlay, highly valued resources)					
Lower Yosemite Fall	–	–	trace	–	trace
(human-built rock rubble pile)					
Yosemite Lodge	2	2	16	20	40
(former cabin area)					
Yosemite Valley – General	trace	5	7	6	18
(Swinging Bridge and Church Bowl Picnic Areas, Camp 6, Superintendent's House (Residence 1), kennel, former gas station)					

Alternative 5					
	Acres Restored				
Area	Upland	Black Oak	Riparian	Meadow	Total
The Ahwahnee	–	1	–	–	1
(tennis courts, utility area)					
Campgrounds	3	7	54	21	85
(Upper and Lower River, Lower and portions of North Pines, Backpackers, Group, Yellow Pine, Camp 4 [Sunnyside Campground], dump station)					
Curry Village	9	2	3	1	15
(portions of Curry Orchard, rockfall zone)					
Housekeeping Camp	1	3	9	–	13
(River Protection Overlay, highly valued resources)					
Lower Yosemite Fall	–	–	trace	–	trace
(human-built rock rubble pile)					
Yosemite Lodge	2	2	16	20	40
(former cabin area)					
Yosemite Valley – General	trace	1	6	trace	8
(Swinging Bridge and Church Bowl Picnic Areas, Camp 6 (River Protection Overlay), Superintendent's House (Residence 1)					

appendix G

Transportation Assumptions

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX G – TRANSPORTATION ASSUMPTIONS

Visitation

VISITOR USE LEVELS

The following data sources were used in the estimation of existing visitor-use levels and use patterns in Yosemite Valley:

- Permanent traffic counters on Southside Drive at the Yosemite Chapel and Northside Drive west of Camp 4 (Sunnyside Campground). These counters provide hourly and daily traffic counts and monthly summaries on a continuous basis.
- Vehicle and visitor counts at Yosemite National Park gates reported in monthly statistical summaries.
- Traffic turning movement counts conducted at several locations in the Valley in 1999 as part of the *Draft Yosemite Valley Plan/SEIS*.
- Counts of Valley shuttle buses, Valley Floor Tour and in-park tour passengers provided by Yosemite Concession Services Corporation for 1998 and previous years.
- Parking occupancy and turnover studies conducted in the Valley in 1992.
- Exit surveys of visitors conducted in 1993 and in 1998.
- Visitor use and satisfaction surveys conducted at Yosemite Falls and at the Mist Trail in 1998.
- Lodging room availability, occupancy, length of stay, and party size data for each month in 1998 provided by Yosemite Concession Services Corporation.
- Yosemite Valley campground unit availability, occupancy, length of stay, and party-size data provided by Yosemite National Park for 1998.
- Employee housing data for 1998 provided by Yosemite Concession Services Corporation and Yosemite National Park.
- Estimates of jobs in the Valley provided by Yosemite Concession Services Corporation and Yosemite National Park.
- Data on employee vehicle registration from Yosemite Concession Services Corporation and Yosemite National Park.
- Field measurements of existing parking areas by Yosemite National Park staff.

SELECTION OF DESIGN DAY AND DESIGN HOURS

The requirements for in-Valley shuttle bus service and bus bays for out-of-Valley shuttle buses, tour buses, and other transit buses were based on the level of visitor use occurring on a typical busy weekend day in the summer. Traffic counts in 1998 from the permanent count stations on Southside Drive and Northside Drive were analyzed to determine levels of activity on weekends

and weekdays during the summer. The days with the highest traffic volume were identified and sorted in descending order to identify a basis for selecting the design day. Based on the relative volumes of the highest traffic days and using the professional judgement of the transportation planning team, the fourth highest day (July 25) in 1998 was selected as the design day. The total vehicle volume entering the Valley on the design day was 7,200.

The hourly traffic volumes entering the Valley and exiting the Valley were examined for the design day to select design hours for transportation analysis. The peak inbound hour occurred between 11:00 A.M. and 12:00 noon, when 772 vehicles entered Yosemite Valley. The peak outbound hour occurred between 5:00 P.M. and 6:00 P.M., when 908 vehicles left Yosemite Valley.

Visitor Use and Other Activity for the Design Day

Visitor use for the design day was estimated from the volume of traffic entering the Valley on that day. Vehicles entering the Valley at the Yosemite Chapel counter and exiting at the Camp 4 (Sunnyside Campground) counter carry a combination of day visitors, newly-arriving (and departing) overnight visitors, overnight visitors returning from (or leaving for) day trips, commercial tour buses carrying both day and overnight visitors, employees commuting to (and from) work in the Valley from residential areas in El Portal and other locations, administrative trips, and vehicles recirculating within the valley to and from the El Capitan crossover. Available data and assumptions were used to develop a model to allocate the daily and hourly vehicle trips detected by the counters by type of trip for entering and exiting traffic. This model provided baseline data for Alternative 1, the No Action Alternative, and estimates of future visitation for each action alternative. The following paragraphs document the process used to estimate visitor demand.

Overnight Visitation

The number of overnight visitors staying in the Valley on the design day was determined from the number of lodging units available, the average party size in the lodging quarters, the number of individual and group campsites available, and the average party size in the individual and group campsites. Because the demand for overnight accommodations in Yosemite Valley exceeds the available supply, it was assumed that the number of overnight visitors equaled the capacity of overnight units throughout the peak visitation season.

The estimated overnight use of the Valley in 1998 included 4,213 lodging guests, including visitors at Housekeeping Camp, 2,170 campers in Valley sites, and 348 wilderness backpackers that started trips from the Valley. The overnight users are estimated to stay an average of 2.99 nights at campsites and 1.98 nights at lodging units. It is estimated that 13.5% of the overnight guests in lodging units travel to the Valley in tour buses. The occupancy of vehicles serving overnight lodging guests is assumed to be equal to the average party size for lodging guests. Campers are assumed to travel in groups of 2.9 people per vehicle. These factors result in a vehicle trip demand of 435 trips per day for newly arriving lodge guests, 372 trips per day for campers, and 40 trips per day for wilderness backpackers. In addition, lodging guests and campers are estimated to make 1,032 vehicle trips out of the Valley to visit other areas in the park.

Commuters and Administrative Traffic

There were an estimated 377 employees that commuted to and from the Valley on the design day. A survey of employee travel behavior indicated that 72% of employees drive alone, 21% carpool and 7% travel by bus or vanpool. The resulting commute vehicle trip volume is 310 per day. An additional 67 vehicle trips are estimated to occur for other administrative purposes. The alternatives call for relocating employee housing from Yosemite Valley to El Portal and other locations. The analysis of Alternatives 2, 3, 4, and 5 assumes that an employee transportation system would be developed to transport employees from employee housing to the Valley. The impact analysis assumes that the future number of commuter vehicle trips to the Valley would remain the same as or be lower than 1998.

Commercial Tour Buses and Other Transit Services

Commercial tour bus entries and passengers are recorded at the entrance stations and reported on a monthly basis. All tour buses are assumed to travel to Yosemite Valley. On the design day, an estimated 77 tour buses entered the Valley. These buses carried a mix of day and overnight visitors. The analysis of action alternatives assumes that commercial tour buses would continue to serve about 13.5% of overnight visitors in lodge units and 13.5% of day visitors.

Internal Circulation

Traffic counts taken at the El Capitan crossover indicate that about 10% of the traffic that enters the east end of the Valley near the Yosemite Chapel is coming from Northside Drive via the El Capitan Bridge. Alternatives that retain the existing traffic pattern assume that there would be a similar volume of recirculating traffic. Many other vehicle trips are currently made between locations within the Valley. An example is a trip from a campsite to the Yosemite Village Store for groceries. Depending on the alternative, these vehicle trips would continue to be made or they would be replaced by trips on Valley shuttle buses.

Day Visitors

The number of vehicle trips by day visitors to the Valley was estimated by subtracting estimates of the number of vehicle trips associated with every other type of travel from the total vehicle volume. In other words, the vehicle volume for day visitors on the design day was the number of vehicles remaining from the 7,200 total vehicles after subtracting the estimated vehicle volumes for overnight visitor turnover, day trips by overnight visitors, commuters and other administrative trips, commercial buses, and recirculating vehicles. The number of day visitors was then calculated using an average vehicle occupancy of 2.9 for private vehicles and adding the estimated number of day visitors arriving via tour bus (13.5% of all day visitors). The estimated number of day visitors using this method was 13,950 on the design day. This estimate was compared to independent estimates of the number of day visitors to the Valley generated from exit surveys. The estimates were found to be similar within acceptable limits.

Diurnal Visitation Patterns

The hourly distribution of visitor arrival and departure times was based on the observed volume of vehicles at the Yosemite Chapel and Camp 4 (Sunnyside Campground) permanent count stations and assumptions regarding the proportion of vehicle trips of each type that occurred in the design hours.

Day-of-Week Visitation Patterns

The relationship between conditions on the design day and other days of the week was determined by analyzing traffic counts for each day of the week and for the overall average day during the peak visitation season. It was assumed that overnight accommodations continue to be fully occupied on all days in the peak visitation season (July and August). As a result, the difference between the seasonal average traffic volumes and the design day volumes was assumed to be caused by lower day visitation on nonpeak days. The average day visitation in the peak season was estimated to be 10,950 people per day, compared to 13,950 for the design day. Estimates of total annual visitation to the Valley were based on the average daily visitation and seasonal visitation variations described in the next section.

Seasonal Visitor Use

Traffic entering and exiting the Valley is counted continuously and the counts are recorded and analyzed to determine seasonal patterns and annual averages. To develop estimates of visitor demand by month and for the year, the average daily traffic counts for each month were compared to the counts for the design day. The ratio of the monthly count to the design day count was used to estimate visitation for months other than the peak season. It was assumed that overnight and day visitation vary proportionally over the year.

Distribution of Visitor Use in Valley

Overnight Visitors

Overnight visitors were assumed to be distributed among locations throughout the Valley based on the number of campsites and lodging units in each developed area. In the action alternatives, overnight visitors were assumed to travel to destinations within the Valley from their overnight accommodations using shuttle buses, bikes, or walking paths. Surveys of visitor travel to the major features of Yosemite Falls and Vernal Fall trail in 1998 were used as a starting point for estimates of overnight visitor travel in the Valley. These estimates were used to determine the demand for in-Valley shuttle bus service.

Day Visitors

Day visitors were assumed to travel in private vehicles to the parking areas defined in each alternative, or to parking locations outside the Valley. Other visitors were assumed to use commercial tour buses and other forms of public transportation to reach Yosemite Valley. Each alternative includes a bus transfer facility or transit hub where day visitors arriving in buses from parking areas outside the Valley would gain access to walking trails, bike trails, and shuttle buses operating within the Valley. Depending on the location of the parking and bus transfer facilities,

varying proportions of the visitors were assumed to use shuttle buses to reach features and activity areas. Alternatives with transit facilities in Yosemite Village were assumed to offer more opportunities for walking and biking and less need for shuttle bus service than alternatives with transit facilities in the west Valley.

Transportation Facilities, Services, and Volume

Transportation facilities and services incorporated in the plan alternatives were sized to meet anticipated demand by all relevant user groups. Transportation demand for the plan alternatives was estimated by determining the number of vehicle trips that would be made by visitors and other travelers to the Valley if they were not constrained by the capacity of facilities provided in the plan. It was assumed that the proportion of visitors and employee commuters (the two largest components of travel demand to the Valley) using private vehicles and buses to travel to the vicinity of the park would remain the same as in 1998. It also was assumed that the average number of people traveling in private vehicles would remain the same as in 1998. Depending on the alternative, varying numbers of the vehicle trips would be intercepted at locations outside the Valley. The travelers would then be transported by bus to their destinations in the Valley.

Parking Demand and Supply

The demand for parking in Yosemite Valley fluctuates with the flow of day visitors into the Valley throughout the day, the arrival and departure of commuting employees, and the arrival and departure patterns of overnight visitors. The net change in the accumulation of vehicles in the east Valley is estimated over time by comparing the hourly counts of inbound and outbound vehicles. The total vehicle occupancy of the Valley at any time is determined by adding to the net change a baseline number that reflects the number of resident vehicles, park and concession vehicles, and the minimum estimated number of overnight visitor vehicles that are in the Valley at the time of lowest total occupancy.

The lowest occupancy of vehicles in the east Valley occurs near midnight on weeknights. Some lodging units and campsites may be unoccupied on these nights and all day visitors and commuting employees have left the Valley by this time of night. It is estimated that 3,180 vehicles are parked in the Valley at the minimum occupancy time.

The highest occupancy of vehicles occurs on Saturdays during the afternoon. It is estimated that about 4,700 vehicles are either parked or driving on the roads in the Valley east of the Yosemite Chapel during Saturday afternoons in the peak season. The components of parking demand are discussed in more detail below.

The supply of parking that is available and endorsed for visitor use was estimated by Yosemite National Park staff during a field survey in 1999. Improvements to the parking areas at Camp 6 and the historic Curry dump were made in 1999. These improvements allowed more vehicles to be parked in the same developed area by organizing the parking areas and providing better delineation of parking spaces. Under present use patterns, all parking areas are used by a mix of day and overnight visitors and employees.

Overnight Visitors

The estimated parking demand for overnight visitors includes 861 lodge guest vehicles, 1,112 camper vehicles (includes vehicles at Housekeeping Camp), and 120 backpacker vehicles. The peak demand for overnight parking of 2,093 visitor vehicles is estimated to occur in the evening after all overnight visitors have arrived. During the afternoon, when the overall maximum vehicle occupancy occurs, an estimated 1,595 overnight visitor vehicles are parked in the Valley. This estimate is based on assumptions regarding the number of departing visitor vehicles that have not been replaced by new arriving visitor vehicles, and the number of overnight visitors that have left the Valley in their vehicles to make day trips to other areas.

The overnight parking demand assumed in the alternatives is equal to the number of overnight units, with the exception of walk-to campsites, which are assumed to be used by visitors traveling to the Valley by alternative modes, and sites at Camp 4 (Sunnyside Campground), where an average of 3 vehicles per site is assumed. The number of vehicles parked could be higher, since individual campsites can accommodate two vehicles and group sites can accommodate up to three vehicles. The parking is generally located with the overnight units. Walk-in campsites have parking lots located within a reasonable walk distance, rather than at each site.

Day Visitors

Most of the fluctuation in the number of vehicles in the Valley over time is caused by the arrivals and departures of day-visitor vehicles. The number of day-visitor vehicles in the Valley at the time of maximum occupancy was estimated by calculating the net change in vehicle occupancy in the Valley from Friday at midnight to Saturday afternoon. After accounting for a net reduction in the number of overnight vehicles in the Valley over the same time period and considering the number of employee commuter vehicles that are estimated to be in the Valley at the peak time, the number of day-visitor vehicles parked or driving on Valley roads was estimated to be 1,737 vehicles.

The overall parking supply for each alternative is designed to provide enough parking to meet a specific demand level, which in total equals the visitation level in the *General Management Plan*. The location of parking varies by alternative. The parking supply for alternatives that include parking areas outside Yosemite Valley includes a factor to account for the additional time required for visitors to travel between the parking lots and the Valley.

For those alternatives with out-of-Valley parking for day visitors, parking was located along the major Valley access corridors, including Highway 140 (El Portal Road), Highway 41 (Wawona Road), and Highway 120 (Big Oak Flat Road). The share of parking for each route was based on estimates of the number of visitors making trips to and from the Valley from each route. A 1993 and a 1998 survey of visitors exiting the park were used to estimate the share of Valley visitors from each route.

The alternatives were designed to provide parking and, where required, shuttle bus service within the park to accommodate the *General Management Plan* total visitation of 18,241 people per day. Because each alternative accommodates a differing number of overnight visitors, the alternatives provide parking for different numbers of day visitors in the park (see Vol. IA, Chapter 2, Actions Common to All Action Alternatives).

Table G–1 shows the number of day visitors that would be served by parking in the park (both in-Valley and out-of-Valley) under each alternative.

Table G-1
Day Visitors Served by In-Park Parking

	Alternative				
	1	2	3	4	5
Day Visitors Served by In-Park Parking	13,950	12,852	13,0291	13,077	12,350

1. The number of visitors shown for Alternative 3 reflects the capacity of the parking lot in the Valley only, because this alternative was defined to not include out-of-Valley parking.

The number of parking spaces required to accommodate the desired number of day-visitors was determined as follows:

- Determine the number of parking spaces that would be required to park all day-visitor vehicles in the Valley at the time of maximum occupancy. It is estimated that 1,737 day-visitor vehicles are presently parked on Valley roads or driving on Valley roads at peak time. Using a parking efficiency ratio of 97.5%, 1,782 parking spaces would be needed to park these vehicles assuming that a traveler information and traffic management system is in place.
- Determine the number of daily visitors that would be served by each parking space: 13,950 daily visitors/1,782 parking spaces = 7.83 visitors per space.
- Divide the number of day visitors to be served in each alternative by 7.83 to determine how many parking spaces would be needed in the Valley. For Alternative 3, with parking in a single lot, a parking efficiency ratio of 100% was used. As a result, the number of spaces needed was slightly lower than the other alternatives on a per-visitor basis.
- Subtract the actual number of spaces provided in the Valley from the number required to determine the "equivalent" spaces to be provided outside the Valley.
- Apportion the out-of-Valley spaces to each approach route, based on the share of Valley visitors making trips in and out the same route (50% to Big Oak Flat Road, 24% to El Portal Road and 26% to Wawona Road).
- Adjust the number of parking spaces in each corridor to reflect the extra travel time required to reach the parking. Because the current average stay duration is 4.5 hours, the parking expansion adjustment was (Round-trip time + 4.5 hours)/4.5 hours.

TOUR BUSES

At present there are 23 designated tour bus parking spaces in the parking lot serving the Lower Yosemite Fall trail. The existing spaces are not sufficient to meet the demand for tour bus parking. As a result, tour buses are parked in other locations, including roadside turnouts.

The alternatives provide for tour bus loading and unloading at lodging units for overnight visitors. Day visitors arriving in tour buses would be dropped off and picked up at the valley transit transfer center. After dropping passengers at the designated loading areas, tour buses would proceed to a parking area. The location of the parking area for tour buses varies by alternative. Tour buses would park in the area designated for overnight parking of Valley shuttle buses. This parking area would not be used by shuttle buses during the day when parking

demand for tour buses is greatest. Tour bus use in the future is unknown. The impact analysis assumes that tour buses would continue to serve about 13.5% of day visitors and overnight lodging guests. Day visitors that do not park in the Valley or at remote locations in the park may also use commercial tour buses to enter the Valley. The capacity of the passenger loading areas and bus parking would accommodate growth in tour bus use beyond the levels assumed in the impact analysis.

Commuters and Administrative Vehicles

Parking demand for commuters and other administrative vehicles not based in the Valley is currently estimated to be 283 vehicles. This assumes that 75% of the commuter vehicles traveling into the Valley on a typical day are in the Valley when parking demand is greatest. All of the alternatives assume that traffic management measures and alternative transportation systems would provide commuter and administrative parking needs at or below the existing amount. Parking for commuters and other administrative vehicles is assumed to be located at the work sites of employees and not in public parking areas used by visitors under the action alternatives.

Residents

Resident parking demand is estimated based on an assumed ratio of 0.8 vehicles per resident employee. The current parking requirement for employee residents is 1,022 vehicles. Some residents currently park vehicles in visitor parking areas because parking is not available at some residences.

All of the action alternatives call for a reduction in the number of residents in the Valley and a corresponding decrease in the demand for resident parking. Parking for residents in the action alternatives is assumed to be provided at the place of residence and not in public areas used by visitors.

Roadway Traffic and Facilities

Traffic volumes and the resulting requirements for roadway capacity were estimated by forecasting the daily and peak hour vehicle volumes for day visitors, overnight visitors, commuters, and other administrative vehicles, and the various types of bus service. Traffic routes were determined for each type of user, reflecting the locations of parking provided in each alternative. Overnight visitor traffic was assigned to lodging and campgrounds in proportion to the overnight capacity of each area. Day-visitor traffic was assigned to the parking areas defined in each alternative. Buses carrying visitors entering the Valley were routed to the transfer facility provided in each alternative, or to Yosemite Village if no transfer facility was included in an alternative. Administrative traffic was assigned to employment areas in the Valley. The following paragraphs describe how traffic volumes on roadway segments was forecast for the design day.

Traffic Entering the Valley

The total volume of vehicle traffic entering the Valley varies by alternative. Traffic is a function of the day-visitor parking, the campsites and lodging units provided in each alternative, and the number of bus trips required to serve parking areas outside the Valley. This section describes how private vehicle traffic was estimated for the alternatives.

Estimates of daily and hourly traffic volumes were developed for the following categories of vehicle traffic:

- Day visitors
- Overnight visitor turnover
- Day trips by overnight visitors
- Commuters and administrative trips
- Recirculating traffic

The process for estimating the daily volume of each category was described in an earlier section of this appendix. Additional detail for traffic by hour of the day is provided below.

It is estimated that 4,159 vehicle trips are currently made by day visitors into the Valley on the design day. As described previously, 1,782 parking spaces would be needed to accommodate day visitor demand. The number of vehicle trips per parking space was determined to be 4,159/1,782 = 2.33 trips per space. The number of vehicle trips for day visitors entering the Valley was then determined by multiplying this number of vehicle trips per space by the number of parking spaces included in the alternatives.

Hourly traffic volumes for vehicles entering and leaving the Valley were determined for the peak inbound hour and the peak outbound hour of the design day. Table G–2 shows the factors that were applied to each category of traffic to estimate total hourly traffic volumes.

Table G-2
Percent of Daily Traffic by Direction and Hour of Day

Traffic Direction and Hour of Day	Type of Traffic				
	Day Visitor	Overnight Turnover	Day Trips by Overnight	Administrative	Commercial Bus
Entering Valley					
Inbound Peak	15.2%	2.0%	2.0%	4.0%	20.0%
Outbound Peak	2.0%	13.0%	13.0%	3.0%	1.0%
Exiting Valley					
Inbound Peak	0.8%	20.0%	20.0%	2.0%	1.0%
Outbound Peak	15.2%	10.0%	4.0%	16.0%	5.0%

TRAFFIC VOLUMES ON ROADS

The alternatives include varying modifications to the existing roadway system. To evaluate the impacts of each alternative on the valley transportation system, a traffic impact analysis was conducted. The traffic impact analysis included trip generation, trip distribution, trip assignment and roadway network analysis (described in the next section).

TRIP GENERATION

Previous sections of this appendix document the process for estimating the number of vehicle trips generated by the different traffic user groups in the Valley. Table G-2 above shows the percentage of trips that occur during selected hours of the day.

Trip Distribution

Once the number of vehicle trips was estimated, the next step was to determine where the vehicles were traveling. The road network within the park is limited and primarily exists to provide direct access to lodging, parking, Yosemite Village, and attractions. The trip distribution model was developed for each alternative based on destinations of users. Overnight visitor destinations were distributed based on the number of campsite and lodge units in each area of the Valley. Commuter and administrative trips were distributed based on the assumption that 60% of these vehicle trips were destined for Yosemite Village and 40% were destined for the Curry Village area.

Trip Assignment

Once the trip distribution step was completed, the vehicle trips were assigned to the roadways in each alternative. The trip assignment varied for each alternative to reflect the changes to the roadway and transit networks. In all alternatives, except Alternative 3 and Alternative 4, buses traveling to the Valley were assumed to drop-off and pick-up passengers at Yosemite Village. To conservatively estimate the impact from the internal circulation and recirculation use categories, internal circulation traffic was assumed to travel the entire length of the Valley from Pohono Bridge or El Capitan Bridge to Stoneman Bridge. The road network was divided into 14 segments to assign the trips to the roadway system.

Traffic Flow And Level of Service

Once the estimated trips generated by each alternative were assigned to the Valley roadway network, several roadway segments and intersections were analyzed for each alternative. The transportation system was evaluated for both the inbound and outbound peak hours.

To evaluate the impacts of the various alternatives on the roadway system, nine roadway sections were selected for analysis including five roadway segments and four intersections. The chosen sections below were among the more heavily traveled routes within the Valley.

Roadway Sections

- Pohono Bridge
- El Capitan Bridge
- El Portal Road Segment D, from the intersection of the El Portal and Big Oak Flat Roads east to Pohono Bridge
- Southside Drive (near the Yosemite Chapel)
- Northside Drive (between Yosemite Lodge and Yosemite Village)

Intersections

- Southside Drive/Sentinel Road
- Northside Drive/Sentinel Road
- Northside Drive/Camp 6 – Village Access
- Southside Drive/Northside Drive

Transit

VALLEY SHUTTLE BUSES

Throughout each alternative, shuttles are included as the primary visitor distribution system within the Yosemite Valley. They are designed to transport visitors from designated parking areas and lodging facilities to the various scenic areas of the Valley. The intent of the shuttles is to relieve traffic congestion and enhance the visitor experience by providing improved circulation.

Demand estimates for Valley shuttles are developed from the prescribed modes of Valley access, and the size and location of lodging and camping facilities within each alternative, with consideration for the estimated number of visitors desiring to use the multi-use paved trail once in the Valley. Each alternative provides Valley access through a combination of in-Valley parking, overnight Valley lodging and camping capacity, and a system of out-of-Valley parking facilities and shuttles. The estimated daily Valley visitation is held constant at 18,241 visitors per day across all alternatives. Access to the Valley is managed using a combination of the Valley access options listed above and a traveler information and traffic management system, or the Restricted Access Plan.

The methodology employed in developing Valley shuttle demand estimates for the action alternatives (Alternatives 2 through 5) assumes that overnight visitors would be allowed to drive their personal vehicles to the Valley and park at the appropriate lodging or camping facility. Once at the overnight facility, visitors would be required to utilize the Valley shuttles or the multi-use paved trail for circulation among the various Valley visitor sites. Day visitors would be required to park in designated areas upon arrival at the park and then use shuttles or multi-use paved trail for circulation. Depending on alternative, day visitors are provided in-Valley parking spaces at a designated parking hub. Once the in-Valley parking is filled, visitor management actions are taken to divert day visitors to designated out-of-Valley parking locations where a system of out-of-Valley shuttles would take them to and from the Valley. After the out-of-Valley parking is filled, the only Valley access for visitors would be regional transit or other alternative transportation services. The following tables show the number of people who would board each shuttle route at the Valley transit hub under each action alternative. People also would board shuttle routes at other locations. Boardings at the transit hub are used to estimate the maximum demand on the shuttle routes.

Table G-3
In-Valley Shuttle Boardings by Route at the Transit Hub
Alternative 2 – Camp 6 (550 parking spaces)

	Ahwahnee Shuttle	West Valley	East Valley	Total
Peak Season Daily Boardings	1,340	4,560	10,528	16,428
Off-Season Daily Boardings	1,009	3,053	7,921	11,983

Table G-4 In-Valley Shuttle Boardings by Route at the Transit Hub Alternative 3 – Taft Toe (1,622 parking spaces)					
	Ahwahnee Shuttle	Yosemite Lodge	Happy Isles	Bridalveil Circulator	Total
Peak Season Daily Boardings	5,361	8,200	7,419	2,736	23,716
Off-Season Daily Boardings	3,609	5,354	5,530	1,832	16,325

Table G-5 In-Valley Shuttle Boardings by Route at the Transit Hub Alternative 4 – Taft Toe (550 parking spaces)					
	Ahwahnee Shuttle	Yosemite Lodge	Happy Isles	Bridalveil Circulator	Total
Peak Season Daily Boardings	5,379	8,203	7,393	2,736	23,711
Off-Season Daily Boardings	3,621	5,354	5,512	1,832	16,319

Table G-6 In-Valley Shuttle Boardings by Route at the Transit Hub Alternative 5 – Camp 6 (550 parking spaces)			
	East Valley	West Valley	Total
Peak Season Daily Boardings	14,593	1,706	16,299
Off-Season Daily Boardings	10,992	1,182	12,174

Shuttle service levels and associated support facilities are designed to provide convenient Valley circulation based on demand estimates developed for each alternative. Generally, shuttle services within each alternative are designed to provide a connection between the designated parking facilities and transit centers and the visitor center (as defined for each alternative), and additional connections to circulator services for the east Valley and, for some alternatives, the west Valley. Route variations and service levels change, depending on the location of in-Valley parking and the transit hub for each alternative.

The level of visitor activity expected, and primary activities for each location, defines passenger facilities. At the designated transit hub for each alternative, passenger facilities would include visitor orientation and information services, and other visitor services. Other passenger facilities would be located at Valley shuttle stops. These generally include visitor orientation material and route signs. Passenger seating, waste receptacles, and other limited passenger amenities may be provided at high-use shuttle stops. Valley shuttle support facilities include waiting areas (bus bays) at major visitor access and destination areas, and vehicle maintenance and overnight storage. Maintenance facilities are assumed to provide space and equipment for light maintenance and fueling in Yosemite Valley. Major repair functions would be located in the El Portal Administrative Site. Required area for maintenance and storage is determined under each alternative by the fleet size for the alternatives.

Capital, operating, and maintenance cost estimates were prepared for the transit elements of each alternative based on planning-level unit costs. The type of vehicle defined for the described service determines vehicle capital cost estimates. Standard low-floor shuttle buses used for the

Valley shuttle service are estimated at $250,000 per vehicle. High capacity, low-floor shuttle buses (used for circulator and connector services described for each alternative) are estimated at $350,000 per vehicle. These bus types and capital cost estimates are used for comparison purposes only. Actual bus configurations may change as the routes are implemented. Bus specifications for each shuttle service will be prepared as part of the implementation and procurement process. Operation and maintenance cost estimates for each shuttle are developed using a two-variable cost methodology. Shuttle operations are estimated to cost $30.50 per vehicle hour traveled (VHT) and include operator salary and various planning and administrative costs related to the size of the operating staff. Shuttle fuel and maintenance is estimated to cost $0.61 per vehicle mile traveled (VMT), including fuel and maintenance material (such as equipment and parts), and maintenance personnel salaries. Operating speeds vary by vehicle type and shuttle service within each alternative, but generally, the in-Valley shuttle services are expected to operate at average speeds of 12 to 20 miles per hour depending on vehicle type.

Out-Of-Valley Shuttles

Out-of-Valley shuttle buses provide transportation for day visitors between designated out-of-Valley parking and the Valley Visitor/Transit Center for each alternative. Under Alternatives 2, 4, and 5, in-Valley parking is supplied at various levels and is supplemented by out-of-Valley parking for day visitors. Alternative 3 provides all day-visitor parking within the Valley at the Taft Toe Visitor/Transit Center and does not provide out-of-Valley day-visitor parking and shuttle service. Alternative 1 manages Valley daily visitation through the Restricted Access Plan and provides no additional in-Valley parking or out-of-Valley parking.

Demand estimates for out-of-Valley shuttles in Alternatives 2, 4, and 5 are based on the designated number of out-of-Valley parking spaces provided by each alternative. Generally, alternatives with more in-Valley parking have fewer out-of-Valley parking spaces.

The amount of out-of-Valley shuttle service for each alternative is designed to accommodate the estimated demand for each service based on assumed arrival times at parking areas and assumed duration of day-visitor stays in the Valley. Out-of-Valley shuttle services provide day-visitor transport from three primary Valley access corridors: north, west, and south. The north access corridor serves the Big Oak Flat and Tioga Pass entrance stations. Out-of-Valley parking facilities for this access corridor would most likely be located along Highway 120 (Big Oak Flat Road). The west access corridor is defined as Highway 140 (El Portal Road) and provides visitor access from the Arch Rock Entrance Station. Out-of-Valley parking for this corridor is located at El Portal for each of the out-of-Valley service alternatives. The south access corridor is defined as Highway 41 (Wawona Road) and provides visitor access from the South Entrance Station. Out-of-Valley parking for this corridor is defined within each alternative. The following tables present demand estimates as total daily visitor round-trips on out-of-Valley shuttles by alternative and route.

Table G-7 Out-of-Valley Shuttle Boardings by Route Alternative 2 – Camp 6 (550 parking spaces)				
	Badger Pass	El Portal	Hazel Green or Foresta	Total
Peak Season Daily Boardings	1,921	1,773	3,694	7,387

Table G-8 Out-of-Valley Shuttle Boardings by Route Alternative 4 – Taft Toe (550 parking spaces)				
	Badger Pass	El Portal	South Landing	Total
Peak Season Daily Boardings	1,971	1,820	3,791	7,582

Table G-9 Out-of-Valley Shuttle Boardings by Route Alternative 5 – Camp 6 (550 parking spaces)				
	Henness Ridge	El Portal	Foresta	Total
Peak Season Daily Boardings	1,808	1,669	3,477	6,953

Out-of-Valley parking areas and the shuttle services to the Valley would not be operated during periods of low demand. Generally, parking in the Valley is expected to be adequate to meet day-visitor demand from November through March. During the shoulder seasons (April, May, and October) out-of-Valley shuttle service would operate at a lower level than during the summer. Service on the shuttles would be tailored to visitor needs throughout the year. Operating costs for out-of-Valley shuttles were estimated using the same unit costs documented for the in-Valley shuttle system.

Regional Transit and Tour Buses

Regional transit and other modes of transportation will be able to access the Valley under each alternative in the event regional service is implemented by private, commercial service providers. The National Park Service does not have authority to operate services outside the park, but is committed to working with other service providers desiring to implement regional transit service.

In-park Tours and Shuttles

In-park tours and shuttles, as described in Vol. IA, Chapter 3, Affected Environment, are expected to remain in operation in each alternative and are not affected by actions of the alternatives. Minor route deviations would be required for each alternative as road segments are closed or traffic flow directions are altered.

appendix H

Considering Cumulative Effects

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX H – CONSIDERING CUMULATIVE EFFECTS

Introduction

The Council on Environmental Quality's regulations for implementing the National Environmental Policy Act defines cumulative effects as:

> *the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such actions. (40 CFR § 1508.7)*

The following is a scenario of projects that may have potential cumulative impact when considered along with actions called for in the *Final Yosemite Valley Plan/SEIS*. The purpose of this scenario is to evaluate (1) whether the resources, ecosystems, and human communities have already been affected by past or present activities, and (2) whether other agencies or the public have plans that may affect resources in the future.

The Affected Region

This list of projects was developed through an iterative process with individuals, groups, and agency officials and attempts to include major projects within the affected environment relative to each impact topic. The region of evaluation was established based upon an observation of natural boundaries, the recognition of potential ecological relationships to Yosemite National Park, and with a general understanding of the common issues to be addressed in the impact analysis. However, overall the descriptions of the projects listed below were provided by those contacted.

In addition to considering other past, present, and reasonably foreseeable projects from within Yosemite National Park, the region of analysis included surrounding counties as follows.

- The National Park Service contacted county planning departments in each of the eight major counties surrounding Yosemite National Park:
  - Fresno County, CA
  - Inyo County, CA
  - Madera County, CA
  - Mariposa County, CA
  - Merced County, CA
  - Mono County, CA
  - Stanislaus County, CA
  - Tuolumne County, CA

- The National Park Service contacted city planning offices or city economic development councils in each of the seven key cities in the Yosemite National Park region:
  - Fresno, CA
  - Mammoth Lakes, CA
  - Merced, CA
  - Mariposa, CA
  - Modesto, CA
  - Oakdale, CA
  - Oakhurst, CA
- Other federal land management agencies with jurisdiction over lands surrounding Yosemite National Park (The National Park Service contacted agency public information officers, planners, and National Environmental Policy Act coordinators at each of these agencies):
  - State of California, Department of Transportation, Stockton, CA
  - U.S. Forest Service – Inyo National Forest, Bishop, CA
  - U.S. Forest Service – Stanislaus National Forest, Sonora and Groveland, CA
  - U.S. Forest Service – Sierra National Forest, Clovis, CA
  - U.S. Forest Service – Toiyabe National Forest, Carson City, NV
  - U.S. Bureau Of Land Management – Folsom Field Office, Folsom, CA

National Park Sevvice planners evaluated each project listed from the perspective of the individual characteristics of each impact topic. Analysis of potential cumulative impacts was specific to those projects that may have a compounding effect when considered with the actions of each alternative.

Cumulative Impact Scenario

Agency: California State Department of Transportation; U.S. Department of Transportation; Mariposa County; Merced County Association of Governments; Mono County; National Park Service – Yosemite National Park; U.S. Forest Service – Sierra National Forest and Inyo National Forest

Project Name: **Yosemite Area Regional Transportation System (YARTS)**

Description: YARTS is a collaborative, inter-agency effort begun in 1992 to evaluate the feasibility of a regional transportation system and to identify the best options for initial implementation and upkeep of such a system. YARTS is a Joint Powers Authority under California law and the National Park Service is an ex-officio partner of the JPA Commission, participating in all discussions but not as a voting member. The YARTS mission statement is as follows:

YARTS will provide a positive alternative choice for access to Yosemite National Park for visitors, employees, and residents. YARTS service is not intended to replace auto-access or trans-Sierra travel, but is intended to provide a viable alternative that offers a positive experience, maximizing comfort and convenience for riders while guaranteeing access into the park. (Yosemite Area Regional Transportation Strategy 1999:4)

YARTS has four primary objectives:

- Increase transportation options
- Reduce reliance on automobiles
- Support local economies
- Improve regional air quality

The target market for YARTS service includes those visitors staying overnight in the gateway communities and Yosemite National Park employees who live in the gateway communities. Decisions on the placement of bus stops and transfer facilities are local land-use decisions that will be made by the County Board of Supervisors in gateway communities, and by the National Park Service for locations inside the park boundaries. YARTS staging areas outside the park are undergoing a region-wide NEPA/CEQA process and will likely be a part of a region-wide shuttle bus system.

- YARTS is designed as a voluntary service that uses incentives to attract riders.
- YARTS is not intended to replace auto access to Yosemite National Park and does not support a ban on auto access to the park.
- YARTS supports the use of alternative fuels and is committed to operating vehicles utilizing the cleanest possible fuel as soon as practical.
- YARTS service will be designed to offer a seamless service between the gateway communities and major destinations within Yosemite National Park. YARTS buses will stop at attractions throughout the park and Yosemite Valley and will coordinate services with the park's internal shuttle bus operations.
- The initial YARTS service is a demonstration project. The purpose of the demonstration project will be to evaluate the public reaction to taking the bus, the quality of the service provided, and the impacts of YARTS transit on local communities.

A two-year demonstration service will test the YARTS concept. Implementation of the demonstration service occurred in May 2000 and the service is scheduled to operate until May 2002, with most service offered in the summer months.

One component of the YARTS effort to date includes bus stop improvements. On the Highway 140 corridor, eleven stops in each direction were approved, including stops in El Portal, Midpines, Mariposa, Cathey's Valley, and Merced. The project also includes approved stops in Mono County. Twelve to fifteen stops are currently approved and in use in Yosemite National Park. Three are approved and in use in the El Portal Administrative Site. Only minor safety improvements have occurred at the El Portal sites.

Agency Name: American Indian Council of Mariposa County, Inc. (Southern Sierra Miwok)

Project Name: **Indian Cultural Center**

Description: An Indian Cultural Center would be established by the American Indian Council of Mariposa County, Inc. (Southern Sierra Miwok) at the site of the last-occupied Indian village in Yosemite Valley (west of Camp 4 [Sunnyside Campground]). This center would provide a location for culturally associated Indian people to conduct traditional ceremonies and to practice and teach techniques of traditional lifeways. While the center would be open to the public, access might be limited during special ceremonies. Some public interpretation would occur, but this cultural center would not replace the primary educational function of the current Indian Village of Ahwahnee at Yosemite Village.

Facilities at the Indian Cultural Center would consist of structures and landscape features typical of an Indian village from the mid- to late-19th century. One large, partly subterranean ceremonial roundhouse and a smaller sweatlodge would be constructed. Approximately 15 cedar bark umachas (conical houses) would be built in the vicinity of the roundhouse and sweatlodge. Plants important for food, basketry, and medicinal uses may be grown. Existing archeological features, such as mortar rocks, would remain in place and be incorporated into the village design. The last extant structure from the original village, a small cabin (the former Westley and Alice Wilson home) currently being used as a National Park Service office, would be moved back to the village and adaptively reused as the cultural center office. A new kitchen and restroom facility would be constructed. Utilities (water, sewer, propane, unimproved road access, and electrical service) would be provided. Screening would be established where necessary to visually separate the cultural center and Northside Drive, Yosemite Lodge, Camp 4 (Sunnyside Campground), and the Valley Loop Trail. The Valley Loop Trail could be relocated to a route south of the cultural center to minimize intrusions. Overnight parking for scheduled activities would be provided at the Indian Cultural Center or other administrative areas.

Agency Name: National Park Service

Project Name: **Bridalveil Horse Camp Rehabilitation**

Description: This site was identified as a high priority for campground improvement in the park based on severe resource impacts due to soil loss, specifically erosion from failing roads, stock trails, social trails, and deteriorating stock campsites. Planned work includes arresting potential water pollution from stock campsites and rehabilitation of the gravel campground loop road.

Agency Name: National Park Service

Project Name: **Discovery View Scenic Overlook Vault Toilet Installation**

Description: This project proposes to install a vault toilet at the Discovery View scenic overlook in Yosemite Valley. Work will include purchasing a four-unit manufactured concrete vault toilet structure; excavating the vault site; and assembling of the restroom on site.

Agency Name: National Park Service

Project Name: **El Portal Road Improvement Project**

Description: This federal jurisdiction transportation project, which is entirely within the National Park Service's jurisdiction, involves the reconstruction of 7.5 miles of the El Portal Road (Segments A, B, and C) from the Yosemite National Park boundary in El Portal to Cascades Diversion Dam near the intersection of El Portal Road and Big Oak Flat Road. The project will improve access to Yosemite Valley and reduce safety concerns. The El Portal Road is a primary route for visitors accessing Yosemite Valley, and is the shortest all-weather route to the Valley. It also serves as the primary commuting route for park employees living in El Portal, Midpines, and Mariposa.

Agency Name: National Park Service

Project Name: **El Portal, Trailer Village Closure**

Description: The project calls for continuing to implement the actions described in the 1993 *Trailer Village Closure Policy*. Due to flood related risks all existing trailers would be removed from the site. The houses at Abbieville would not be effected. As a part of the closure process, the National Park Service would need to comply with the provisions of the Uniform Relocation Act of 1970, and on a case by case basis evaluate individual eligibiligy for housing and moving benefits.

Agency Name: National Park Service

Project Name: **Fire Management Plan Update**

Description: The National Park Service is updating the 1990 *Yosemite National Park Fire Management Plan*. The objectives associated with updating the plan are to improve ecosystem health, enhance public safety, and provide guidance to park operations for successfully integrating fire with other vegetation management principles. The plan will address prescribed fire, wildland fire, and community fire protection services. It is also expected to address parkwide fire issues and consider effects to burn units, vegetation associations, air resources, watersheds, soils, cultural landscapes, and other natural, cultural, and social resource variables.

Agency Name: National Park Service

Project Name: **Happy Isles to Vernal Falls Trail Reconstruction**

Description: This project proposes to reconstruct 5,400 linear feet of the Vernal Fall Trail from Happy Isles to the base of the Mist Trail stairs. Actions include construction of an average tread width of seven feet; rebuilding of trail walls; redistribution of old pavement as sub-base; and application of layers of aggregate road base, tack oil, and asphalt, with a granite dust topcoat. On steeper sections of the trail, improved traction will be provided for pedestrians. A functioning drainage system will be established in the trail corridor by paving water breaks and constructing rock drainages to channel water away from the trail.

Agency Name: National Park Service/City and County of San Francisco

Project Name: **Hetch Hetchy Road Reconstruction**

Description: To maintain administrative and visitor access to O'Shaughnessy Dam, the Hetch Hetchy Reservoir and other associated areas, the National Park Service (NPS) in 1999 and 2000 improved 8.6 miles of the Hetch Hetchy Road in Yosemite National Park, Tuolumne County, California. This included:

- Repairing the roadbed
- Resurfacing the road with asphalt concrete
- Re-grading and paving the existing drainage ditch
- Installing 15 culverts and associated inflow and outflow structures
- Repairing damaged embankments and stone wall

The action stabilized the roadway, decreased annual maintenance requirements, reduced the likelihood of future road closures associated with flood events, improved the safety of the road, and helped ensure a safe and reliable water supply for the City and County of San Francisco.

Agency Name: National Park Service

Project Name: **Hodgdon Meadow Campground Rehabilitation**

Description: This project was identified as a priority for campground infrastructure improvement to mitigate impacts to resources.

Agency Name: National Park Service

Project Name: **Hodgdon Meadow Water and Wastewater Treatment Improvement**

Description: Hodgdon Meadow is located at an elevation of 4,575 feet. During peak summer usage, water and wastewater must be provided for 70 residents, up to 440 campers (130 campsites with two restrooms), and up to 5,000 visitors per day who use the Big Oak Flat Entrance Station facilities. Improvements are required to meet state and federal regulations regarding public health and safety and to protect the natural environment.

Improvements to the water system will include: providing an additional water source, improving disinfection, increasing water storage capacity, improving water system controls, replacing asbestos cement pipe, equalizing system pressure, and constructing a dedicated line from treatment to storage. Improvements to the wastewater system will include: improving solids handling and effluent quality, improving the disinfection system, constructing primary and secondary treatment facilities, improving the spray field, replacing the leach field, and replacing the septic tank.

Agency Name: National Park Service

Project Name: **Merced River at Eagle Creek Ecological Restoration**

Description: The National Park Service proposes to mitigate human-caused impacts to the riverbank and floodplain at the confluence of Eagle Creek and the Merced River in Yosemite

Valley. Actions proposed in the project include: removal of an undetermined amount of abandoned park infrastructure including a sewer line and manhole; revegetation of the damaged riverbank using brush-layering, seeding, and mulching techniques; construction of a temporary fence to guide visitor activities to resilient areas; and elimination of a road shoulder used for parking.

Agency Name: National Park Service

Project Name: **Merced Wild and Scenic River Comprehensive Management Plan**

Description: In 1999 and 2000, the National Park Service developed a comprehensive management plan for sections of the Merced Wild and Scenic River that it administers. The purpose of the *Merced River Plan* would be to protect and enhance the river's Outstandingly Remarkable Values for the benefit and enjoyment of present and future generations.

The final plan and environmental impact statement was released to the public in July 2000; the planning process was completed in August 2000, with the signing of the Record of Decision. Included in the plan are descriptions of the boundaries, the official classification of river segments, and a description of the Outstandingly Remarkable Values associated with the Merced River. The *Merced River Plan's* land-use zoning prescriptions have served as a guide to protect river values during the *Yosemite Valley Plan* process, and have thereby directed the type of potential development and potential levels of use allowed within the river corridor in Yosemite Valley, Wawona, and El Portal.

Agency Name: National Park Service

Project Name: **Protection of Giant Sequoias at Mariposa Grove**

Description: This project proposes to protect the Mariposa Grove of giant sequoia trees by mitigating impacts caused by human activities. Work will include construction of a quarter-mile of boardwalks in areas where soils have been compacted and sequoia roots have been damaged; restoration of natural drainage patterns by re-routing a quarter-mile of trails to more appropriate sites; control of invasive non-native plant species; and evaluation of the preservation efforts through a monitoring program. This project is identified as priority 9 in the approved Resource Management Plan (Project Statement number YOSE-N-305.000).

Agency Name: National Park Service

Project Name: **Red Peak Pass Trail Rehabilitation**

Description: This project proposes to reconstruct the trail from Red Peak Pass to the Triple Peak Fork of the Merced River. Work will include extensive construction of rock retaining wall, rip-rap tread, water breaks, terrace steps, and meadow restoration.

Agency Name: National Park Service

Project Name: **Rehabilitation of Tuolumne Grove Trailhead Parking**

Description: This project would redesign and pave the existing Tuolumne Grove dirt trailhead parking area to accommodate automobile, buses and/or recreation vehicles for summer and

winter use. It would include preparation of preliminary design plans, environmental compliance documents, construction drawings, and bid documents. Construction projects include: vault toilets; installation of signs for improved way-finding; development of a picnic area; revegetation of cut slopes; visual screening of the trailhead area from Tioga Road; and providing for accessibility for visitators with disabilities.

Agency Name: National Park Service

Project Name: **Replacement/Rehabilitation of Yosemite Valley Main Sewer Line**

Description: This project consists of slip lining the sewer between Yosemite Lodge lift station and the El Capitan wood yard and also includes the selective replacement of manholes.

Agency Name: National Park Service

Project Name: **Mariposa Grove Roadway Improvement and Giant Sequoia Restoration**

Description: The National Park Service is considering alternatives for restoring giant sequoia habitat in the Lower Mariposa Grove of Giant Sequoias in Yosemite National Park by relocating the existing parking to the South Entrance area. It is expected that water drainage improvements will be made to the Mariposa Grove Road and that the existing water supply line would then be relocated into the road corridor. At the South Entrance area, the roadway would have minor realignments to address roadway safety problems, requiring the relocation of the park's South Entrance Station.

Agency Name: National Park Service

Project Name: **South Fork Merced River Bridge Replacement**

Description: The existing flood-damaged and temporary replacement South Fork Merced River Bridge will be replaced with a single-span structure.

Agency Name: National Park Service

Project Name: **Tamarack Campground Rehabilitation**

Description: This campground was identified as the highest priority for campground improvement based on severe resource impacts due to soil loss, specifically erosion from failing roads, trails, social trails, and deteriorating campsites. Much of the eroded soil is being deposited in a fragile creek. Planned work includes rehabilitation of the campground loop, relocation of ten campsites off Tamarack Creek, revegetation of the stream bank, and provision of additional campsites where possible within camp boundaries.

Agency Name: National Park Service

Project Name: **Tuolumne Meadows Development Concept Plan**

Description: The draft planning objectives of this document include the following:

- Identify sites to be restored to natural conditions
- Incorporate restoration actions to enhance these conditions and visitor experiences

- Identify appropriate levels of development
- Produce a comprehensive design plan for National Park Service and concessioner housing
- Assure that site layout, functional relationships, and circulation patterns will be designed in a manner with the least impact on resource values

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Agency Name: National Park Service

Project Name: **Tuolumne Meadows Water and Wastewater Improvements**

Description: The original objective of these improvements was to halt surface water diversion from the seasonally unpredictable and unprotected Dana Fork, and to develop a water supply from reliable and protected ground water sources. However, hydrogeological evaluations have found no aquifer capable of providing an adequate water supply. The park is steering toward using an infiltration gallery to collect water directly from the main stem of the Tuolumne River. The collection site would be placed under the Tioga Road Bridge that crosses the main stem of the Tuolumne River near Lembert Dome.

Also, this project would include design and construction to improve process efficiency of the Tuolumne Meadows water and wastewater treatment facilities, which currently impose grave risks to the environment and threats to public health. Tuolumne Meadows is the largest sub alpine meadow in the Sierra Nevada; the meadow is fragile, with a short growing season, where recovery from resource damage can take years to accomplish. The treatment facilities, located at an elevation of 8,575 feet, support approximately 5,000 park visitors and 200 park staff daily from May through October. Facilities served include a 304-site campground, a visitor center, a retail sales/service station, a 104-bed lodge, food service and grocery facility, and employee housing.

Work will include construction of a new wastewater treatment plant, modification of an existing pump station to transport raw sewage to the new plant location, elimination of sewage lagoons, and demolition of the existing plant. The new facility will include extended aeration, a covered 860,000-gallon effluent storage tank, sludge-handling capabilities, and an expanded sprayfield. The water line and electric service will be extended one mile to the new plant location and the access road will be improved. A 150,000-gallon water storage tank will be constructed. All work will be performed through contracts.

Agency Name: National Park Service

Project Name: **Tuolumne Wild and Scenic River Comprehensive Management Plan**

Description: In 1984, the Tuolumne River was designated a Wild and Scenic River. The Wild and Scenic Rivers Act requires that managing agencies develop a comprehensive management plan for Wild and Scenic Rivers that flow in their jurisdiction. The draft planning objectives of this document include the following:

- Review and finalize classifications and boundaries, and establish Outstandingly Remarkable Values for the Tuolumne Wild and Scenic River
- Delineate management zones and develop zoning prescriptions
- Address user capacity

Agency Name: National Park Service

Project Name: **Wawona, Seventh Day Adventist Parcel Land Exchange**

Description: The park has been involved in land exchange negotiations with the Seventh Day Adventist (SDA) Recreational Camp, located in Wawona. SDA is owner of a parcel of land adjacent to the park boundary and designated Wilderness. Current land use impacts adjacent Wilderness lands. The parcel desired by the National Park Service would be exchanged for park land adjacent to the lower portion of the existing SDA parcel, but away from the Wilderness boundary.

Agency Name: National Park Service

Project Name: **Wawona Campground Rehabilitation**

Description: The purpose of this project is to implement the *General Management Plan* goal to rehabilitate the Wawona Campground. Preliminary design plan, construction drawings, and bid documents will include the following actions: a) rehabilitate the campground entrance and loop road and individual campsite spurs, b) retrofit campsites and restrooms to meet accessibility standards, c) install low-flow toilet, replace toilet partitions, repaint, install energy efficient lights and heat, replace composition roofs with metal, and insulate and winterize the restrooms in loop A and B, d) construct showers e) replace exterior privacy partitions, f) reconstruct the amphitheater, g) remove septic tanks and leach fields, h) extend sewer, electrical service, and telephone 1.5 miles, i) replace existing signs with the new park sign system, and j) prepare a vegetation management plan which includes shoreline protection and reestablishes privacy and shade in the campground.

Agency Name: National Park Service

Project Name: **White Wolf Water System Improvements**

Description: The National Park Service proposes to design and construct upgrades to correct treatment process deficiency and capacity for the White Wolf water distribution, collection, and treatment facilities. The project includes the development of a new underground state-approved water source; the construction of a new state approved treatment facility, and the replacement of approximately 9,200 linear feet of water supply and distribution piping. The project would provide remote supervisory control and data acquisition of SCADA water treatment and improve vehicular and pedestrian access to the water treatment facility in an attempt to minimize existing safety concerns. Once the project is complete, emphasis will be focused on the restoration and revegetation of all disturbed areas.

Agency Name: National Park Service

Project Name: **Wilderness Management Plan Update**

Description: The National Park Service is updating the 1989 *Yosemite National Park Wilderness Management Plan*. The objective of updating the plan is to provide guidance to park operations for the successful management of Yosemite's designated Wilderness, which comprises over 95% of the park. The plan will address land management issues within the wilderness including

visitor use, vegetation associations, air resources, noise issues, watersheds, soils, cultural landscapes, and other natural, cultural, and social resource variables. The plan update would also address the use of the five High Sierra Camps in Yosemite National Park.

Agency Name: National Park Service

Project Name: **Yosemite Creek Campground Restoration**

Description: This campground was identified as the second highest priority for campground improvement in the park based on severe resource impacts due to soil loss, specifically erosion from failing roads, trails, social trails, and deteriorating campsites. Much of the eroded soil is being deposited in a fragile creek. Planned work includes rehabilitation of the campground loop, relocation of eight campsites off Yosemite Creek, revegetation of the stream bank, and the addition of campsites where possible within camp boundaries.

Agency Name: National Park Service, Yosemite Institute

Project Name: **Yosemite Institute, Crane Flat Campus Improvement**

Project Description: This project proposes an educational center at Crane Flat that would enable Yosemite Institute to provide educational and interpretive programs about the park's compelling stories. Facilities would be operated by Yosemite Institute, and accommodate Yosemite Institute groups and park partner interpretive and educational programs, training programs, research and field seminars. The campus design and function would model sustainable energy and resource practices, and would meet accessibility standards. Existing facilities include dormitories, a shower house with bathrooms, kitchen and dining areas, field equipment storage, offices, staff housing, and indoor and outdoor spaces for meetings, training, instruction, and evening and campfire programs. Among the expanded facilities would be a science lab with hands-on study collections of common Sierra plants and vertebrates, and dissecting scopes.

Agency Name: National Park Service

Project Name: **Yosemite Valley Shuttle Bus Stop Improvements**

Description: This project consists of the preparation of preliminary design plans, environmental compliance documents, and construction drawings; and the construction of six 10×80 foot concrete braking pads, and the rehabilitation or replacement of 94,000 square feet of asphalt road approaches.

Agency Name: National Park Service

Project Name: **Yosemite View Parcel Land Exchange**

Description: The park has been involved in land exchange negotiations with Yosemite Motels, Inc., owners of a parcel of land adjacent to the park boundary. The parcel desired by the National Park Service would be exchanged for park land directly downstream of the existing Yosemite Motels, Inc. development, between California Highway 140 and the Merced River, upstream of the confluence with Crane Creek. This parcel would accommodate a new entrance station complex and provide space for other needs. Yosemite Motels, Inc. would use exchanged

park lands for construction of motel units, parking lots, a public trail system, and nature/river interpretive study areas.

Agency Name: National Park Service, State of California

Project Name: **Sierra Nevada Research Institute – University of California, Merced**

Description: The Sierra Nevada Research Institute facilities are being considered near or in both Yosemite and Sequoia-Kings Canyon National Parks. To serve Yosemite National Park, the potential project locations under consideration are Hazel Green Ranch and Wawona. At Hazel Green Ranch, the project would consist of a new facility that would include a research laboratory, operational and residential space for researchers, and a small student dormitory. At Wawona, the project would consist of providing similar facilities by adaptively using existing buildings located in the Wawona area.

Agency Name: Hetch Hetchy Water and Power, City and County of San Francisco

Project Name: **O'Shaughnessy Compound Water System Improvements**

Description: The O'Shaughnessy Dam/Hetch Hetchy Reservoir is located in the northwestern portion of Yosemite National Park. The purpose of this project is to repair and replace the piping and appurtenances of the domestic water system for the O'Shaughnessy Dam Compound. During construction there will be reduced access to some portions of the compound and visitor facilities. Excavation and other construction activities may uncover artifacts from the O'Shaughnessy Dam construction period (1915-1938).

Agency Name: Hetch Hetchy Water and Power, City and County of San Francisco

Project Name: **O'Shaughnessy Dam Well**

Description: The dam outlet facilities will be modified to allow outlets to be used at more than one elevation for diverting water to the Canyon Tunnel. The feasibility of alternative conceptual designs is currently being evaluated.

Agency Name: Yosemite Sierra Visitors Bureau, Madera County

Project Name: **Winter Recreation Feasibility Study**

Description: The Yosemite Sierra Visitors Bureau has applied for funding for an Eastern Madera County Winter Recreation Feasibility Study to define the potential or lack of potential for winter recreation opportunities in Eastern Madera and the surrounding area. This would be accomplished through a market research study to identify: (1) if there is an interest in winter recreation opportunities, (2) whether this would lend itself to an anticipated winter visitation, (3) obtaining feedback from existing U.S. Forest Service recreation business permit holders for the purpose of identifying better levels of service to the general public from these recreation providers, and (4) preparation of an implementation plan which relates the demand and the potential for obtaining funding and in-kind services to support recommendations, if any, from the analyses.

Agency Name: Madera County

Project Name: **Highway 41 Extension**

Description: Highway 41 is a two-lane highway extending in a north/south direction through eastern Madera County from the Fresno County Line to the Mariposa County Line. It provides access to Yosemite National Park and the recreational areas of the east county.

The *Madera County Area Regional Transportation Plan* (November 1994) lists the following planned improvements for Highway 41:

Table H-1
Planned Improvements for Highway 41 in Madera County

Location	Short-Range 1992-1999	Long-Range 2000-2014
1. Fresno County Line to Avenue 11	2 lane highway to 4 lane freeway	4 lane freeway to 6 lane freeway
2. Avenue 11 to Avenue 12		2 lane highway to 4 lane freeway
3. Avenue 11 to Street 15		2 lane highway to 4 lane arterial
4. Avenue 15 to 145	Operational improvements/passing lanes	Operational improvements/passing lanes
5. At Road 417 intersection		Construct turn lanes
6. Coarsegold Creek Bridge to Marava	Safety Improvements	
7. Fresno River to Road 200		4 lane arterial & channelization
8. Ranger Station to Cedar Valley Rd.	Resurfacing	

Note: Projects are listed according to their proximity to Yosemite National Park.

The first two project improvements are located immediately outside of Fresno, California, approximately 50 miles south of the park, and the last project improvement is located approximately 8 to 10 miles from the park.

The "Fresno County Line to Avenue 11" and the "Avenue 11 to Avenue 12" improvements are the most likely to occur in the near future. The others, with the exception of resurfacing work for the "Ranger Station to Cedar Valley Road," which has already been completed, probably will not occur until at least 2015. The "Coarsegold Creek Bridge to Marava" project involves very minor safety improvements.

Highway 41 improvements are expected to relieve existing congestion problems, but it is not anticipated that they will affect traffic counts near the park. According to Bob Stone, Executive Director of the Madera County Transportation Commission, Highway 41 traffic counts are 30,000 trips per day at the county line and 3,000 trips per day at the Yosemite National Park gate.

Agency Name: Madera County

Project Name: **Rio Mesa Area Plan**

Description: This area plan encompasses approximately 15,000 acres on the east side of Highway 41, between the San Joaquin River and Highway 145. Construction of approximately 29,000 dwelling units is expected over 100 years. The elevation of the project area is almost 500 feet and lower on flat valley land. This project has an approved area plan that at this stage is

conceptual. The next step would require the property owners to work together to develop sub-area plans. No estimates can be made at this time regarding the number of units to be constructed in the next 15 to 20 years. Several different property owners are involved in this project and a timeline for progression to the next tier of planning is difficult to estimate.

Agency Name: Mariposa County

Project Name: **Expansion of County Transit System**

Description: Mariposa County plans to use federal funds matched with the local Transportation Fund dollars for bus purchases to meet the needs of the Mariposa County Transit System. Plans are to purchase four new buses that will be used to replace existing buses. As part of this project, service has been expanded from Coulterville and Greeley Hill to Mariposa, adding one trip per week. County transit system service would potentially be merged with the Yosemite Area Regional Transit System when YARTS is implemented.

Agency Name: Mariposa County

Project Name: **Hazel Green Ranch**

Description: Hazel Green Ranch is a privately owned piece of land abutting the western boundary of the park. The owner of Hazel Green Ranch has proposed to develop an eco-tourism project including approximately 250 guest rooms as single, double, and quad hard-sided cabins as well as 50 summer tent cabins. Food service, merchandise sales, and a University of California research station (see Sierra Nevada Research Institute) are also under consideration. Meadow preservation would be a focus for the property. Circulation and access in the resort area would be designed to emphasize a pedestrian environment with raised walkway providing much of the circulation. Facilities and activities would be provided for year-round recreation. Parking would be provided along the perimeter of the resort, adjacent to the area proposed for use as a transit center, parking area, and visitor contact facility (see Out-of Valley Transit Facilities, under Alternative 2)

Because of the potential development of a 200-meter public access road (see Alternative 2) across park lands to a transit center, parking area, and visitor contact station located on Hazel Green Ranch, the National Park Service is concerned about the potential for uncontrolled growth on this property and along the park boundary. To remedy these concerns, the landowner has agreed to put a deed restriction on the Hazel Green property, limiting development to 300 lodging units should the road, parking, and transit elements of the project move forward.

Agency Name: Mariposa County

Project Name: **Incline Road Reconstruction, Foresta Road Bridge to South Fork**

Project Description: During the flood of January 1997, Incline Road sustained substantial damage. The objective of this project was to reconstruct the roadway to pre flood conditions from Foresta Bridge to a point near the Merced River/South Fork Merced River confluence. The project consisted of reconstructing the roadway by reinforcing the fill and resurfacing with both road base and asphalt. The project was completed in June 2000.

Agency Name: Mariposa County

Project Name: **Mariposa County General Plan Update**

Description: The Mariposa County General Plan will update county wide zoning ordinances and related implementing documents. This update is intended to allow Mariposa County to comply with current California law. Specifically, it is intended that this would allow Mariposa County to comply with changes to state law that have changed since the 1980 General Plan was adopted. This update will follow established public involvement protocol and may respond to county wide land-use issues.

Agency Name: Mariposa County

Project Name: **Mariposa Creek Pedestrian/Bike Path**

Description: This pedestrian/bike path will eventually traverse the town of Mariposa for 3.5 miles from Highway 49 north, to the Mariposa County fairgrounds, two miles south of the Highway 140/49 intersection. The bike/pedestrian path will eventually add other routes and could serve local commuters when complete. Currently, the county is beginning construction of a three block section located in the center of the town of Mariposa. Estimated project completion is approximately ten years, depending on funding availability.

Agency Name: Mariposa County

Project Name: **Recreation Master Plan**

Description: This plan, now in the early planning stage, is intended to address county wide recreational opportunities, facilities, and strategies.

Agency Name: Mariposa County

Project Name: **Road Improvement and Circulation Policy**

Description: This project will establish access standards for subdivisions and other developments; will establish State of California Fire Safety Standards, define a county grading ordinance and establish county-wide road improvement standards.

Agency Name: Mariposa County

Project Name: **Road Realignment and Bridge Replacement of Highway 49 and Old Highway**

Description: The intersection, currently located south of the community of Mariposa, would be relocated closer to Mariposa, with other lane and bridge improvements included. The purpose of the project is to eliminate safety concerns. Construction activities are scheduled to begin in the year 2003 and are expected to extend into multiple planning cycles due to the relatively high cost of the project and the timing of various project components.

Agency Name: Mariposa County

Project Name: **Silvertip Resort Village Project**

Description: Located within the community of Fish Camp in southern Mariposa County, the proposed development includes a 137-room hotel, 40 cabins, conference facilities, an exterior swimming pool, three decorative ponds, an on-site wastewater disposal system, and 359 parking spaces, as well as roadway, pathway, and utility line extensions.

Agency Name: Mariposa County

Project Name: **Wawona Town Planning Area Specific Plan Update**

Description: This project is intended to update the 1987 Wawona Town Plan. The current planning objectives include amendment to and/or revision of Wawona Town Zoning Ordinances to address current nonconforming uses, to make the plan more reflective of other existing development, to provide for minimal community growth, and seek to establish a formal process for National Park Service involvement in town planning.

Agency Name: Mariposa County

Project Name: **Yosemite Motels Expansion**

Description: This project site is located along the north and south sides of Highway 140 at the existing Yosemite View Lodge development, within the El Portal Town Planning Area. Permitting has been requested to construct a 78-unit motel and a multi-purpose chapel/recreation building. Proposed access to the 78-unit motel and multi-purpose chapel/recreation building would be from the north side of Highway 140. Permitting has also been requested for the construction of a 63-unit, 3-story motel building and associated parking near the existing Yosemite View Lodge. Access to this 63-unit building would be from the south side of Highway 140.

Agency Name: Mariposa County

Project Name: **Yosemite West Re-zoning for 55 acres**

Description: This project would call for the re-zoning of a 55 acre parcel in the Yosemite West area to allow for the development of: employee housing, visitor parking, National Park Service and concessioner operating facilities, regional commercial and office service facilities and a hotel complex.

Agency Name: Mariposa County

Project Name: **Yosemite West, Rezone – Transient Rental Overlay Zone Amendment**

Description: The goal of this project is to provide a mixed-use development in Yosemite West that would complement the existing residential neighborhood and minimize work/home commute patterns inside the park for some employees.

Agency Name: Mariposa County

Project Name: **Yosemite West, Specific Plan**

Description: The objectives of this plan will be to resolve current land-use conflicts in Yosemite West by defining land-use standards and zoning criteria. The Yosemite West Community Advisory Committee is currently working with Mariposa County to identify other related goals and objectives of the proposed specific plan.

Agency: Mariposa County

Project Name: **Yosemite West, Thirty-One Acre Bed and Breakfast**

Description: This project would be located on thirty-one acres of land located adjacent to and immediately west of the current Yosemite West Subdivision. Access to the site would require travelling over two segments of roadway located within Yosemite National Park. The complex would need to comply with Mariposa County zoning ordinances and State of California waste water treatment regulations.

Agency Name: Mariposa County

Project Name: **Yosemite West, Wastewater Improvement Projects**

Description: The community of Yosemite West has received a Cease and Desist Order from the State of California, Regional Water Control Board. This order has required the Yosemite West Community to improve its wastewater treatment facilities by the fall of 2001. Wastewater treatment facilities in Yosemite West are currently undersized and cannot adequately treat the volume of sewage received. Mariposa County has also issued a moritorium on building in Yosemite West until such time as the wastewater treatment facilites are improved.

Agency Name: Merced County

Project Name: **University of California Campus, Merced**

Description: A development concept is underway for a new 10,300-acre university community which would include 8,100 acres owned by trusts, 200 acres owned by the County of Merced, and 2,000 acres that would be donated by a trust. The new development will be located north and east of Lake Yosemite, just outside of Merced, California. Currently, 150 acres are and would remain a golf course; the remaining acreage is currently undeveloped. At completion, the new community is expected to encompass 5,000 developed acres, with 31,500 residents and 31,600 students, faculty, and staff, for a total population of 63,100. The development will consist of 12,000 housing units, 825,000 square feet of commercial property, and a 2,750,000 square-foot business/employment center. This project is expected to bring significant urban development and growth to the northern portion of Merced County.

The Merced campus is scheduled to open in fall 2005 and site construction is expected to begin in summer 2001. This development is located approximately 40 miles from Yosemite National Park, it requires approximately two hours of driving time on Highway 140 to reach the park. The site is located at the base of the Sierra Nevada foothills and is primarily composed of grazing land and non-native grasslands, with some wetlands.

Agency Name: City of Merced

Project Name: **Merced City General Plan**

Description: By 2015, the City of Merced is expected to increase from its 1999 population of 62,000 to 133,000. The growth area was expanded from 16,000 acres to 20,500 acres in 1997 to accommodate the expected increase in population with the adoption of the City of Merced's General Plan.

Agency Name: California Department of Transportation, Amtrak

Project Name: **Rail Projects**

Description: New stations planned for the San Joaquin Corridor:

- Merced – 1 year to 18 months
- Fresno – unknown time frame
- Modesto – by Dec. 1, 1999
- Bakersfield – unknown time frame

The Modesto station north of Highway 132 for the Burlington Northern/Santa Fe rail line serves the San Joaquin Valley. The rail line runs from Kern County in the south to Sacramento in the north and provides service to local ridership as well as to tourists and visitors. This line serves the east San Joaquin Valley.

Currently there are five round-trips per day in this corridor: four from the Bay Area to Bakersfield and back and one from Sacramento to Bakersfield and back. The addition of another round-trip from Sacramento to Bakersfield is anticipated within one month. Last year, 700,000 Amtrak passengers traveled the San Joaquin corridor. In addition, two-thirds of those 700,000 passengers also boarded buses chartered by Amtrak. At the Bakersfield station, there are eight bus routes to take Amtrak passengers to various destinations beyond the station.

A rail corridor improvement project is underway to upgrade track, signalization, etc., along the Union Pacific corridor from Sacramento to Stockton. Another project is planned for improvements to the Burlington Northern corridor between Stockton and Bakersfield. These improvements would decrease running time and increase ridership.

The San Joaquin corridor is the fourth most popular corridor in the country in terms of ridership.

Agency Name: Mono County

Project Name: **Double Eagle Resort Construction at June Lake**

Description: Approved plans for this project include an 11,000 square-foot resort/spa development, a 2,960 square-foot restaurant, a 2,520 square-foot conference facility, and 22 rental cabins with a 4,000-square-foot recreation building. The restaurant, spa, and 14 of the 22 rental cabins were proposed to be completed in the summer of 1999. The other eight cabins were scheduled for construction during the summer of 1999, while other facilities are still in the planning phase. This project is currently in the construction phase.

Agency Name: Mono County

Project Name: **Hide-a-Way Down Canyon Condominiums, June Lake**

Description: This project, now in the preliminary planning stage, will include ten condominium units.

Agency Name: Mono County

Project Name: **Highlands, June Lake**

Description: Approved plans for Phase I of this project include 113 condominium units and 35 single-family residential lots. Lots are expected to become available for sale in 2000, and construction of the condominium units may occur in two or three years. This project is currently in the planning (Environmental Impact Report) phase.

Agency Name: Mono County

Project Name: **Mono County Regional Transportation Plan**

Description: The goal of this project is summarized as follows: "Through it's transportation planning efforts, the Mono County Regional Transportation Plan will assist in the preservation and protection of the park by strengthening the relationship between the Yosemite region and its eastern gateway."

The objectives of this project are as summarized: A) support the park's mission to preserve the resources that contribute to Yosemite's unusual character and attractiveness; B) improve opportunities for access by alternative modes; C) encourage diversity in visitor destinations and experiences; D) provide for safe and consistent transpotation between Yosemite National Park and its eastern gateway; and E) develop transportation infrastructure that supports access to and within the gateway communities.

Agency Name: Mono County

Project Name: **Residential Development, Crowley Lake**

Description: This project, now in the preliminary planning stage, will include a 48-unit multi-family apartment complex.

Agency Name: Mono County

Project Name: **RV Park Specific Plan and Construction, Bodie**

Description: This project will be located at the junction of U.S. 395 and S.R. 270 and will propose to impact approximately 13 acres of land on a 155 acre parcel. The project will consist of a general store, office, restroom, 10-unit motel, 600-square-foot old west museum, 32 space RV park, RV park restroom/shower, 8 cabins, 14 tent camping spaces, and 2 single-family residences.

Agency Name: Mono County

Project Name: **Tioga Inn Improvement, Lee Vining**

Description: Plans have been approved for this 120-room hotel at the intersection of Highways 395 and Highway 120. The hotel will also include ten residential housing units, banquet facilities, a coffee shop, a restaurant, and a gas station. Construction is estimated to begin in 2001 or 2002. This project is currently in the construction stage.

Agency Name: Tuolumne County

Project Name: **Evergreen Lodge Expansion**

Description: The Evergreen Lodge is located on Evergreen Road just south of Camp Mather, approximately 7.5 miles from Highway 120. Expansion plans are being considered to increase the size of the Lodge from 21 guest units to 109 guest units with associated amenities. It is anticipated that construction will not be completed until 2001 or 2002.

Agency Name: Tuolumne County, Yosemite National Park, Stanislaus National Forest, Federal State Route (Highway) Administration, City and County of San Francisco, National Park Service, California State Department of Transportation.

Project Name: **Evergreen Road Improvement**

Description: Discussions have been held regarding the improvement of Evergreen Road through the Forest Highway program. Evergreen Road provides access to Camp Mather and the Hetch Hetchy area from Highway 120 near the Big Oak Flat Entrance Station to Yosemite National Park. The project would improve Evergreen Road and possibly reroute it east of Camp Mather to Hetch Hetchy Road. No action has been taken on this project since discussions were held in October of 1998 and the project appears to be on hold.

Agency Name: Tuolumne County

Project Name: **Rush Creek Guest Lodging and Conference Facilities**

Description: Plans are being reviewed for approximately 144 guest units and conference facilities on approximately 18 acres near the intersection of Hardin Flat Road and Highway 120, approximately one mile west of the Big Oak Flat Entrance Station. The Rush Creek Lodge currently occupies the site. Construction is expected to be completed in 2001 or 2002.

Agency Name: Tuolumne County

Project Name: **Yosemite Gateway Plaza, Big Oak Flat**

Description: The project, now in the planning stage, may include: 1) two hotels at 200 rooms each; 2) a 80,000 square-foot commercial center; 3) an IMAX-type theater; 4) fast-food restaurants; 5) a gas station; 6) a 200 space RV park; 7) an information building; and 8) parking to serve Yosemite National Park.

Agency Name: U.S. Forest Service, Stanislaus National Forest

Project Name: **A-Rock Reforestation**

Description: This project will occur within Mariposa County at T2S, R19-20E and T3S, R19-20E. The Forest Service will reforest 5,000 acres within the A-Rock Fire. Reforestation activities may include burning, mechanical, and ground and serial application of herbicides. The decision notice and FONSI were signed in March 1999.

Agency Name: U.S. Forest Service – Stanislaus National Forest

Project Name: **Aspen Fuels Reduction (G020003)**

Description: The project is located in Tuolumne County at the Evergreen and Aspen Valley Road junction; T1S, R19E, Sec 26 & 35. This project proposes manual and mechanical removal of under-story trees to allow 500 acres of under-burning with prescribed fire to improve spotted owl habitat and provide protection to owl habitat and general forest from stand replacing wildfire. A portion of a Spotted Owl Protected Activity Center (PAC) is included within the treatment area.

Agency Name: U.S. Forest Service, Stanislaus National Forest

Project Name: **Fire Management Action Plan for Wilderness**

Description: This is a forest-wide action to incorporate the recently approved *Federal Wildland Fire Policy* that involves changes in terminology, funding sources, and management of wildland fires. A site-specific environmental analysis is in progress. The fire policy for wilderness allows naturally ignited fires to burn across boundaries (between U.S. Forest Service and National Park Service, for example) as long as the fire stays within certain prescribed conditions. As the fire burns, it is monitored and evaluated to ensure that it stays within these conditions.

Agency Name: U.S. Forest Service

Project Name: **Granite Project: Watershed Protection and Enhancement (G049905)**

Description: The project is located in Tuolumne County at T1N, T2N, R18, 19E. The watershed protection and enhancement is project proposed for 12,000 acres in the Reed, Jawbone, and Granite Creek Watersheds.

Agency Name: U.S. Forest Service, Inyo and Sierra National Forest

Project Name: **Revised Draft, Environmental Impact Statement – Management Direction for the Ansel Adams, John Muir, and Dinkey Lakes Wildernesses**

Description: The U.S. Forest Service is preparing a Forest Plan amendment for wilderness direction and land and resource management plans for three designated wilderness areas. The original planning began in 1991 and a draft EIS was released in 1997, followed by a one-year comment period. The U.S. Forest Service received over 2,000 comments. A revised draft was released to the public on August 23, 2000. The biggest issues leading to a revised draft were the lack of sufficient data to support the decisions made by the document and concerning commercial uses in the wilderness areas. The document will focus on three main areas:

- Visitor use
- Commercial services management
- Recreational pack stock management

One of the issues related to commercial use involves commercial outfitters who begin their trips in these wilderness areas and then move into Yosemite National Park. Outfitter operations that travel to Yosemite Valley could be affected by changes in wilderness operations.

Agency Name: U.S. Forest Service, Stanislaus National Forest (Groveland Ranger District)

Project Name: **Orange Crush Fuels Treatment Projects**

Description: This project will occur within Mariposa County at T1S, R19E, Sec. 27, 28, 29, 32, 33 & 34. This project proposes to add 290 acres of prescribed burning of natural fuels outside the timber sale area for the Orange Crush Timber Sale (Crush Multi-Product Environmental Assessment-GO99212) and modify the original prescribed burning prescriptions. The total area to be treated with prescribed fire would be 1,018 acres.

Agency Name: U.S. Forest Service, Stanislaus National Forest (Summit Ranger District)

Project Name: **Pinecrest Basin Forest Plan Amendment**

Description: U.S. Forest Service is evaluating how to manage the current recreational use that is occurring along the Highway 108 corridor (north of the park), particularly in the Pinecrest Lake area. There are 300 cabin permits issued in the lake area in addition to numerous campgrounds. The recreational use is excessive and methods to manage people are being explored. This project is currently in the early planning phase.

Agency Name: U.S. Forest Service, Stanislaus National Forest

Project Name: **Rogge-Ackerson Fire Reforestation**

Description: The U.S. Forest Service will reforest 4,500 acres affected by the Rogge-Ackerson fires. Reforestation activities may include burning, slash poling, deep tilling, shredding, and application of herbicides. The decision notice and FONSI was signed in March 1999.

Agency Name: U.S. Forest Service, Pacific Southwest Region (PSW)

Project Name: **Sierra Nevada Framework for Conservation and Collaboration**

Description: *The following information was copied directly from the Sierra Nevada Framework web site @ www.r5.fs.fed.us/sncf.*

In 1992, the U.S. Forest Service Pacific Southwest Region (PSW) initiated a Sierra Nevada-wide planning effort in response to a 1991 technical report on the declining status of the California spotted owl. Interim guidelines for protecting owl habitat were adopted in January 1993. The U.S. Forest Service subsequently began developing a long-term management plan for owl habitat and other issues. A draft environmental impact statement (EIS) for this work was released in 1995. A revised draft EIS was scheduled for release in 1996. However, release of new scientific information in the Sierra Nevada Ecosystem Project (SNEP) report influenced the withdrawal of the revised draft EIS. The Secretary of Agriculture empanelled a Federal

Advisory Committee (FAC) to review and advise on the EIS and SNEP report. The committee concluded that the revised draft EIS was inadequate in its current form as either an owl or ecosystem management-planning document. The FAC report offered recommendations for addressing inconsistencies with new scientific information, identified shortcomings in some key elements of the analysis process, and stressed the need for more collaborative planning.

In January 1998, in response to the FAC report and other information, the Forest Service and the PSW Research Station initiated a collaborative effort to incorporate new information into management of Sierra Nevada National Forests. This effort, known as the Sierra Nevada Framework for Conservation and Collaboration, incorporates the latest scientific information into national forest management through broad public and intergovernmental participation in natural resource planning. The framework includes the Sequoia, Sierra, Stanislaus, Eldorado, Inyo, Tahoe, Plumas, Lassen and Modoc National Forests, and the Lake Tahoe Basin Management Unit. In addition, Region 5 (PSW) is working with personnel from the Humboldt-Toiyabe National Forest in Region 4 to ensure coordination and compatibility of management across administrative boundaries.

The amendment effort is focused on five problem areas: old forest ecosystems; riparian, aquatic, and meadow ecosystems; fire and fuels; noxious weeds; and lower west-side hardwood forests.

Alternative 1 is the No Action Alternative that allows current forest management patterns to continue. Alternatives 2 through 8 address the five problem areas in the following manner:

- Protect and increase old forests
- Protect and restore healthy streams and stream sides
- Increase consistency in fuels treatments
- Reduce the spread of noxious weeds and
- Protect and rehabilitate lower west-side hardwood ecosystems

The action alternatives are also similar in that they incorporate adaptive monitoring and feedback to improve management; they employ ecosystem assessment; and they require increased coordination and cooperation with tribes, local government, agencies, and the public. Alternatives 2 through 8 differ in emphasis, in the amount of land in designated areas (land allocations), in the amount of management activity that occurs, and in the flexibility for local adjustments.

The emphasis of each alternative is as follows. For more specific actions, see the summary of alternatives at the web site address provided above.

- Alternative 2 – protection reserves: Biodiversity and ecological reserves; large acreage in designated areas; limited management activity; and limited flexibility for local adjustment
- Alternative 3 – restoration: Management Emphasis Areas; moderate acreage in designated areas; moderate amount of management activity; and limited flexibility for local adjustments
- Alternative 4 – resilience and sustainability: Resilient ecosystems and sustainable outputs; small acreage in designated areas; active management; and local flexibility

- Alternative 5 – protection and restoration: Emphasize ecological values; moderate acreage in designated areas; limited activity in areas without -roads and more activity in areas with roads; and limited flexibility for local adjustment
- Alternative 6 – not being developed: Extensive use of prescribed fire
- Alternative 7 – whole forest: Landscape diversity; small acreage in designated areas; active management on much of landscape; and high degree of flexibility to adjust management to respond to local conditions

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Agency Name: U.S. Forest Service and Bureau of Land Management

Project Name: **South Fork and Merced Wild and Scenic River Implementation Plan**

Description: The U.S. Forest Service and the Bureau of Land Management developed a joint *South Fork and Merced Wild and Scenic River Implementation Plan* in 1991 for the segments of the main stem and South Fork of the Merced River that are under the jurisdiction of these agencies. The segments include a 15-mile portion of the main stem extending from the El Portal Administrative Site to a point 300 feet upstream of the confluence with Bear Creek; a 21-mile segment of the South Fork from the park boundary to the confluence of the Merced River; and a 3-mile segment of the South Fork just upstream of Wawona, where the National Park Service has jurisdiction over the north side of the river and the U.S. Forest Service has jurisdiction over the south side. The plan calls for the long-term protection of natural and cultural resources and the management of the area for the use and enjoyment of visitors such that the resource would be unimpaired for future use and enjoyment as a natural setting.

Agency Name: Bureau of Land Management

Project Name: **Briceburg Bridge Reconstruction**

Description: The Briceburg Bridge is located approximately 15 miles west of El Portal. It crosses the Merced River from Highway 140 to Burma Grade Road and provides access to a 4.5-mile frontage road on the river's north side. Along this frontage road visitors are provided access to three Bureau of Land Management campgrounds, river frontage for river-related activities such as fishing, river-access points for rafters, and the Merced River Canyon Trail.

The bridge was damaged in the flood of 1997 and was slated for reconstruction from August to December 1999 (now complete). The bridge was closed during construction.

Agency Name: Bureau of Land Management

Project Name: **Merced River Canyon Trail Acquisition**

Description: A trail for walking and mountain biking runs intermittently from approximately El Portal to Lake McClure along the old railroad bed adjacent to the Merced River. The trail was heavily damaged in a recent flood and is being reconstructed, as money becomes available. Private in-holdings occur throughout the trail's length, thus disrupting the continuity of the trail. The Bureau of Land Management is attempting to negotiate land exchanges in order to acquire some of the private land and create a continuous trail running along the canyon from the Bagby Recreation Area to Yosemite National Park.

appendix I

Air Quality Data

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX I – AIR QUALITY DATA

Carbon Monoxide And PM_{10} Hot Spot Modeling

INTRODUCTION

Short-term air quality analyses were performed for carbon monoxide levels and concentrations of particulate matter which are equal to or less than 10 microns in diameter (commonly known as PM_{10}) on a roadway segment in order to assess the relative impact of the proposed transportation mitigation alternatives on ambient air quality in Yosemite Valley. The analyses were performed using the dispersion model CALINE3, which is the preferred U.S. Environmental Protection Agency (EPA) line-source Gaussian plume dispersion model that predicts the hourly average impacts of inert pollutants near roadways. The roadway geometry, worst-case meteorological parameters, traffic volumes, receptor positions, and emission factors were inputs to the model. The roadway link selection and traffic volumes definition were based on transportation studies conducted for the National Park Service (BRW 2000), and the carbon monoxide and PM_{10} emission factors were integrated from the Yosemite Valley vehicle emissions database (EA 1996). Persistence factors were applied to the predicted maximum hourly average concentrations of carbon monoxide and PM_{10} to estimate the maximum 8-hour average carbon monoxide concentrations and 24-hour average PM_{10} concentrations. Moreover, the maximum concentrations imparted to traffic conditions of the proposed transportation alternatives were independently compared to those of the existing traffic conditions (No Action Alternative) in order to determine the amount and direction of changes in carbon monoxide and PM_{10} concentrations. A roadway link representing the worst-case level of service (LOS) in Yosemite Valley was used for the analyses.

MODEL DESCRIPTION

CALINE3 is a line-source air quality model based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. The purpose of the model is to assess air quality impacts near transportation roadways. Using source strength, meteorology, and site geometry, the model predicts pollutant concentrations for receptors located within 150 meters of the roadway. CALINE3 divides individual roadway links into a series of elements from which incremental concentrations are computed and then summed to form a total concentration estimate for a particular receptor location. CALINE3 treats the region directly over the roadway as a zone of uniform emissions and turbulence. This is designated as the mixing zone and is defined as the region over the traveled way plus three meters on either side. The additional width accounts for the initial horizontal dispersion imparted to pollutants by the vehicle wake.

A link is defined as a straight segment of roadway having a constant width, height, traffic volume, and vehicle emission factor. The location of the link is specified by the endpoint coordinates of its centerline. The location of a receptor is specified in terms of X, Y, Z coordinates. The program automatically sums the contributions from each link to each receptor. After this is completed for all receptors, a background value may be added. Surface roughness is

assumed to be uniform throughout the study area. The meteorological variables of atmospheric stability, wind speed, and wind direction are also taken as constant over the study area.

Pollutant deposition and settling are also taken into account in CALINE3. Deposition velocity is a measure of the rate at which a pollutant can be adsorbed or assimilated by a surface. It involves a molecular diffusive process through the laminar sublayer covering the surface. Settling velocity is the rate at which a particle falls with respect to its immediate surroundings. A composite vehicle emission factor in grams per vehicle-mile must be provided for each link.

Roadway Link Selection

Based on the levels of service and the traffic volume of the existing conditions, the Northside Drive segment from Yosemite Lodge to the park headquarters was selected for modeling. It is a two-way road segment for the existing traffic conditions and measures 1.13 miles long and 20 feet wide. This segment presents the worst-case traffic conditions. The associated levels of service are "D" and "E" for the A.M. and P.M. peak travel hours, respectively. The level of service quantifies the performance of a roadway section, and it ranges from "A" (best operating condition) to "F" (worst operating condition).

CALINE3 Inputs

Modeling Parameters

The modeling parameters define the averaging interval, the aerodynamic roughness coefficient, the settling and deposition velocities, the link/receptor geometry units, and the number of links and receptors. An averaging time of one hour was selected in order to study the short-term "hot spot" effect of carbon monoxide and PM_{10}. Moreover, the mandatory limit in CALINE3 is 120 minutes, which represents a reasonable limit of the power law approximation in the model formulation. A uniform aerodynamic roughness coefficient of 50 centimeters was selected since the valley road network lies on a relatively flat terrain with mixed vegetation and scattered buildings. This value corresponds to a rural, rolling, and lightly wooded terrain. The deposition velocity of PM_{10} was estimated to be 0.5 centimeters per second (Zanneti 1990). CALINE3 assumes that the settling velocity is equal to the deposition velocity. Carbon monoxide deposition and settling rates are negligible. The link/receptor coordinates are expressed in meters, and 7 links and 14 receptors were defined (see Figure 1).

Link Geometry

The link geometry defines the link types, the endpoint coordinates, the link heights, and the mixing zone widths. The selected road segment was subdivided into seven straight segments whose locations are shown in Figure 1. An arbitrary X – Y (east – north) referential system was defined at about midpoint of the entire road segment. The links were numbered 1 to 7 from the east. All the links are at-grade, except link 4, which was defined as a bridge. The receptor locations are shown in Figure 1 as well. They are located very close to the link in order to simulate the short-term effects of the pollutants and to satisfy the assumptions of CALINE3. They are assigned the average breathing height of 1.8 meters. They are numbered 1 to 14 from

the west. The mixing zone is 12.2 meters wide (20 feet travel-lane width plus 10 feet on each side) for Alternative 1 and 12.8 meters for the proposed alternatives (22 feet travel-lane width).

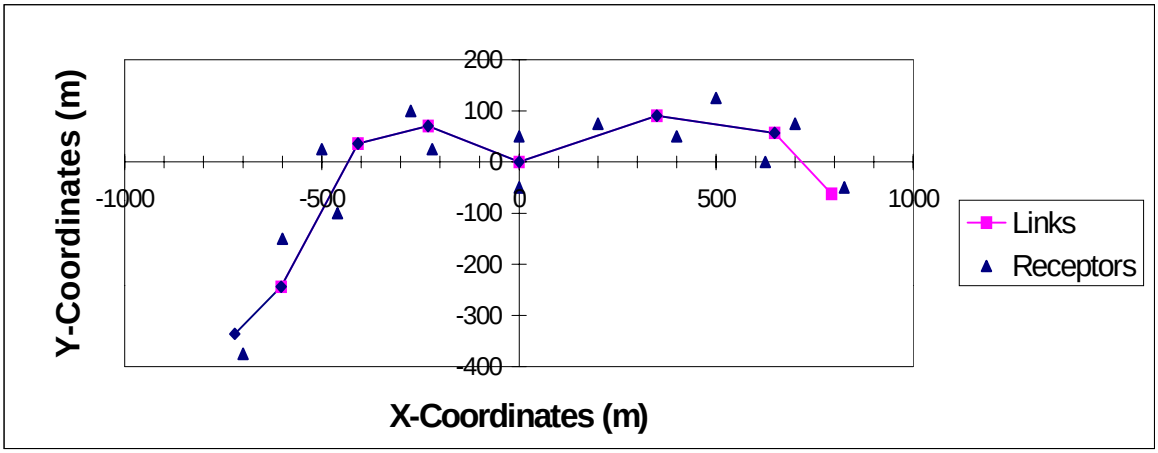

Figure 1. Selected Road Segment Link Geometry and Receptor Locations.

Link Activities

The link activities define the traffic volumes and the emission factors. The traffic volume data (in vehicles per hour) for the existing traffic conditions and the proposed transportation alternatives were obtained from National Park Service transportation studies (BRW 2000). Table I-1 presents the traffic volume data for the modeling segment. It was assumed that the total traffic volume remains constant on the entire road segment.

Table I-1
Selected Road Segment Peak Travel Hour Traffic Volume (Vehicles/Hour)

Alternative	A.M. Peak Hour Traffic Volume	P.M. Peak Hour Traffic Volume
1	532	911
2	132	147
3	140	155
4	139	154
5	465	466

The composite travel emission factors (in grams per vehicle mile) were estimated from the Yosemite Valley vehicle emissions database developed using EMFAC7G (EA 1996). For carbon monoxide, the average running exhaust and continuous start exhaust emission factors weighted by the vehicle number in each vehicle class were summed to generate the composite emission factor for the road segment. The weighted-average running exhaust emission factor was estimated at the design constant speeds of 35 miles per hour for automobiles and 25 miles per hour for buses. The weighted-average continuous start emission factor was calculated by estimating the average vehicle "soak" timefleet, which is the time between turning an engine off and restarting the engine, for the vehicle fleet. Assuming the average stay for each visitor in the valley to be 4.5 hours and the average travel time per vehicle to be 64 minutes, the difference, 206 minutes, represents the average vehicle soak time. The estimation of the composite emission factor for PM_{10} is similar to that of carbon monoxide. In addition, the average PM_{10} tire and

brake wear emission factors and the entrained paved road dust were added to the average running exhaust and continuous start exhaust. Table I-2 shows the estimated composite carbon monoxide and PM_{10} emission factors. In addition, it was assumed that the composite emission factors remain constant on the selected road segment.

Table I-2
Carbon Monoxide and PM_{10} Composite Emission Factors

Pollutant	Emission Factor (grams/vehicle-mile)
Carbon Monoxide	56.0
PM_{10}	1.6

Modeling Conditions

The meteorological parameters needed to run the model these include wind speed and direction, atmospheric stability class, mixing height, and ambient background concentrations. In this study, the worst-case meteorological conditions and pollutant background concentrations that can be anticipated at the site were used. These parameters are summarized in Table I-3.

Table I-3
Worst-Case Meteorological Parameters

Parameter	Value
Wind Speed (m/s)	1.0
Wind Direction (degrees)	5º – 360º
Atmospheric Stability Class	6 (stable)
Mixing Height (m)	500
Background Carbon Monoxide (ppm)	3.0 (1 hour average)
Background PM_{10} ($\mu g/m^3$)	21.0 (24 hour average)

MODELING RESULTS

Carbon Monoxide Results

The maximum hourly average carbon monoxide concentrations predicted from the activities on the modeling road segment for the five transportation alternatives are presented in Tables I-4 and I-5. The 8-hour average carbon monoxide concentrations calculated by applying a persistence factor of 0.7 (EPA 1992) to the 1-hour average values also are presented in Tables I-4 and I-5. The spatially unpaired reductions relative to Alternative 1 in maximum carbon monoxide concentrations imparted to each of the proposed alternative are presented in Table I-4 and 5 as well. The maximum hourly average carbon monoxide concentrations (including the background concentration) vary from 3.50 parts per million to 5.10 parts per million for the A.M. peak travel hour and from 3.60 parts per million to 6.50 parts per million for the P.M. peak travel hour. The maximum 8-hour average carbon monoxide concentrations (including the background concentration) vary from 2.45 parts per million to 3.57 parts per million for the A.M. peak travel hour and from 2.52 parts per million to 4.55 parts per million for the P.M. peak travel hour. The reductions in generated maximum concentration vary from 9% to 76% for the A.M. peak travel hour and from 46% to 83% for the P.M. peak travel hour. Table I-4 and I-5 show that the P.M. peak travel hour represents the worst-case traffic and carbon

monoxide air quality conditions. However, the reductions in air quality impacts during the P.M. peak travel hour are the highest for each alternative.

The data also indicate that the maximum carbon monoxide concentrations contributed by the traffic on the modeling road segment are below the federal and California 1-hour average standards of 35 parts per million and 20 parts per million, respectively and the 8-hour average federal and California carbon monoxide standard of 9 parts per million.

Table I-4
Maximum Carbon Monoxide Concentrations and Reductions for the A.M. Peak Hour

Alt	1-hour Maximum Concentration w/o background (ppm)	1-hour Maximum Concentration w/ background (ppm)	8-hour Maximum[1] Concentration w/o background (ppm)	8-hour Maximum Concentration w/ background (ppm)	Change Relative to Alternative 1 w/o background (%)
1	2.10	5.10	1.47	3.57	NA
2	0.50	3.50	0.35	2.45	76.2
3	0.50	3.50	0.35	2.45	76.2
4	0.50	3.50	0.35	2.45	76.2
5	1.90	4.90	1.33	3.43	9.5

1. Calculated using the persistence factor 0.7
Percentages derived from 8-hour maximum concentrations without background.

Table I-5
Maximum Carbon Monoxide Concentrations and Reductions for the P.M. Peak Hour

Alt	1-hour Maximum Concentration w/o background (ppm)	1-hour Maximum Concentration w/ background (ppm)	8-hour Maximum[1] Concentration w/o background (ppm)	8-hour Maximum Concentration w/ background (ppm)	Change Relative to Alternative 1 w/o background (%)
1	3.50	6.50	2.45	4.55	NA
2	0.60	3.60	0.42	2.52	82.9
3	0.60	3.60	0.42	2.52	82.9
4	0.60	3.60	0.42	2.52	82.9
5	1.90	4.90	1.33	3.43	45.7

1. Calculated using the persistence factor 0.7
Percentages derived from 8-hour maximum concentrations without background.

PM_{10} Results

The maximum hourly average PM_{10} concentrations predicted from the activities on the modeled road segment for the five transportation alternatives are presented in Tables I-6 and I-7. The 24-hour average PM_{10} concentrations calculated by applying a persistence factor of 0.4 (U.S. EPA 1992) to the 1-hour average values also are presented in Tables I-6 and I-7. The spatially unpaired reductions relative to Alternative 1 in maximum PM_{10} concentrations imparted to each of the proposed alternative are presented in Tables I-6 and I-7 as well. The maximum 24-hour average PM_{10} concentrations (including the background concentration) vary from 27.40 micrograms per cubic meter ($\mu g/m^{3)}$ to 46.20 $\mu g/m^3$) for the A.M. peak travel hour and from 28.20 $\mu g/m^3$ to 64.20 $\mu g/m^3$ for the P.M. peak travel hour. The reductions in generated maximum concentration vary from 11% to 75% for the A.M. peak travel hour and from 48% to 83% for the P.M. peak travel hour. Table I-6 and I-7 show that the P.M. peak travel hour represents the worst-case traffic and PM_{10} air quality conditions. However, the

reductions in air quality impacts during the P.M. peak travel hour are the highest for each alternative.

The data also indicate that the maximum 24-hour average PM_{10} concentrations contributed by the modeled road segment traffic are below the federal 24-hour average standard of 150 $\mu g/m^3$ for all alternatives, but exceeds the California 24-hour standard of 50 $\mu g/m^3$ for the evening peak travel hour for the No Action Alternative (Alternative 1).

Table I-6
Maximum PM_{10} Concentrations and Reductions for the A.M. Peak Hour

Alt	1-hour Maximum Concentration w/o background ($\mu g/m^3$)	24-hour Maximum[1] Concentration w/o background ($\mu g/m^3$)	24-hour Maximum Concentration w/ background ($\mu g/m^3$)	Change Relative to Alternative 1 w/o background (%)
1	63.00	25.20	46.20	NA
2	16.00	6.40	27.40	74.6
3	17.00	6.80	27.80	73.0
4	17.00	6.80	27.80	73.0
5	56.00	22.40	43.40	11.1

1. Calculated with a persistence factor of 0.4
Percentages derived from 24-hour maximum concentrations without background.

Table I-7
Maximum PM_{10} Concentrations and Reductions for the P.M. Peak Hour

Alt	1-hour Maximum Concentration w/o background ($\mu g/m^3$)	24-hour Maximum[1] Concentration w/o background ($\mu g/m^3$)	24-hour Maximum Concentration w/ background ($\mu g/m^3$)	Change Relative to Alternative 1 w/o background (%)
1	108.00	43.20	64.20	NA
2	18.00	7.20	28.20	83.3
3	19.00	7.60	28.60	82.4
4	18.00	7.20	28.20	83.3
5	56.00	22.40	43.40	48.1

1. Calculated with a persistence factor of 0.4
Percentages derived from 24-hour maximum concentrations without background.

CONCLUSION

CALINE3 was used to study the short-term hot spot effects of carbon monoxide and PM_{10} pollutants for five transportation alternatives in Yosemite Valley. The dispersion modeling was applied to the Northside Drive roadway segment from Yosemite Lodge to park headquarters, which represents the worst-case operating conditions. The results of the modeling show that the 1-hour and 8-hour average maximum concentrations of carbon monoxide are below the federal standards. The 24-hour average PM_{10} concentrations are below the federal standard, but exceed the California standard for Alternative 1, the No Action Alternative for the evening peak travel hour. The reductions in maximum concentrations from the proposed alternatives relative to the No Action Alternative vary from 9.5% to 83% for carbon monoxide and from 11% to 83% for PM_{10}.

appendix J

Socioeconomic Analysis Methods

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX J – SOCIOECONOMIC ANALYSIS METHODS

The key methods and assumptions used in the socioeconomic analysis for the *Final Yosemite Valley Plan/SEIS* are provided below. The methods and assumptions are presented and discussed according to three issue areas: (1) visitor demand and park visitation projections, (2) regional economic impacts, and (3) cumulative impacts.

Visitor Demand and Park Visitation Projections

For purposes of the impact analysis, visitor demand for park access was projected to remain unchanged in the future from its current conditions. The rationale for this assumption is discussed below. In addition, 1998 park visitation levels were used as the baseline conditions for the visitation analysis, and it is estimated that summer day visitation averaged 10,950 visitors per day. During the summer, visitation is typically greater during the weekends. As a result, day visitor use on the busiest days of the year would be higher than 10,950.

Table J-1 shows the expected visitor use based on overnight and day-visitor parking facilities for each alternative. These expected visitor use levels were compared with the baseline conditions (1998 park visitation levels shown in Alternative 1) to evaluate whether projected future visitation demand could be accommodated.

Table J-1
Expected Visitor Use in Yosemite Valley

Alternative	Expected Use Level of Yosemite Valley Overnight Facilities	Expected Use Level of Valley by Day Visitors That Can Be Accommodated	Total Daily Visitation
1	6,387	10,950 (13,950)[1]	**17,337 (20,337)**
2	5,389	12,852	**18,241**
3	5,212	13,029	**18,241**
4	5,164	13,077	**18,241**
5	5,891	12,350	**18,241**

Note: The table assumes that existing visitor characteristics and visitor use patterns would continue. Characteristics that could change over time and affect the number of visitors who would use facilities in the park include the number of people in each party or vehicle, the length of stay, the distribution of visitor arrivals and departures over the course of the day, the ridership on tour buses, the locations in the Valley visited by each party, and the number of vehicles at each campsite, among others. Additionally, the number of visitors (use level) on any particular day will vary according to daily fluctuations in these characteristics.

[1] 10,950 is the peak season average day visitor level, while 13,950 is the fourth largest peak summer day-visitor level.

The analysis also considered that park visitation on the busiest days during the summer would be higher than the 10,950 average visitation estimate. It is expected that the existing and proposed traveler information and traffic management systems would help to mitigate any potential adverse impacts associated with visitor capacity during the busiest days. These systems could help visitors to plan in advance of their visit and forewarn visitors when day-visitor parking is approaching full capacity. This would help manage park visitation by encouraging and directing visitors to visit during non-peak periods of the day and season. In which case, no net reduction in total annual visitation would occur since peak period visitation would be shifted to less busy days (i.e., weekdays) or less busy times of the day.

Using the methodology and assumptions discussed above, future day use was projected for each of the action alternatives. These visitation projections were compared with the baseline conditions to evaluate the type and magnitude of day visitor impacts for each alternative.

Future Visitor Demand And Park Visitation Projections

Projecting the magnitude and nature of future day visitation is difficult due to the complexities associated with the proposed alternatives and numerous uncertainties associated with other independent factors that may affect future visitor demand for park access.

Table J-2 identifies the major factors that may influence an increase or decrease in future day use at Yosemite National Park. Past visitation and visitor use patterns are important factors influencing future Yosemite-related visitation and spending, and numerous other factors are shown that may affect future day use. While some of these factors relate to the proposed alternatives (such as future environmental restoration and changes in transportation and access), several other significant factors operate independently of the proposed alternatives (such as underlying visitor demand for outdoor recreation and population growth).

Many of the factors influencing future day use may have countervailing influences. For example, relocating parking out of the east Valley may add time to day visitors' trips into the park, but the resulting reduced congestion may increase visitation demand. It is not possible to determine the net influences of these and other factors on future day use for several reasons. First, the number and variety of factors potentially influencing future visitation cannot be easily combined to estimate a net impact on day use. Second, there is insufficient information on current visitor demand and attitudes on which to base any future visitor response to the proposed changes at Yosemite. Third, social and econimic data for many of these factors is insufficiently detailed to fully understand the likely effects on potential visitors. Fourth, visitors may respond to changes in park facilities and operations by changing their demand for park access, their spending behavior, their use patterns and/or their length of stay. These responses cannot be predicted easily, especially when complex and innovative changes are being proposed. Fifth, the identified visitation factors and influences are based on several basic assumptions about future Yosemite visitor demand (see the bottom of Table J-2). If these assumptions are not consistent with future conditions, then future day use may change markedly.

Due to uncertainties of the future influence of the factors identified above, for purposes of the impact analysis, it has been assumed that future visitor demand will be unchanged from 1998 levels. As a result, changes in future visitation among alternatives have been evaluated solely on the basis of visitor facility service capacity differences associated with the proposed alternatives. This assumption was considered to be a conservative approach that would allow for a clear comparison of the various alternatives and associated impacts.

Table J-2 Factors Potentially Influencing Future Day Visitation To Yosemite National Park		
	Factors Potentially Increasing Visitation	**Factors Potentially Decreasing Visitation**
UNDERLYING DEMAND	Increased Population Growth in Market Area/Region	—
	Increased California Tourism	—
	Increased In-Park Accommodations	Decreased In-Park Accommodations
	Increased Local Accommodations	Decreased Local Accommodations
	—	Development of Substitute Tourism Destinations
	—	Construction and Implementation Impacts
	Favorable Publicity & Marketing	Unfavorable Publicity & Marketing
PARK ACCESS	Vehicle Management System Improvements	Vehicle Management System Limitations
	Guaranteed Entry	Reservation System
	Low Entry Fees	Higher Entry Fees
	—	Relocated Parking
	—	Satellite Parking
	Greater In-Valley Shuttle Service	Shuttle Transfer
	Increased Alternative Transit (YARTS)	—
	Maximum Acceptable Service Level (MASL)	Maximum Acceptable Service Level (MASL)
VISITOR EXPERIENCE	Improved Visitor Experience	—
	Improved Visitor Orientation	—
	Improved Interpretation	—
	Reduced Traffic & Congestion	—
	Increased Recreational Opportunities	Reduced Recreational Opportunities
	Improved Hiking, Biking, Nature Viewing	Reduced Car Touring, Horseback Riding
	—	Reduced Picnicking

Source: Dornbusch & Company, Inc.

Key Assumptions

- No change to fundamental nature of demand for Yosemite visitation
- No change to current visitor behavior such as visitation patterns, visitor spending, or visitor origin and destination
- Minor additional cost and potential time delay to visitors from traveler information and traffic management system, west Valley, and satellite parking
- Changes to visitor experience consistent with National Park Service's visitor experience objectives

Methods For Determining Regional Economic Impacts

The economic impacts of each *Final Yosemite Valley Plan/SEIS* alternative on the affected region would result from: (1) spending to implement each of the project's components, and (2) changes in the park's lodging and campsite capacity. Regional and county-specific output and employment impacts were estimated for each of these project effects using the input-output IMPLAN (Impact Planning) model. IMPLAN was selected over several other input-output systems for a number of reasons including: (1) it closely follows the accounting conventions used in the widely cited "Input-Output Study of the U.S. Economy," by the Bureau of Economic Analysis, (2) it provides comprehensive and detailed data coverage of the entire United States, (3) it provides a high degree of flexibility in geographic coverage and model formulation, and (4) it allows for business sector aggregation by Standard Industrial Classification sector. IMPLAN

provides estimates of the cumulative (or multiplied) economic effects that result directly and secondarily from an initial stimulus to an industrial sector (e.g., spending changes in construction, mining, manufacturing, retail, etc.).

Secondary impacts include indirect effects and induced effects. *Direct* multipliers are those which determine the immediate effect within the sector(s) of the economy where the initial stimulus occurs. *Induced* multipliers represent the impact of the initial stimulus on the economy from changes in personal consumption (as a result of changes in employee income). *Indirect* multipliers represent the impact of the initial stimulus on the economy as a result of changes in business spending. IMPLAN can be used to estimate each of these multipliers separately. Once these multipliers are calculated they can be combined to quantify the total impacts of an actual or hypothetical shift in spending in a specific economic sector. Once the impacts are estimated they can be compared to a baseline of economic data for the specific area of study to evaluate the magnitude (or significance) of the impact.

Significance thresholds applied in the evaluation of magnitudes are as follows:

- Below 1% = negligible
- Above 1% but below 2.5% = minor
- Above 2.5% but below 5.0% = moderate
- Above 5% = major

These thresholds are based on best professional judgement.

Impacts Of Construction Spending

It is estimated that construction proposed under each of the *Final Yosemite Valley Plan/SEIS* action alternatives would take fifteen years to finish and be approximately 65% and 95% complete five and ten years, respectively, after the start of construction. For the analysis of construction-spending impacts, a gravity model was used to develop a reasonable estimate of the construction spending distribution among the counties surrounding Yosemite that are expected to supply the majority of the material and labor resources needed to implement the *Yosemite Valley Plan.* The model weighs each county by the ratio of its population over the distance of its largest city from the proposed project site squared (similar to the approach used to measure the gravitational pull between two bodies in physics where population is a proxy for mass).

$$\text{Construction Spending Distribution} = \frac{\text{County Population}}{(\text{Distance To Project Site})^2}$$

In this manner, it is assumed that the larger the population (and thus, presumably, labor and construction material resources of a county), the greater the potential share of project construction spending would go to that county. At the same time, it is assumed that the further the county is away from the proposed project site, the smaller the potential share of project construction spending would go to that county. Seven counties were included in the model, the five Yosemite-region counties (Madera, Mariposa, Merced, Mono, and Tuolumne) as well as Fresno and

Stanislaus Counties. Mariposa County's weight based on the gravity model was doubled to anticipate some immigration of labor into Mariposa County during construction of the project.

Ultimately how the *Yosemite Valley Plan* is implemented would effect how construction spending impacts occur in the five Yosemite-area counties, the use of a gravity model is necessary since specific details of project implementation are not determined. The gravity model results are used to estimate output and employment impacts resulting from project construction for the five-county affected region as a whole. In addition, the projected construction spending impacts on Mariposa County are evaluated separately.

The gravity model results indicate that about 70% of the total project's construction cost (excluding planning) would be spent within the affected Yosemite region. Similarly, it is estimated that 15% of the total project's construction cost (excluding planning) would be spent within Mariposa County alone. The percentages were used to calculate the portion of the total construction cost for the development proposed under each alternative, excluding planning costs, expected to be spent within the affected region as a whole and Mariposa County specifically. (Historically, the majority of engineering and planning work on infrastructure and facility development at Yosemite has been conducted outside the Yosemite region. Therefore, the analysis assumes that none of the *Yosemite Valley Plan* construction planning costs would be spent within the Yosemite region.)

Impacts Of Visitor Spending

Following implementation of each alternative, visitation patterns to the park will likely change. The distribution of the resulting visitor-spending impacts among the counties in the Yosemite region was estimated from a combination of: (1) recent traffic count along routes entering and exiting Yosemite as compiled by BRW, Inc., and (2) visitor lodging and spending patterns within the affected region. Although visitation may also be affected during implementation of proposed projects, (particularly any new Valley lodging during the first ten years of project construction), the visitor spending impacts associated with project implementation were not estimated for several reasons. First, the actual schedule for the implementation of specific *Yosemite Valley Plan* development proposals has yet to be determined. Second, no studies have been conducted to evaluate the potential effects on visitor and employee access of those proposals. Third, the National Park Service would work to minimize the impacts of *Yosemite Valley Plan* implementation on visitors through a combination of signage, construction timing (e.g., work during off-peak hours, etc.) and other measures, and the details of these approaches are not available. Fourth, it is the intention of the National Park Service to permit use of all Valley lodging units planned for removal until new units are completed.

METHODS FOR DETERMINING CUMULATIVE IMPACTS

Under each alternative, an array of development projects would be implemented in the region, as identified in Appendix H (Cumulative Impacts Scenario). Implementation of these projects is likely to be gradual and coordinated. Nonetheless, these projects could have an appreciable impact on various elements of the region's socioeconomy, including: (1) visitation and visitor spending, (2) local construction spending, and (3) employment and housing. Cumulative impacts represent the impacts of these projects *in combination with* the projects proposed under each alternative.

Visitation And Visitor Spending

The park itself is the primary destination for more than 50% of the visitors to Yosemite National Park.[1] Accordingly, most of the future non residential projects in the region would be designed to accommodate park visitors. Several projects in the cumulative impacts scenario are planned to enhance visitor experience, such as the Yosemite Area Regional Transportation System and shuttle bus stop improvements. Yet, Yosemite National Park is already one of the major tourist attractions in the United States, primarily because of its scenic resources and natural conditions. Therefore, new projects designed to provide relatively minor enhancements to visitor experience would not be expected to generate significant increases in visitation or visitor spending.

Impacts on visitation and visitor spending were assumed to occur as a result of lodging projects in the cumulative impacts scenario. Given the high demand for lodging in the region, especially during the peak season, it is expected that some day visitors would likely choose to stay overnight in the region if there is additional capacity. This may translate into an increase in overnight visitation and visitor spending. This is a relatively conservative assumption because it assumes that there would be no net increase in visitation associated with increases in the region's lodging capacity (only a switching of day visitors to out-of-park overnight visitors).

The cumulative impacts scenario identified 757 lodging units to be constructed on seven properties in the region. The number of additional overnight stays was estimated by multiplying the number of new lodging units by 3.17 guests per room, assuming 60% occupancy.[2] These additional stays would represent out-of-park overnight visitors, who spend an average of $61.30 per capita per day. Assuming that these out-of-park overnight visitors would otherwise be day visitors, the net economic impact of each additional overnight stay would be $35.76 ($61.30 - $25.54), or daily per capita spending by out-of-park overnight visitors less day visitors. If additional visitors are attracted to the region by the increase in lodging capacity, visitor spending growth would be even higher and the impact would be even greater.

Actual impacts on the local economy would result when businesses and individuals respend money locally that was earned from new visitor spending. These secondary impacts were calculated using IMPLAN in the same manner as the direct economic impacts of the alternatives were calculated. (See Vol. IB, Chapter 4, Environmental Consequences.)

Local Construction Spending

Local construction spending would be generated primarily by housing, transportation, and other commercial projects in the region. Appendix H (Cumulative Impacts Scenario) shows that over 35,700 new housing units (including 23,500 in the City of Merced[3] and 12,000 in the proposed university community at the University of California, Merced) are planned for construction over

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[1]Gramann, 1992.

[2]Guests per room based on BRW estimate. Occupancy based on average occupancy at facilities managed by Yosemite Motels (Source: Barry Brouillette, Yosemite Motels, August 10, 1999).

[3]Population is projected to increase by 71,000 by the year 2015. At 3.02 persons per household (average for City of Merced), this equates to 23,500 new housing units.

the next 15 years. Construction spending for these housing projects was estimated using a unit cost of $65.80 per square foot (based on 1999 *Uniform Building Code* valuation data for Dwellings [Type V-Masonry] in California).[4] The average square footage per unit was assumed to be 1,500 square feet.[5]

Construction spending estimates for transportation projects were obtained from project proponents.

Commercial projects in Appendix H (Cumulative Impacts Scenario) include new lodging units, conference facilities, office space, and restaurants. A total of 757 new lodging units were identified in the cumulative impacts scenario. Construction spending was estimated for these projects using a unit cost of $64.86 per square foot (based on 1999 *Uniform Building Code* valuation data for Hotels and Motels [Type V-N] in California).[6] The average square footage per unit was assumed to be 288 square feet.[7]

Other commercial projects identified in the cumulative impacts scenario would result in over 3.6 million square feet of new construction. Construction spending for these projects was calculated assuming an average construction cost per square foot of $63.75.[8]

Additional construction spending would generate output impacts, not only directly but also secondarily, as a result of local spending on material inputs and wage spending by project labor. These impacts were estimated using IMPLAN.

Employment And Housing

When available, employment impacts associated with the projects identified in Appendix H (Cumulative Impacts Scenario) were obtained directly from project proponents. Otherwise, employment impacts were calculated as a function of spending impacts. County multipliers were used to determine the number of new full-time equivalent (FTE) jobs that would be generated per one million dollars in increased construction spending. In addition, the number of jobs associated with increased spending for lodging, food and beverages, retail, and transit were calculated based on county multipliers.

Housing impacts were determined based on the amount of new workers that would need to be accommodated in the region as a result of employment impacts.

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[4]Source: *Building Standards,* March/April 1999. In compliance with Section 223 of the 1997 Uniform Building Code, the unit cost includes architectural, structural, electrical, plumbing, and mechanical work.

[5] Source: Personal communications with County Assessor's Offices in Madera, Mariposa, Merced, Mono, and Tuolumne Counties, 7/30/99.

[6] Source: *Building Standards,* March/April 1999. In compliance with Section 223 of the 1997 Uniform Building Code, the unit cost includes architectural, structural, electrical, plumbing, and mechanical work.

[7] Source: Personal communication with Bruce Ford, National Hotel Realty, 8/10/99.

[8] Cost per square foot equals average for Type V offices, public buildings, restaurants, and stores, adjusted for California (*Uniform Building Code*).

appendix K

Biological Assessment

Final Yosemite Valley Plan

Supplemental EIS

Appendix K–Biological Assessment

Biological Assessment on the Final Yosemite Valley Plan/SEIS

National Park Service
Department of the Interior
August 2000

TABLE OF CONTENTS

Chapter I. Introduction **K-1**

Purpose and Need K-1
U.S. Fish and Wildlife Service Consultation K-1
Species Evaluated in this Biological Assessment K-6
Species Removed from Further Analysis K-7
Critical Habitat K-9

Chapter II. Current Management Direction **K-11**

Authorities K-11
Policy and Program Objectives K-11

Chapter III. The Final Yosemite Valley Plan/SEIS **K-13**

The Preferred Alternative – Yosemite Village and Out-of-Valley Parking K-13
Summary of Major Changes in Relation to Existing Conditions K-13

Chapter IV. Existing Environment **K-17**

Habitat Descriptions K-17
Species Accounts K-22
Federal Endangered Species K-32
Federal Threatened Species K-33
Federal Species of Concern K-37
Plants K-58

California State Endangered Species **K-59**

Wildlife K-59

California State Threatened Species **K-63**

Wildlife K-63

California State Rare Species **K-63**

Plants K-63

California State Species of Special Concern **K-64**

Wildlife K-64

Park Rare Species **K-72**

Plants K-72

Chapter V. Environmental Effects **K-81**

Methods Used to Assess Effects K-81

Federal Endangered Species K-83
Federal Threatened Species K-84
Federal Species of Concern K-87
California State Endangered Species K-112
California State Threatened Species K-115
California State Rare Species K-116
California State Species of Special Concern K-117
Park Rare Species K-128

Chapter VI. Determination of Effects on Federally Listed Species K-131

Determinations for Federally Listed Threatened or Endangered Species K-131

Chapter VII. Management Recommendations and Mitigation K-133

Avoidance and Protection Measures K-133

Chapter VIII. Contributors and References K-139

Contributors K-139
References K-140

Appendix K-1 – U.S. Fish and Wildlife Service Species List K-153

Index K-165

TABLES

Table K-1 Species Considered in this Biological Assessment K-2
Table K-2 Special-Status species K-22

CHAPTER I. INTRODUCTION

Purpose and Need

The National Park Service in Yosemite has prepared the *Final Yosemite Valley Plan Supplemental Environmental Impact Statement* (*Final Yosemite Valley Plan/SEIS*) to provide direction and propose specific actions to restore, protect, and enhance the natural, cultural, and scenic resources of Yosemite Valley, and to provide a high-quality, resource-based experienced for visitors. The purpose of this Biological Assessment is to review the *Final Yosemite Valley Plan* in sufficient detail to determine effects of the plan on federal and state-listed threatened or endangered species, federal and state species of concern, state-listed rare species, and species that are locally rare or threatened. All of these species are also referred to as special-status species throughout this document.

The *Final Yosemite Valley Plan/SEIS* aims to restore degraded areas and reduce development within the Merced River ecosystem and other highly valued natural and cultural resource environments. The plan proposes to reduce traffic congestion and supports the use of alternative fuels to reduce mobile sources of air pollution. It presents alternatives to expand orientation and interpretation services and proposes to move nonessential housing, administrative headquarters, offices, and other functions out of Yosemite Valley. Many of these functions would move to the El Portal Administrative Site on the western boundary of the park. The plan proposes options for the size and placement of parking areas, both within and outside of Yosemite Valley.

This Biological Assessment will evaluate the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS*, Alternative 2. The areas that could be affected by the Preferred Alternative include Yosemite Valley, the El Portal Administrative Site, Wawona, Foresta, the Tioga Entrance Station, the Arch Rock Entrance Station, the South Entrance Station, the Big Oak Flat Entrance Station, and proposed parking areas in the western part of the park at Badger Pass, El Portal, and Hazel Green or Foresta. These areas are designated as the project area. Detailed maps of the project area are available in Vol. IC, *Final Yosemite Valley Plan/SEIS*.

This Biological Assessment will:

- Evaluate and document the effects of the Preferred Alternative on special-status species or their critical habitat that are known to be or could be present within the project area
- Determine the need for consultation and conference with the U.S. Fish and Wildlife Service (USFWS)
- Conform to requirements of the Endangered Species Act (19 USC 1536 [c], 50 CFR 402) and the National Environmental Policy Act (42 USC 4321 et seq., implemented at 40 CFR Parts 1500-1508)

U.S. Fish and Wildlife Service Consultation

The Endangered Species Act (Section 7 [a][2]) directs federal agencies to consult with the responsible agency (in this case, the USFWS) to determine whether proposed actions are likely to

jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat. To initiate the consultation process with the USFWS, the National Park Service requested a list of federally listed endangered or threatened species that may be present or may be affected by actions proposed in the *Draft Yosemite Valley Plan/SEIS*. The National Park Service requested that the list include species that are found in the region of the following U.S. Geological Survey quadrangles: Ackerson Mountain, El Capitan, El Portal, Half Dome, Tioga Pass, Yosemite Falls, and Wawona. An informal USFWS list was received on January 24, 2000. A formal updated list was received on March 29, 2000 (see Appendix K-1).

The National Park Service evaluated all federally listed species found in the seven U.S. Geological Survey quadrangles that encompass the area that could be affected by the plan (see table K-1). Each species was evaluated by National Park Service biologists familiar with habitat requirements to determine whether each species could be found in the project area. Several species were removed from further evaluation because biologists determined that they do not occur within the project area (see Species Removed from Further Analysis).

In addition to federally listed endangered or threatened species, the USFWS provided a list of candidate species and federal species of concern. Candidate species are currently being reviewed by the USFWS and are under consideration for possible listing as endangered or threatened. There were no candidate species identified in the project area for the *Draft Yosemite Valley Plan/SEIS*. Species of concern are species for which listing is possibly appropriate, but for which the USFWS lacks sufficient information to support a listing proposal. Each species of concern was evaluated by National Park Service biologists familiar with habitat requirements and added to the list of species to be evaluated in this assessment, if appropriate (see table K-1). Candidate species and species of concern have no protection under the Endangered Species Act, though National Park Service policies require consideration of these species in park planning (NPS 1988).

Table K-1
Species Considered in this Biological Assessment

Federal Endangered Species

Mammals

Sierra Nevada bighorn sheep *(Ovis canadensis sierrae)*

Federal Threatened Species

Birds

Bald eagle *(Haliaeetus leucocephalus*)

Reptiles and Amphibians

California red-legged frog *(Rana aurora draytonii)*

Fish

Delta smelt *(Hypomesus transpacificus)*

Paiute cutthroat trout *(Oncorhynchus clarki seleniris)*

Central Valley steelhead *(Oncorhynchus mykiss)*

Sacramento spittail *(Pogonichthys macrolepidotus)*

Invertebrates

Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*

Table K-1
Species Considered in this Biological Assessment

Federal Species of Concern

Birds

Harlequin duck (*Histrionicus histrionicus*)
Northern goshawk (*Accipiter gentilis)*
California spotted owl (*Strix occidentalis occidentalis)*
(Little) willow flycatcher *(Empidonax traillii brewsteri)*
Bell's sage sparrow *(Amphispiza belli belli)*

Fish

Longfin smelt *(Spirinchus thaleichys*)
Red Hills roach *(Lavinia symmetricus)*

Mammals

Mount Lyell shrew *(Sorex lyelli)*
Spotted bat *(Euderma maculatum)*
Small-footed myotis bat *(Myotis ciliolabrum)*
Long-eared myotis bat *(Myotis evotis)*
Fringed myotis bat *(Myotis thysanodes)*
Long-legged myotis bat *(Myotis volans)*
Yuma myotis bat *(Myotis yumanensis)*
Greater western mastiff bat *(Eumops perotis californicus)*
Sierra Nevada snowshoe hare *(Lepes americanus tahoensis)*
Sierra Nevada (Mono Basin) mountain beaver *(Aplodontia rufa californica*)
Sierra Nevada red fox *(Vulpes vulpes necator)*
California wolverine *(Gulo gulo luteus)*
American (pine) marten *(Martes americana*)
Pacific fisher *(Martes pennanti pacifica)*

Reptiles and Amphibians

Limestone salamander *(Hydromantes brunus*)
Mount Lyell salamander *(Hydromantes platycephalus)*
Yosemite toad *(Bufo canorus*)
Foothill yellow-legged frog *(Rana boylei)*
Mountain yellow-legged frog *(Rana muscosa)*
Northwestern pond turtle *(Clemmys marmorata marmorata)*
Southwestern pond turtle *(Clemmys marmorata pallida)*
Northern sagebrush lizard *(Sceloporus graciosus graciosus)*

Invertebrates

Merced Canyon (Yosemite) shoulderband snail *(Helminthoglypta allynsmithi*)
Keeled sideband snail *(Monadenia circumcarinata*)
Mariposa sideband snail *(Monadenia hillebrandi)* [Formerly known as Yosemite Mariposa sideband snail *(Monadenia hillebrandi yosemitensis*)]
Sierra pygmy grasshopper *(Tetrix sierrana*)
Wawona riffle beetle *(Atractelmis wawona)*
Bohart's blue butterfly *(Philotiella speciosa bohartorum)*

Plants

Tiehm's rock-cress *(Arabis tiehmii)*
Yosemite woolly-sunflower *(Eriophyllum nubigenum)*
Congdon's lomatium *(Lomatium congdonii)*
Slender-stemmed (Hetch Hetchy) monkeyflower *(Mimulus filicaulis)*
Bolander's clover (parasol clover) *(Trifolium bolanderi)*

Table K-1
Species Considered in this Biological Assessment

California State Endangered Species

Birds

Bald eagle *(Haliaeetus leucocephalus*)
American peregrine falcon *(Falco peregrinus anatum)*
Great gray owl *(Strix nebulosa)*
Willow flycatcher *(Empidonax traillii)*

California State Threatened Species

Mammals

Sierra Nevada red fox *(Vulpes vulpes necator)*
California wolverine *(Gulo gulo luteus)*

California State Rare Species

Plants

Yosemite onion *(Allium yosemitense)*
Tompkin's sedge *(Carex tompkinsii)*
Congdon's woolly-sunflower *(Eriophyllum congdonii)*
Congdon's lewisia *(Lewisia congdonii)*

California State Species of Special Concern

Birds

Harlequin duck *(Histrionicus histrionicus)*
Cooper's hawk *(Accipiter cooperi)*
Northern goshawk *(Accipiter gentilis*)
Sharp-shinned hawk *(Accipiter striatus)*
Prairie falcon *(Falco mexicanus)*
Golden eagle *(Aquila chrysaetos)*
Merlin *(Falco columbarius)*
Long-eared owl *(Asio otus)*
California spotted owl *(Strix occidentalis occidentalis)*
Yellow warbler *(Dendroica petechia)*

Mammals

Sierra Nevada mountain beaver *(Aplodontia rufa californica*)
Spotted bat *(Euderma maculatum)*
Yuma myotis bat *(Myotis yumanensis)*
Greater western mastiff bat *(Eumops perotis californicus)*
Pallid bat *(Antrozous pallidus)*
Townsend's big-eared bat *(Corynorhinus townsendii townsendii)*
White-tailed hare *(Lepus townsendii)*
Pacific fisher *(Martes pennanti pacifica)*

Reptiles and Amphibians

Limestone salamander *(Hydromantes brunus*)
Mount Lyell salamander *(Hydromantes platycephalus)*
California red-legged frog *(Rana aurora draytonii*)
Yosemite toad *(Bufo canorus*)
Foothill yellow-legged frog *(Rana boylei)*
Mountain yellow-legged frog *(Rana muscosa)*
Northwestern pond turtle *(Clemmys marmorata marmorata)*
Southwestern pond turtle *(Clemmys marmorata pallida)*

Table K-1
Species Considered in this Biological Assessment

Park Rare Species

Plants

Sugar stick *(Allotropa virgata)*
Snapdragon *(Antirrhinum leptaleum)*
Sweetwater Mountains milkvetch *(Astragalus kentrophyta* var. *danaus)*
Black and white sedge *(Carex albonigra)*
Capitate sedge *(Carex capitata)*
Congdon's sedge *(Carex congdonii)*
Indian paintbrush *(Castilleja foliolosa)*
Alpine cerastium *(Cerastium beeringianum)*
Small's southern clarkia *(Clarkia australis)*
Sierra claytonia *(Claytonia nevadensis)*
Child's blue-eyed Mary *(Collinsia childii*)
Collinsia *(Collinsia linearis)*
Draba *(Draba praelta)*
Round-leaved sundew *(Drosera rotundifolia)*
Stream orchid *(Epipactis gigantea)*
Desert fleabane *(Erigeron linearis)*
Rambling fleabane *(Erigeron vagus)*
Fawn-lily *(Erythronium purpurascens*)
Northern bedstraw *(Galium boreale* ssp. *septentrionale)*
Dane's gentian *(Gentianella tenella* ssp. *tenella)*
Goldenaster *(Heterotheca sessiliflora* ssp. *echioides*)
Yosemite ivesia *(Ivesia unguiculata)*
Common juniper *(Juniperus communis)*
Pitcher sage *(Lepechinia calycina)*
Sierra laurel *(Leucothoe davisiae)*
False pimpernel *(Lindernia dubia* var. *anagallidea)*
Congdon's monkeyflower *(Mimulus congdonii)*
Inconspicuous monkeyflower *(Mimulus inconspicuus)*
Palmer's monkeyflower *(Mimulus palmeri)*
Pansy monkeyflower *(Mimulus pulchellus)*
Dwarf sandwort *(Minuartia pusilla)*
Sierra sweet-bay *(Myrica hartwegii)*
Azure penstemon *(Penstemon azureus* ssp. *angustissimus)*
Phacelia *(Phacelia platyloba*)
Phacelia *(Phacelia tanacetifolia)*
Snow willow *(Salix reticulata)*
Wood saxifrage *(Saxifraga mertensiana*)
Bolander's skullcap *(Scutellaria bolanderi)*
Groundsel *(Senecio serra* var. *serra)*
Giant sequoia *(Sequoiadendron giganteum)*
Ladies' tresses *(Spiranthes porrifolia)*
Trillium *(Trillium angustipetalum)*
Hall's wyethia *(Wyethia elata)*

The USFWS also provided a list of federal and state-listed species that may occur in Mariposa County (see Appendix K-1). Each species on the Mariposa County list was evaluated by National

Park Service biologists familiar with habitat requirements and added to the list of species to be evaluated in this assessment, if appropriate (see table K-1).

In May 2000, the National Park Service mailed the *Biological Assessment on the Draft Yosemite Valley Plan/SEIS* to the USFWS and requested formal consultation with regard to the *Yosemite Valley Plan/SEIS*. Later that month, the USFWS requested additional information on the Valley elderberry longhorn beetle. Specifically, the USFWS requested information on whether elderberry plants (which serve as the beetle's host plant) occur in riparian habitats below 3,000 feet in the project area. The USFWS also requested the number of stems of each elderberry plan over 1 inch at ground level. In June 2000, the additional information was mailed to the USFWS along with the *Revised Biological Assessment on the Draft Yosemite Valley Plan/SEIS*, which reflected the new information.

The public comment period for the *Draft Yosemite Valley Plan/SEIS* (NPS 2000a) closed in early July. At this point, the planning team began to use an analysis of the over 10,600 public comments to guide the direction of the *Final Yosemite Valley Plan/SEIS*. The biological assessment team used decisions made during this period as the basis for this Biological Assessment. The USFWS will use this Biological Assessment to render a Biological Opinion on the *Final Yosemite Valley Plan/SEIS* (NPS 2000b).

Species Evaluated in this Biological Assessment

FEDERALLY LISTED SPECIES

The Endangered Species Act defines an endangered species as any species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Of the federally listed species that could be affected by the *Final Yosemite Valley Plan/SEIS*, one is endangered: Sierra Nevada bighorn sheep *(Ovis canadensis sierrae)*; and three are threatened: bald eagle *(Haliaeetus leucocephalus)*, Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*, and California red-legged frog *(Rana aurora draytonii)*.

The Sierra Nevada bighorn sheep formerly ranged throughout the high elevations of the Sierra Nevada. By the beginning to the 20th century, however, their numbers had been decimated by overhunting, competition for forage with domestic sheep, and especially by diseases contracted from domestic sheep. By 1999, fewer than 200 Sierra Nevada bighorn sheep were left in the entire range, prompting its listing that year as endangered.

The bald eagle suffered steep population declines from the effects of pesticides in its food chain, resulting in its listing by the USFWS as a federally endangered species in 1978. Populations of bald eagles, however, have rebounded since the banning of the pesticide DDT in the United States in 1972. As a result, the species was reclassified from endangered to threatened in 1995. In 1999, the USFWS proposed to remove the bald eagle from the List of Endangered and Threatened Wildlife in the lower 48 states of the United States because available data indicated

the species has recovered. A final rule is expected in the near future. No critical habitat in the Sierra Nevada has been designated by the USFWS.

The Valley elderberry longhorn beetle was listed by the USFWS as threatened on August 8, 1980. This listing was primarily a result of destruction of riparian habitat in the San Joaquin Valley that removed the beetle's host plant, the elderberry. Critical habitat has been designated for the beetle in two areas: along the American River near the Sacramento metropolitan area and along Putah Creek in Solano County. However, the beetle also occurs up to 3,000 feet in elevation in the Sierra Nevada.

The California red-legged frog was listed as threatened in 1996 after its virtual disappearance from the Central Valley and the Sierra Nevada. The cause(s) of this disappearance are not well understood, but theories include pesticides, habitat destruction, and predation by non-native bullfrogs.

Special-Status Species

Special-status species that could be affected by this plan are listed in table K-1. The species on this list include the federally endangered and threatened species in the seven U.S. Geological Survey quadrangles that encompass the project area for the plan (see USFWS Consultation), species listed in the California Natural Diversity Data Base, applicable species on the list of endangered and threatened species in Mariposa County provided by the USFWS (see Appendix K-1), and "park rare" plants identified by National Park Service. Park rare plants include those that are:

- locally rare natives
- listed by the California Native Plant Society
- endemic to the park or local vicinity
- at the furthest extent of their range
- of special importance to the park (identified in legislation or park management objectives)
- the subject of political concern or unusual public interest
- vulnerable to local population declines
- subject to human disturbance during critical portions of their life cycle

There is no classification of "park rare" for any wildlife species.

Species Removed from Further Analysis

The following species are on the list of "Endangered and Threatened Species that may occur or be Affected by Projects in the USFWS 7 ½ Minute Quads" that was provided by the USFWS (see Appendix K-1). However, the National Park Service has determined that they would not be affected by the *Final Yosemite Valley Plan/SEIS* because they do not occur in the project area, as described under Alternative 2, nor were they historically found in the project area, as described below. Therefore, there is no effect on these species from the Preferred Alternative in the *Draft Yosemite Valley Plan/SEIS*, nor are they potentially indirectly or cumulatively affected by the Preferred Alternative. These species will not be evaluated further in this Biological Assessment.

Paiute cutthroat trout, *Oncorhynchus (= Salmo) clarke seleniris* (Federal Threatened). The native range of the Paiute cutthroat trout was extremely limited – to approximately 9 miles of stream habitat in Silver King Creek, Alpine County. The California Department of Fish and Game has introduced the subspecies into creeks outside the historic range, including Delaney Creek in Yosemite National Park. The subspecies does not occur in the project area for the *Final Yosemite Valley Plan/SEIS*.

Delta smelt, *Hypomesus transpacificus* (Federal Threatened). The Delta smelt occurs only in Suisun Bay and the Sacramento-San Joaquin estuary ("Delta") near San Francisco Bay in California (Thelander 1994). Historically, this species occurred form Suisun Bay upstream to Sacramento on the Sacramento River and to Mossdale on the San Joaquin River (Thelander 1994). The reduction of freshwater inflows to the Delta from water developments, water diversions, and drought appears to be the most deleterious factor affecting this species (Thelander 1994). The subspecies does not occur in the project area for the *Final Yosemite Valley Plan/SEIS*.

Sacramento spittail, *Pogonichthys macrolepidotus* (Federal Threatened). Until recently, the Sacramento spittail was thought to be limited to tidal fresh and brackish waters of the Sacramento-San Joaquin Delta, Suisun Bay; and to marshes in Suisun, Napa, and Petaluma (Baxter 1994, Baxter et al. 1996). Recent surveys have found that some fish spend summers in the main stem of the Sacramento (CDFG 1999a). The Sacramento spittail is threatened by large freshwater exports from Sacramento and San Joaquin River diversions, loss of shallow-water habitat, introduced aquatic species, and agricultural and industrial chemicals. The subspecies does not occur in the project area for the *Final Yosemite Valley Plan/SEIS*.

Central Valley steelhead, *Oncorhynchus mykiss* (Federal Threatened). This species does not occur in the project area for the *Final Yosemite Valley Plan/SEIS* (CDFG 1999b).

Longfin smelt, *Spirinchus thaleichthys* (Federal Species of Concern). This species does not occur in the project area for the *Final Yosemite Valley Plan/SEIS* (CDFG 1999b).

Red Hills roach, *Lavinia symmetricus* (Federal Species of Concern). This species does not occur in the project area for the *Final Yosemite Valley Plan/SEIS* (CDFG 1999b).

Bell's sage sparrow, *Amphispiza belli belli* (Federal Species of Concern). This subspecies does not occur in the project area for the *Final Yosemite Valley Plan/SEIS* (CDFG 1999b).

Northern sagebrush lizard, *Sceloporus graciosus graciosus* (Federal Species of Concern). This subspecies does not occur in the project area for the *Final Yosemite Valley Plan/SEIS* (CDFG 1999b).

Mono Basin mountain beaver, *Aplodontia rufa californica* (Federal Species of Concern). This listing is specific to the population of Sierra Nevada mountain beaver that occurs in the Mono Basin. This population belongs to the same subspecies as occurs in Yosemite, which is a state species of special concern.

Keeled sideband snail, *Monadenia circumcarinata* (Federal Species of Concern). The keeled sideband snail is a terrestrial snail that is not known to occur outside the Tuolumne River canyon, where it is found in association with steep limestone outcrops and talus slopes (Pilsbre 1939,

Maciolek 1985). The California Academy of Sciences has records for eight specimens collected in Tuolumne and Stanislaus Counties. The nearest locality to the project area is Paper Cabin Ridge, above the Tuolumne River. Paper Cabin Ridge is about 18.5 miles west of the Yosemite National Park boundary. Therefore, this species does not appear to occur within the project area.

Yosemite woolly-sunflower, *Eriophyllum nubigenum* (Federal Species of Concern). This annual herb in the aster family is endemic to California and occurs on south-facing granite slabs, domes, and on gravelly soils in the upper Merced River watershed. This species does not occur in the project area and would not be indirectly affected by any actions in the Preferred Alternative of the *Final Yosemite Valley Plan/SEIS.*

Critical Habitat

Critical habitat is a specific area or type of area that is considered to be essential for the survival of a species, as designated by the USFWS under the Endangered Species Act. No critical habitat occurs in Yosemite National Park or the El Portal Administrative Site for any special-status species that is known to occur or has the potential to occur in these areas.

CHAPTER II. CURRENT MANAGEMENT DIRECTION

Authorities

The following legislation and policies address the management of special-status species in the park: the National Park Service Organic Act, the Endangered Species Act, the National Environmental Quality Act, the California Endangered Species Act, the Migratory Bird Conservation Act, the Fish and Wildlife Coordination Act, the Wild and Scenic Rivers Act, and the Wilderness Act.

The USFWS normally takes the lead departmental responsibility of coordinating and implementing provisions of the Federal Endangered Species Act for all listed endangered, threatened, and candidate species. This Biological Assessment is prepared in accordance with Section 7 of the Federal Endangered Species Act of 1973, as amended, as part of the consultation process with the USFWS.

Policy and Program Objectives

The following National Park Service policies and program objectives prescribe the management of special-status species:

- The *Natural Resources Management Guideline* NPS-77 (1991) states:
  "Management affects the distribution, abundance, and ecological relationships of and among species. Whereas preservation can be accomplished by a zoo, botanical garden, or other non-natural refugium, the National Park Service's goal is the long-term preservation of species and their ecological role and function as part of a "natural ecosystem." It is, therefore, critical that ecological aspects of management prevail in dealing with threatened and endangered species. An understanding of factors limiting the distribution and abundance of the species of concern must be well understood and incorporated into any management action."

- National Park Service *Management Policies* (1988) states:
  "Consistent with the purposes of the Endangered Species Act (16 USC 1531 et seq.), the National Park Service will identify and promote the conservation of all federally listed threatened, endangered, or candidate species within park boundaries and their critical habitats."

  "The National Park Service also will identify all state and locally listed threatened, endangered, rare, declining, sensitive, or candidate species that are native to and present in the parks, and their critical habitats. These species and their critical habitats will be considered in National Park Service planning activities."

- The 1980 *General Management Plan* for Yosemite states:

  > "Protect threatened and endangered plant and animal species and reintroduce, where practical, those species eliminated from the natural ecosystems."

CHAPTER III. THE FINAL YOSEMITE VALLEY PLAN/SEIS

The Preferred Alternative – Yosemite Village and Out-of-Valley Parking

This alternative would restore approximately 180 acres of currently disturbed or developed land in Yosemite Valley to natural conditions. It would consolidate parking for day visitors at Yosemite Village, where a new Valley Visitor Center would be located, and in parking areas outside Yosemite Valley. There would be fewer campsites and lodging units than there are now. This alternative would result in a major reduction in vehicle travel in the eastern portion of Yosemite Valley during summer months. The area of the former Upper and Lower River Campgrounds would be restored to a mosaic of meadow, riparian, and oak woodland communities, roads would be removed from Ahwahnee and Stoneman Meadows, and parking would be removed from Curry Orchard. Southside Drive would be converted to two-way traffic from El Capitan crossover to Curry Village, and Northside Drive would be converted to a multi-use (bicycle and pedestrian) paved trail from El Capitan crossover to Yosemite Lodge. There would be minimal new development west of Yosemite Lodge.

Actions outside of Yosemite Valley would include relocation of employee housing to El Portal and Wawona, relocation of National Park Service and concessioner stables to McCauley Ranch in Foresta, establishment of day-visitor parking at Badger Pass, Hazel Green or Foresta, and El Portal. Hazel Green is the preferred location for out-of-Valley parking to accommodate visitors arriving to the park via Highway 120. If negotiations with the private landowner at Hazel Green do not yield a satisfactory agreement, Foresta would become the preferred location. Improved visitor orientation would be provided at the Tioga Pass, South Entrance, El Portal, and Big Oak Flat Entrances. For a detailed description of the Preferred Alternative, refer to Vol. IA, Chapter 2 of the *Final Yosemite Valley Plan/SEIS* (NPS 2000b).

Summary of Major Changes in Relation to Existing Conditions

RESTORE

- Large tracts of meadow, riparian, and California black oak woodland communities along the river from Clark's Bridge downstream to Swinging Bridge

REMOVE

- Roads through Stoneman and Ahwahnee Meadows (including the road through the former Upper and Lower River Campgrounds)
- North Pines Campground
- Sugar Pine Bridge and possibly Stoneman Bridge to restore the hydrologic system of the Merced River

- Other historic structures: concessioner stable, Cascades Diversion Dam, and Cascades houses
- Most parking in east Valley other than at lodging, campgrounds, and the Yosemite Village area
- The Concessioner Headquarters Building
- Commercial trail rides in Yosemite Valley
- Curry Orchard and associated parking, and restore to natural conditions

ESTABLISH OR PRESCRIBE

- A Visitor Experience and Resource Protection (VERP) study to identify existing and desired conditions for natural resources, cultural resources, and visitor experience
- A traveler information and traffic management system to provide information to visitors, provide incentives for efficient use of available parking and transportation services, and manage access and parking
- Out-of-Valley day-visitor parking areas at Badger Pass, El Portal, and Hazel Green or Foresta
- Some utility hookups for recreational vehicles, and shower facilities in campgrounds
- New walk-to campsites for visitors without personal vehicles
- Land management zoning throughout Yosemite Valley
- Design guidelines for rehabilitiating the landscape in existing historic developed areas and for new construction
- An Indian Cultural Center at the last historically occupied Indian Village in Yosemite Valley

IMPLEMENT

- A contiguous River Protection Overlay, as proposed in the *Merced Wild and Scenic River Comprehensive Management Plan/Final Environmental Impact Statement*

CONSTRUCT

- A day-visitor parking area for 550 vehicles at Yosemite Village
- A visitor/transit center at Yosemite Village
- A vehicle bridge across Yosemite Creek near Yosemite Lodge
- A replacement footbridge at Happy Isles near the Nature Center
- Lodging at Yosemite Lodge and Curry Village
- Campsites at Camp 4 (Sunnyside Campground), east of Curry Village, in the Upper Pines area, and north of Tenaya Creek
- Employee housing at Curry Village, El Portal, Wawona, and Foresta

- Two firehouses, one in the Yosemite Village area (not in historic district), and one in the Curry Village area

CONVERT

- Museum/Valley District Building to a museum
- Southside Drive from El Capitan crossover to Curry Village to two-way traffic, one-lane each direction (road widened where necessary)
- Northside Drive from El Capitan crossover to Yosemite Lodge from a vehicle road to a multi-use (bicycle and pedestrian) paved trail
- Trail to the base of Yosemite Falls to a route accessible by people with mobility impairments and provide a larger viewing platform

INCREASE/EXPAND

- Shuttle bus service to Bridalveil Fall and out-of-Valley parking areas
- Interpretive and orientation services, including a new visitor center in Yosemite Valley and at or near principal park entrances
- Multi-use (bicycle and pedestrian) paved trails

REDUCE

- Stock trails by approximately 0.5 mile
- Lodging by 199 units (including 164 units at Housekeeping Camp)
- Traffic entering the Valley on a typically busy day by approximately two-thirds

RELOCATE

- Principal employee housing to El Portal and Wawona, leaving 683 beds in Yosemite Valley
- National Park Service and concessioner administrative stable operations to McCauley Ranch in Foresta
- National Park Service and concessioner headquarters out of Yosemite Valley
- Historic Superintendent's House (Residence 1) and its garage to a site within the historic district in Yosemite Village
- Museum collection storage, research library, and archives to a central facility in El Portal

CHAPTER IV. EXISTING ENVIRONMENT

Habitat Descriptions

YOSEMITE VALLEY

Yosemite Valley is a glacier-carved valley with sheer granite cliffs rising over 2,000 feet above the valley floor. Alluvial deposits are found to a depth of about 2,000 feet below the soil surface, creating a huge underground aquifer. The Merced River meanders along the nearly level Valley floor. Habitats in Yosemite Valley can be loosely grouped into meadow, riparian, and upland. Mammals resident or transient in Yosemite Valley include deer mouse, California ground squirrel, western gray squirrel, broad-footed mole, Botta's pocket gopher, mink, ringtail, raccoon, coyote, bobcat, mule deer, mountain lion, and black bear.

Meadows. Meadows in Yosemite Valley are found along the Merced River where water tables are high and flooding is common. Meadows serve as a transition zone, linking aquatic and riparian habitats along the Merced River to drier upland habitats such as California black oak. Aquatic life and nutrients concentrate in meadow ponds during dry summer months. This concentrated food source spills over into the Merced River during periods of high water and helps to sustain aquatic life in the river. Meadows in Yosemite Valley were maintained in the past by natural flooding and by frequent, low-intensity broadcast fires set by Native American residents of the Valley. Today, prescribed fire is used as a tool to clear the meadows of encroaching conifers and release nutrients into the soil.

Special-status species that are representative of meadows in Yosemite Valley include the peregrine falcon, willow flycatcher, great gray owl, California red-legged frog, special-status bats, round-leaved sundew, northern bedstraw, phacelia, ladies' tresses, and false pimpernel (see table K-2 for a complete listing of special-status species that have been found or could occur in Yosemite Valley).

Riparian Habitats. Riparian zones extend outward from the banks of the Merced River and its tributaries toward adjacent meadow and forest communities. Broadleaf deciduous trees such as white alder, black cottonwood, and willow characterize riparian zones in Yosemite Valley. Riparian vegetation along moving water is frequently disturbed and constantly responds to the deposition and removal of soil. Riparian vegetation actively colonizes new areas and is made up of a wide range of ages and types of vegetation. This in turn provides a wide range of foraging, nesting, and resting opportunities for wildlife.

Special-status species that are representative of riparian habitats in Yosemite Valley include the California red-legged frog, harlequin duck, willow flycatcher, yellow warbler, long-eared owl, special-status bats, the foothill yellow-legged frog, stream orchid, fawn-lily, and Sierra laurel (see Table K-2 for a complete listing of special-status species that have been found or could occur in Yosemite Valley).

Upland Habitats. Upland plant communities are found where soil moisture conditions are average to dry and where soils are not periodically flooded or saturated. Upland habitats cover

about 75% of Yosemite Valley and are dominated by mixed conifer, canyon live oak, California black oak, and microhabitats on steep granite walls (Acree 1994).

Mixed conifer communities in Yosemite Valley are typically dominated by ponderosa pine, but may have significant numbers of incense-cedar, Douglas-fir, white fir, California black oak, and an occasional sugar pine. The mixed conifer community is naturally adapted to low-intensity, frequent fires. Nearly 100 years of fire suppression has resulted in a change from open forest to dense thickets of shade-tolerant tree species such as incense-cedar and white fir. Under natural conditions, the return interval for fire is estimated at 8 to 12 years (NPS 1990). Most undeveloped, mixed conifer areas of Yosemite Valley are now managed through a combination of mechanical removal of hazardous fuel and prescribed burning. These treatments simulate the natural and Native American – maintained fire regimes of the Valley and help decrease forest densities to more natural levels.

Canyon live oak communities grow on both north- and south-facing talus slopes. They often form pure or almost pure stands. Fires in this community are infrequent but intense, with a fire return interval of 20 to 50 years on south-facing slopes. Most trees and shrubs in this community resprout after fires.

In addition to being a component of the mixed conifer community, California black oaks in Yosemite Valley form pure, open stands of large trees with a herbaceous understory. These pure stands are found between the upland forest communities and lower-lying meadow and riparian communities. These stands are unique to the Valley due to thousands of years of Native American activities, including annual burning and removal of young conifers. California black oaks also grow in dense stands on talus slopes near drainages.

Special-status species that are representative of upland habitats in Yosemite Valley include the California spotted owl, Cooper's hawk, special-status bats, sugar stick, azure penstemon, phacelia, and wood saxifrage (see Table K-2 for a complete listing of special-status species that have been found or could occur in Yosemite Valley).

EL PORTAL

El Portal lies in the Merced River canyon at 2,000 feet in elevation. The Merced River in this segment is lined with a narrow band of riparian vegetation with occasional wider floodplains. A dense mosaic of chaparral and foothill woodland communities lines the steep canyon walls. Many factors shape this unique biological environment, including natural floods and lightning-ignited fire. Soils derived in the contact zone between metamorphic and granitic rock form a unique substrate for vegetation. Many special-status plants are concentrated in this unique area. Steep canyon walls that are almost inaccessible to human passage create secluded refuges for wildlife. Extremely hot and dry summer weather places a critical importance on riparian habitat for many wildlife species.

Plant communities in El Portal include blue oak woodland, interior live oak woodland, gray pine-oak woodland, interior live oak chaparral, and riparian woodland. All of these communities are adapted to regular, frequent natural fires sparked by lightning.

Special-status species that have been found or could occur in El Portal include the Cooper's hawk, sharp-shinned hawk, golden eagle, long-eared owl, yellow warbler, bald eagle, California spotted owl, special-status bats, western pond turtle, foothill yellow-legged frog, Wawona riffle beetle, Valley elderberry longhorn beetle, Merced canyon shoulderband snail, Yosemite mariposa sideband snail, Bohart's blue butterfly, Sierra pygmy grasshopper, Yosemite onion, Tompkin's sedge, Indian paintbrush (*Castilleja foliolosa*), collinsia (*Collinsia linearis*), Congdon's woolly-sunflower, pitcher sage, Congdon's lewisia, Congdon's lomatium, Congdon's monkeyflower, Palmer's monkeyflower, and phacelia (*Phacelia platyloba*) (see table K-2 for a complete listing of special-status species that have been found or could occur in El Portal).

HAZEL GREEN

Vegetation at the Hazel Green area adjacent to the Big Oak Flat Road is dominated by a white fir/sugar pine/red fir association. Large white fir and sugar pine form a partially closed canopy, with an open subcanopy and minimal groundcover on the westernmost portions of the site. Average trees range from 30 inches to more than 100 inches in diameter, indicating a mixed-aged stand that has been in existence for some time. The majority of this area was burned at a low intensity by the 1987 Stanislaus Complex Fire.

A ponderosa pine/incense-cedar vegetation type occurs in the central portion of the site, which is located on a knoll straddling the Hazel Green and Bull Creek headwaters. Emergent sugar pine is dominant in the subcanopy, which was logged in the early 1920s. A small stand of red willow occurs along the artificial drainage ditches adjacent to the Big Oak Flat Road, where the headwaters of Hazel Green Creek are concentrated into one large culvert beneath the road. Hazel-nut, ocean-spray, and white alder with sedges and rushes grow within and immediately adjacent to the drainage ditch. A small open stand of ponderosa pine occurs around the edges of the meadow at the headwaters of Bull Creek; it has a high proportion of California black oaks. Non-native grasses, including Kentucky bluegrass and various forbs, dominate the meadow.

Special-status species that are representative of the Hazel Green area include the Northern goshawk, Sharp-shinned hawk, California spotted owl, yellow warbler, Small's southern clarkia, and slender-stemmed monkeyflower (see table K-2 for a complete listing of special-status species that have been found or could occur at Hazel Green).

WAWONA

The proposed site for new housing in Wawona occurs on a gentle north-facing slope above the South Fork of the Merced River. A lower montane mixed conifer forest of ponderosa pine, incense-cedar, sugar pine, white fir, and Douglas-fir dominates the site. Shade-tolerant incense-cedar and white fir dominate the subcanopy. Small stands of California black oak with an understory of native perennial grasses (including blue wildrye and California brome) characterize natural openings and rock outcrops within the site.

Special-status species that are representative of the area include the Cooper's hawk, sharp-shinned hawk, yellow warbler, California spotted owl, special-status bats, California red-legged frog,

snapdragon, Sierra sweet-bay, Bolander's skullcap, and trillium (see table K-2 for a complete listing of special-status species that have been found or could occur in Wawona).

Badger Pass

Dense montane coniferous forest and wet meadow habitat surround the existing parking lot at Badger Pass. Dominant forest species include red fir, white fir, Jeffrey pine, and lodgepole pine, with a mountain whitethorn understory. Vegetation in the meadow includes sedges, willows, and alder. Red firs grow in the vegetated islands in the parking lot.

Special-status species that are representative of the area include the Cooper's hawk, northern goshawk, great gray owl, Yuma myotis bat, Sierra Nevada mountain beaver, American marten, Pacific fisher, Sierra Nevada red fox, Yosemite toad, mountain yellow-legged frog, and Bolander's clover (see table K-2 for a complete listing of special-status species that have been found or could occur at Badger Pass).

Tioga Pass Entrance Station

Tioga Pass is located in a subalpine zone characterized by long, broad meadows with small glacial lakes and subalpine coniferous forests. Winters are long and severe, and summers are brief and cool. Intensely strong winds on exposed ridges and passes can dwarf and stunt trees.

Meadow vegetation consists of low-growing, native, tussock-forming grasses, sedges, rushes, and perennial herbs. Shorthair reedgrass, shorthair sedge, pussy-toes, cinquefoil, and dwarf lupine are common. The subalpine forest is found on drier slopes and is relatively open, though it becomes denser along stream channels. The upland forest is made up of lodgepole pine and whitebark pine, with an understory that ranges from sparse perennials in bedrock fractures to sparse shrubs, herbs, and grasses.

Many wildlife species from lower elevations seasonally use the subalpine habitat at Tioga Pass, including mule deer, mountain lion, white-crowned sparrow, and the dark-eyed junco. Special-status species that are representative of the area include the Yosemite toad, mountain yellow-legged frog, American marten, Tiehm's rock cress, and black and white sedge (see table K-2 for a complete listing of special-status species that have been found or could occur in the Tioga Pass area).

Foresta

The 1990 A-Rock Fire significantly altered vegetative cover and wildlife habitat in Foresta. Before the fire, very dense mixed coniferous forest and California black oak habitat dominated upland areas. A mixture of montane chaparral, mixed conifer, and riparian species have emerged since the fire and dominate upland areas. Tree species include California black oak, ponderosa pine, knobcone pine, and occasional sugar pines. Montane chaparral species include Mariposa and greenleaf manzanita, deerbrush ceanothus, and goldenbush. The herbaceous layer contains native early-successional species such as lupine and lotus. Non-native plants including spotted knapweed, yellow star-thistle, cheat grass, and tocalote are also found.

Special-status species that are representative of the area include the Cooper's hawk, great gray owl, sharp-shinned hawk, golden eagle, bald eagle, yellow warbler, willow flycatcher, special-status bats, western pond turtle, California red-legged frog, foothill yellow-legged frog, snapdragon, inconspicuous monkeyflower, and pansy monkeyflower (see table K-2 for a complete listing of special-status species that have been found or could occur in Foresta).

South Entrance Station

The South Entrance to Yosemite supports dense montane mixed coniferous forest habitat on drier upland sites, and riparian habitats along stream channels. The remains of historic railroad logging activity are visible throughout the site. Forested areas are dominated by a white fir overstory with smaller sugar pines, Douglas-fir, and ponderosa and Jeffrey pines. The understory is fairly sparse due to dense shading from the subcanopy and canopy.

Fire has been excluded from much of the area for over a century, and fuel loads have built up to the point that typical shrub species in this habitat, such as whitethorn ceanothus and greenleaf manzanita, are nearly absent. Perennial herbaceous species such as trail plant, wood orchid, and rattlesnake plantain are common. The leach field (for the residence and restrooms at the entrance station) is an unnatural opening in the forest canopy and has a variety of native and non-native plants including sedges, horsetail rush, bull thistle, and rabbit's-ear.

Riparian vegetation is found throughout the South Entrance area along stream courses and in low areas that retain water. Riparian areas are dominated by cottonwood, mountain dogwood, and alder, with an understory of willow, Sierra sweet-bay, and western azalea. Ground cover consists of horsetail, bracken fern, and other moisture-dependent species. Non-native species such as bull thistle and cut-leaf blackberry have become established in these riparian corridors, but remain a minor component.

Special-status species that are representative of South Entrance include Cooper's hawk, California spotted owl, special-status bat species, American marten, and Sierra sweet-bay (see table K-2 for a complete listing of special-status species that have been found or could occur at South Entrance).

Big Oak Flat Entrance Station

Vegetation in the vicinity of the Big Oak Flat Entrance is dominated by two types: a white fir/sugar pine/red fir vegetation type, and a ponderosa pine/incense cedar vegetation type with emergent sugar pine. The fir association, found along the west side of the parking area and along drainages in the area, is characterized by variably-sized trees with diameters up to 40 inches.

Most of this site was logged in the early 1920s, prior to its inclusion in Yosemite National Park. The subcanopy is dominated by shade-tolerant white fir with little shrub or ground cover. The ponderosa pine vegetation type occurs on drier sites to the east of the current parking area and has a more open canopy. The subcanopy is dominated by young incense cedar and a sparse understory of whitethorn ceanothus and greenleaf manzanita.

Special-status wildlife species that are representative of Big Oak Flat Entrance include Cooper's hawk, California spotted owl, American marten, and all special status bat species. No special-status plant species are known to occur in the area.

Species Accounts

Table K-2 presents a summary of species addressed in this analysis.

Table K-2
Special-Status species

Species	Area[1]	Status[2]			Habitat Type / Occurrence
	BO, BP, E, F, HG, SE, T, W, Y	USFWS	State	Park	
INVERTEBRATES					
Merced Canyon (Yosemite) shoulderband snail *Helminthoglypta allynsmithi*	E	FSC			Found in rockslide habitat with shade and moisture. Recorded in Merced River canyon near El Portal.
Mariposa sideband snail *Monadenia hillebrandi*	E, Y	FSC			Occurs in rockslide habitat with shade and moisture. Reported in Yosemite Valley in the early 1900s.
Sierra pygmy grasshopper *Tetrix sierrana*	E, SE, W	FSC			One record for El Portal (1953). Only other record is from Madera County.
Wawona riffle beetle *Atractelmis wawona*	E, W, Y	FSC			Limited distribution in the main stem and South Fork of the Merced River. Little known of exact distribution or habitat needs.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	E	FT			Found in conjunction with its host plant, the elderberry (*Sambucus* spp.), below 3,000 feet in elevation.
Bohart's blue butterfly *Philotiella speciosa bohartorum*	E	FSC			An annual in the buckwheat family (*Chorizanthe membrane*) is the suspected preferred forage plant. It is found in association with serpentine soils. Last recorded in 1970 near Briceburg in the Merced River canyon.
REPTILES AND AMPHIBIANS					
Limestone salamander *Hydromantes brunus*	E	FSC	CT		Very limited distribution along Merced River and its tributaries between elevations of 800 and 2,500 feet, usually in association with limestone outcrops. El Portal lies within elevational range, but not recorded there or elsewhere in park.
Mount Lyell salamander *Hydromantes platycephalus*	Y, T	FSC	CSC		Occurs in massive rock areas between 4,000 and 11,500 feet in elevation, in rock fissures, seeps, shade, and low-growing plants. Two records in Yosemite Valley: base of Cathedral Rocks and base of Bridalveil Fall.

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[2] Special-status species: FE = federally endangered, FT = federally threatened, FD = federally delisted (status to be monitored for at least five years), FSC = federal species of concern, CE = California endangered, CT = California threatened, CSC = California species of special concern, R = California rare, PR = Yosemite park rare

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	BO, BP, E, F, HG, SE, T, W, Y	**USFWS**	**State**	**Park**	
Yosemite toad *Bufo canorus*	BP, T	FSC	CSC		Restricted to areas of wet meadows in central Sierra Nevada between elevations of 6,400 and 11,300 feet.
California red-legged frog *Rana aurora draytonii*	F, W, Y, E	FT	CSC		Found in quiet pools in permanent streams in mixed conifer zones and foothills. Prefers riparian deciduous habitat. Many park museum specimens from one lake (6,000 feet elevation). Once found in Yosemite Valley, but now apparently extinct due to loss of habitat and predation by bullfrogs and other species.
Foothill yellow-legged frog *Rana boylei*	E, F, W, Y	FSC	CSC		Formerly abundant, and found up to elevations of 6,000 feet, this species has virtually disappeared from its range in the Sierra Nevada from unknown causes. Preferred habitat was rocky streams and wet meadows. Historical records exist from Yosemite Valley, but none recent.
Mountain yellow-legged frog *Rana muscosa*	BP, T	FSC	CSC		A species of mountain habitats, occurring between elevations of 4,500 to over 12,000 feet; found in streams, lakes, and ponds in a variety of vegetation types.
Northwestern pond turtle *Clemmys marmorata marmorata*	E, F,W, Y	FSC	CSC		Found in the Sierra Nevada up to 6,000 feet. Has decreased by up to 80% in numbers, probably due to habitat fragmentation and non-native predators. Habitat is permanent water in a variety of habitat types. Recent records include several from Crane Creek in El Portal and an unconfirmed report in Yosemite Valley in 1999.
Southwestern pond turtle *Clemmys marmorata pallida*	E, F,W,Y	FSC	CSC		Found in the Sierra Nevada up to 6,000 feet. Has decreased by up to 80% in numbers, probably due to habitat fragmentation and non-native predators. Habitat is permanent water in a variety of habitat types. Recent records include several from Crane Creek in El Portal and an unconfirmed report in Yosemite Valley in 1999.
BIRDS					
Harlequin duck *Histrionicus histrionicus*	E,W,Y	FSC	CSC		Breeds along large, swift-moving mountain rivers. Was formerly found in every major watershed in the Sierra, but has disappeared, with no sightings in the last 20 years. Formerly nested in Yosemite Valley.
Cooper's hawk *Accipiter cooperi*	BO, BP, E, F, HG, SE, W, Y		CSC		Found in wooded areas up to elevations of 9,000 feet in the Sierra Nevada. Numerous recent records for Yosemite, especially in Yosemite Valley. Habitat destruction in its range has led to population declines. Frequently hunts along wooded edges.

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	BO, BP, E, F, HG, SE, T, W, Y	USFWS	State	Park	
Northern goshawk *Accipiter gentilis*	BO, BP, HG, SE, T, Y	FSC	CSC		Favors moderately dense coniferous forests broken by meadows and other openings, between 5,000 and 9,000 feet elevation. Typically nests in mature conifer stands near streams. Habitat destruction in its range has caused population declines. Has been recorded in the Valley, primarily between November and February.
Sharp-shinned hawk *Accipiter striatus*	BO, BP, HG, SE, W, E, Y		CSC		Hunts in open coniferous forest and edges of meadows and clearings between 4,000 and 7,000 feet elevation in the Sierra Nevada. Nest in forests. One 1930 nesting record for Yosemite Valley.
Golden eagle *Aquila chrysaetos*	E, T, Y		CSC		Found in a wide range of elevations in the park. Needs open terrain for hunting. Feeds primarily on small mammals. Nests on cliffs and in large trees in open areas.
Bald eagle *Haliaeetus leucocephalus*	E,F,W,Y	FT	CE		Forages over river, streams, and lakes. Primarily eats fish, also carrion, waterbirds, and small mammals. Transient in the park. No nesting in the park.
Merlin *Falco columbarius*	E, W, Y, F		CSC		Occurs mostly below 4,000 feet, ranging from annual grasslands to ponderosa pine and California black oak woodland, but prefers open country. Feeds primarily on birds. Reduction in numbers over recent decades may be due to pesticides.
Prairie falcon *Falco mexicanus*	F, Y, T		CSC		Primarily associated with grasslands and meadows where it feeds on small mammals and birds. Nests on cliffs. Has declined in California from several probable factors, including nest robbing by humans, control of prey species, and pesticides. Many records of this species in alpine areas of Yosemite, but it is also occasionally seen in Yosemite Valley and Foresta.
American peregrine falcon *Falco peregrinus anatum*	W, Y	FD	CE		Usually nest on high cliffs near water to search for prey. Three active nest sites in Yosemite Valley.
Long-eared owl *Asio otus*	E, W, Y		CSC		Requires riparian or other thickets with small, densely canopied trees for roosting and nesting. Proximity of this habitat to meadow edges for hunting also enhances quality. One nesting record in Yosemite Valley in 1915.

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	BO, BP, E, F, HG, SE, T, W, Y	**USFWS**	**State**	**Park**	
Great gray owl *Strix nebulosa*	BP, F, HG, W, Y		CE		Entire California population of this species is restricted to the Yosemite region, where it reaches southernmost extent of its North American range. Breeds in mixed conifer/red fir forests bordering meadows. Winters in mixed conifer down to blue oak woodlands. Research suggests that human disturbance could affect foraging success of this species, which may explain its absence from the Valley.
California spotted owl *Strix occidentalis occidentalis*	BO, BP, E., F, HG, SE, W, Y	FSC	CSC		Breeds in oak and ponderosa pine forests upslope to lower-elevation red fir forests (up to elevations of 7,600 feet), with mixed conifer the optimum type. Presence of California black oak in the forest canopy also enhances habitat suitability. Confirmed sightings in Yosemite Valley near Happy Isles, Mirror Lake, Yosemite Chapel, and the base of Cathedral Rocks. Suitable habitat in or near all the project sites, with the exception of Tioga Pass.
Willow flycatcher *Empidonax trailii*	BO, BP, F, W, Y	FSC *(ssp. brewsteri)*	CE		Breeds in mountain meadows and riparian areas from 2,000 to 8,000 feet elevation in the Sierra Nevada, with lush growth of shrubby willows. Has disappeared from much of its range, due to habitat destruction and parasitism from brown-headed cowbirds.
Yellow warbler *Dendroica petechia*	BO, E, F, HG, SE, BP W, Y		CSC		Prefers riparian woodlands, but also breeds in chaparral, ponderosa pine, and mixed conifer habitats with substantial amounts of brush. In recent decades, numbers of breeding pairs have declined dramatically in many lowland areas of California. A major cause of this decline has apparently been brown-headed cowbird parasitism.
Mammals					
Mount Lyell shrew *Sorex lyelli*	T	FSC			Favors riparian zones and other wet sites.
Pallid bat *Antrozous pallidus*	BO, BP, E, F, HG, SE, W, Y, T		CSC		Primarily found below 6,000 feet elevation in a variety of habitats, especially oak, ponderosa pine, and giant sequoia. Roosts in rock outcrops, caves, and hollow trees. Known nursery colony in Yosemite Valley at The Ahwahnee. Population decline due to habitat destruction.

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	BO, BP, E, F, HG, SE, T, W, Y	**USFWS**	**State**	**Park**	
Townsend's big-eared bat *Corynorhinus townsendii townsendii*	BO, BP, E, F, HG, SE, W, Y		CSC		Found in all habitats up to alpine zone. Requires caves, mines, or buildings for roosting. Prefers mesic habitats where it feeds on insects from brush or trees along habitat edges. Captured in Yosemite Valley during 1993 survey.
Spotted bat *Euderma maculatum*	BO, BP, E, F, HG, SE,W,Y, T	FSC	CSC		Rare throughout range. Uses crevices in rockfaces for roosting and reproduction. Forages in a wide variety of habitats, primarily for moths. Surveys (1992–1997) in Yosemite located this species in numerous locations, including Wawona, Crane Flat, Tuolumne Meadows, and especially Yosemite Valley.
Small-footed myotis bat *Myotis ciliolabrum*	BO, BP, E, F, HG, SE, W, Y	FSC			Usually found below 8,800 feet and in wooded and brushy habitats near water. Forages among trees and over water. Breeds in colonies in buildings, caves, and mines.
Long-eared myotis bat *Myotis evotis*	BO, BP, E, F, HG, SE, W, Y	FSC			Wide range from coast to high elevations in the Sierra Nevada, in montane oak woodlands. Roosts primarily in hollow trees, especially large snags or lightning-scarred live trees. Captured in Yosemite Valley in 1993.
Fringed myotis bat *Myotis thysanodes*	BO, BP, E, F, HG, SE, W, Y	FSC			Found to elevations of at least 6,400 feet in the Sierra Nevada in deciduous/mixed conifer forests. Feeds over water, in open habitats, and by feeding on insects from foliage. Roosts in caves, mines, buildings, and trees, especially large conifer snags. Captured during surveys in Yosemite Valley in 1993 near Yosemite Creek and
Long-legged myotis bat *Myotis volans*	BO, BP, E, HG, SE, W, Y	FSC			Found up to high elevations in the Sierra Nevada, in montane coniferous forest habitats. Forages over water, close to tree and cliffs, and in openings in forests. Roosts primarily in large-diameter snags. Forms nursery colonies numbering hundreds of individuals, usually under bark or in hollow trees. Captured in Yosemite Valley in 1993.
Yuma myotis bat *Myotis yumanensis*	BO, BP, E, F, HG, SE, W, Y	FSC	CSC		Usually occurs below 8,000 feet elevation. Forages over open, still, or slow-moving water and above low vegetation in meadows. Roosts in caves, buildings, or crevices. Nursery colonies of several thousand individuals may be in caves, mines, or buildings. Captured during surveys in Yosemite Valley and Wawona in 1993 and 1994.

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	BO, BP, E, F, HG, SE, T, W, Y	**USFWS**	**State**	**Park**	
Greater western mastiff bat *Eumops perotis californicus*	BO, BP, E, F, HG, SE, W, Y, T	FSC	CSC		Found in a variety of habitats to over 10,000 feet in elevation. Roosts primarily in crevices in cliff faces and occasionally trees. Detected most often over meadows and other open areas, but will also feed above forest canopy, sometimes to high altitudes.
Sierra Nevada snowshoe hare *Lepus americanus tahoensis*	BP, T	FSC			Uncommon resident of upper elevations in the Sierra Nevada. Prefers the edges of forested habitats, heterogeneous habitats, and areas with dense understory, particularly in riparian habitats.
White-tailed hare Lepus townsendii	T		CSC		Suitable habitat is found in meadows, willow thickets, shrubby ridgetops, and open stands of lodgepole pines.
Sierra Nevada mountain beaver *Aplodontia rufa californica*	BP	FSC	CSC		Prefers willow-lined, perennial streams through montane meadows, where it establishes a system of burrows, often with the stream running through them. Known population at Badger Pass.
Sierra Nevada red fox *Vulpes vulpes necator*	BO, BP, F, HG, SE, W, Y, T	FSC	CT		Primarily found in red fir, lodgepole pine, subalpine forests, and alpine Sierra. Found mostly above 7,000 feet and rarely below 5,000 feet elevation. Five unconfirmed reports for Yosemite Valley, but these sightings could have been of eastern red fox, a non-native species that is present on the west slope of the Sierra Nevada.
California wolverine *Gulo gulo luteus*	T	FSC	CT		Found in a wide variety of mountain habitats. Needs water, caves, logs, or other cover for denning. No wolverine have been recorded within California since the 1970s.
American (pine) marten *Martes americana*	BO, BP, HG, SE,Y, T	FSC			Found in dense, complex coniferous forests with large trees and snags. Structural complexity near the ground is important for foraging and protection from predators.
Pacific fisher *Martes pennanti pacifica*	BO, BP, HG, SE, F, Y, W	FSC	CSC		Occurs in coniferous forests and deciduous-riparian habitats with a high canopy closure, mostly above 6,000 feet elevations. Carnivorous, but may also eat fruit and fungi. Densities in the central Sierra Nevada appear to be very low, for unknown reasons; higher densities in both the northern and southern Sierra Nevada. Fishers have been seen within the last 10 years near Henness Ridge and Crane Flat.

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Table K-2 Special-Status species					
Species	**Area[1]**	**Status[2]**			**Habitat Type / Occurrence**
	BO, BP, E, F, HG, SE, T, W, Y	**USFWS**	**State**	**Park**	
Sierra Nevada bighorn sheep *Ovis canadensis sierrae*	T	FE	CE		High-elevation species that was reintroduced to the park in 1986. Population numbers have fluctuated between a high of 85+ animals in 1991 to less than 20 today.
Plants					
Yosemite onion *Allium yosemitense*	E, W		R		Confined to open metamorphic slabs, talus slopes, and scree. Restricted to the Merced River watershed.
Sugar stick *Allotropa virgata*	Y			PR	Confined to California black oak and mixed conifer forest areas.
Snapdragon *Antirrhinum leptaleum*	F, W			PR	Restricted to small washes and shallow ditches in disturbed areas.
Tiehm's rock-cress *Arabis tiehmii tiehmii*	T	FSC			Found in alpine fell-fields on the slopes of Mt. Dana above Tioga Pass.
Sweetwater Mountains milkvetch *Astragalus kentrophyta* var. *danaus*	T			PR	This strictly alpine species occurs on dry, exposed, unglaciated ridges and slopes along the Sierra Nevada crest from 10,000 to 12,500 feet in elevation.
Black and white sedge *Carex albonigra*	T			PR	Locally rare in the Sierra Nevada on subalpine talus slopes and cliff bases in marshy areas and springs.
Capitate sedge *Carex capitata*	T			PR	Restricted in the Sierra Nevada; strictly alpine.
Congdon's sedge *Carex congdonii*	T			PR	Found on talus slopes.
Tompkin's sedge *Carex tompkinsii*	E		R		Limited to foothill oak woodland and chaparral areas and along lower talus slopes. Found sporadically from Cascades to El Portal in the Merced River canyon.
Indian paintbrush *Castilleja foliolosa*	E			PR	Found on dry, open, rocky slopes on the edge of chaparral areas below 4,500 feet in elevation.
Alpine cerastium *Cerastium beeringianum*	T			PR	Infrequent in moist snowmelt or rivulets, mossy turf on lakeshores, and streambank overhangs above 9,500 feet in elevation.
Small's southern clarkia *Clarkia australis*	F, HG			PR	Confined to open ponderosa pine forests.
Sierra claytonia *Claytonia nevadensis*	T			PR	Endemic to California, limited to alpine fell-fields in perennially moist areas in granitic and metamorphic substrates.

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Species	Area[1]	Status[2]			Habitat Type / Occurrence
	BO, BP, E, F, HG, SE, T, W, Y	USFWS	State	Park	
Child's blue-eyed Mary *Collinsia childii*	W			PR	Endemic to central and southern Sierra Nevada, reaching the northern extent of its range in Mariposa County. Occurs on shaded slopes and in open oak and mixed coniferous woodlands.
Collinsia *Collinsia linearis*	E			PR	Restricted to dry, metamorphic rock outcrops along the metamorphic-granitic contact zone.
Draba *Draba praelta*	T			PR	Rare in steep springs with bunch grass hummocks above 10,000 feet in elevation along the Sierra Nevada crest in the Tioga Pass region.
Round-leaved sundew *Drosera rotundifolia*	YV, W			PR	Confined to sphagnum bogs.
Stream orchid *Epipactis gigantea*	Y			PR	Restricted to moist granitic ledges, and planted in landscaped areas.
Desert fleabane *Erigeron linearis*	T			PR	Found in the granitic-metamorphic contact zone on the slopes of Mt. Dana.
Rambling fleabane *Erigeron vagus*	T			PR	Found in isolated populations on the slopes of Mt. Dana and adjacent alpine peaks.
Congdon's woolly-sunflower *Eriophyllum congdonii*	E		R		Restricted to dry, mostly south-facing metamorphic and metasedimentary outcrops. Occurs on dry ridges on metamorphic rocks, scree, and talus.
Fawn-lily *Erythronium purpurascens*	Y			PR	Known from riparian corridors in the eastern end of Yosemite Valley
Northern bedstraw *Galium boreale* ssp. *septentrionale*	Y			PR	Found in wet lower montane meadows.
Dane's dwarf gentian *Gentianella tenella* ssp. *tenella*	T			PR	Occurs in high elevation meadows and moist seepage areas on rock and shaded cliff crevices above 10,000 feet in elevation.
Goldenaster *Heterotheca sessiliflora* ssp. *echioides*	F			PR	Limited to grasslands and open oak woodlands below 4,400 feet in elevation.
Yosemite ivesia *Ivesia unguiculata*	BP			PR	Endemic to montane meadows and forest edges.
Common juniper *Juniperus communis*	T			PR	Found infrequently along the crest of the Sierra Nevada near treeline.
Pitcher sage *Lepechinia calycina*	E			PR	Found on rocky slopes within chaparral and canyon live oak woodlands.
Sierra laurel *Leucothoe davisiae*	Y			PR	Grows in wet areas and bogs in acid soil.

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Species	Area[1]	Status[2]			Habitat Type / Occurrence
	BO, BP, E, F, HG, SE, T, W, Y	USFWS	State	Park	
Congdon's lewisia *Lewisia congdonii*	E		R		Grows on moist, exposed metamorphic rockfaces and slopes. Occurs in chaparral and mixed conifer forest on north-facing slopes in shade.
False pimpernel *Lindernia dubia* var. *anagallidea*	Y			PR	Occurs in wet meadows.
Congdon's lomatium *Lomatium congdonii*	E	FSC			Restricted to serpentine and metamorphic soils in canyon live oak woodlands.
Congdon's monkeyflower *Mimulus congdonii*	E			PR	Found in granitic soils in disturbed areas, seeps, runoff areas on slopes.
Slender-stemmed monkeyflower *Mimulus filicaulis*	HG	FSC			Found in vernally moist habitats, typically in gravelly soils in meadows and seeps in the lower to montane forest zone.
Inconspicuous monkeyflower *Mimulus inconspicuus*	F			PR	Found near hillside streams or seeps in partial shade.
Palmer's monkeyflower *Mimulus palmeri*	E			PR	Restricted to damp, shaded slopes under canyon live oaks.
Pansy monkeyflower *Mimulus pulchellus*	F			PR	Found in vernally moist, open, gravelly places such as vernal pools.
Dwarf sandwort *Minuartia pusilla*	BP			PR	Confined to open pine forests and chaparral slopes.
Sierra sweet-bay *Myrica hartwegii*	SE,W			PR	Endemic to the northern and central Sierra Nevada. Restricted to stream banks, forming small thickets along the river.
Azure penstemon *Penstemon azureus* ssp. *angustissimus*	Y			PR	Generally found in moist woodlands and open forests.
Phacelia *Phacelia platyloba*	E			PR	Found in gravelly or rocky soils in chaparral and canyon live oak woodland.
Phacelia *Phacelia tanacetifolia*	Y			PR	Grows in moist, sandy and gravelly, open areas.
Snow willow *Salix reticulata*	T			PR	Reaches the westernmost extent of its range in wet areas and seeps within alpine fell-fields along the crest of the Sierra Nevada in Yosemite.
Wood saxifrage *Saxifraga mertensiana*	Y			PR	Endemic to northern and central Sierra Nevada. Grows on mossy rocks and moist cliffs.
Bolander's skullcap *Scutellaria bolanderi*	W			PR	Occurs in gravelly soils along streambanks and in oak and pine woodlands.

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Groundsel *Senecio serra* var. *serra*	T			PR	In the park, this species is restricted to open coniferous forests or sagebrush scrub on the lower slopes of Mt. Dana and the slopes west of Tioga Pass.
Giant sequoia *Sequoiadendron giganteum*	W, Y			PR	Grows in three discrete groves in the park, has also been planted in historic and recent landscaped areas.
Ladies' tresses *Spiranthes porrifolia*	Y			PR	Found in wet meadows.
Bolander's clover *Trifolium bolanderi*	BP	FSC			Confined to wet montane meadows.
Trillium *Trillium angustipetalum*	W			PR	Found in moist meadow, montane coniferous forests, foothills, and chaparral.
Hall's wyethia *Wyethia elata*	W			PR	Endemic to the central and southern Sierra Nevada. Occurs in open deciduous woodlands and coniferous forests.

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Federal Endangered Species

WILDLIFE

Sierra Nevada bighorn sheep
Ovis canadensis sierrae

General Ecology and Distribution. Sierra Nevada bighorn sheep are endemic to the Sierra Nevada. Originally, the Sierra Nevada bighorn sheep occurred throughout the range wherever suitable habitat was found. Between 1850 and 1900, their numbers declined dramatically due to diseases contracted from domestic sheep, overhunting, and competition for forage with domestic sheep. By the 1970s, their populations had dwindled to two remnant herds totaling approximately 300 sheep (Wehausen 1980).

In Yosemite, evidence from skulls and horn sheaths suggest that Sierra Nevada bighorn sheep inhabited the Sierra crest and the Cathedral Range. Population declines followed the pattern seen elsewhere in the Sierra Nevada and, by 1914, they were declared extinct in the park. In 1986, native Sierra Nevada bighorn were reintroduced to the Yosemite region in Lee Vining Canyon, just east of Tioga Pass. The size of the herd has fluctuated between a high of 85 or more animals in 1991 (Chow 1992) to less that 20 today (Wehausen 1980).

Sierra Nevada bighorn sheep spend the summer in the alpine where the absence of tree and shrub cover permits the sheep to more easily detect and avoid predators. In winter, the sheep generally move to lower elevations to escape deep snow, but will occasionally remain at higher elevations in light snow years. Suitable habitat is characterized by high elevation meadows in close proximity to steep, rocky terrain.

Reproductive Biology and Breeding Habitat. Adult bighorn generally segregate by sex throughout most of the year with; ewes, lambs, and subadults remain close to the safety of steep rocky terrain, while rams wander more widely. Rams join the ewes in late fall for breeding (Geist 1971).

Diet and Foraging Habitat. Bighorns are highly selective in their diet, generally choosing the most nutritious forage available. Diet includes grasses, herbs, and shrubs. Bighorn typically forage in or very close to steep rocky terrain where forage is sparse or widely scattered. In late summer of dry years, foraging will often be concentrated around springs and seeps where green vegetation is still available (Moore 1991).

Habitat Status in the Project Area. Tioga Pass is the only project area where Sierra Nevada bighorn sheep can be expected to occur. They have been sighted on Mt. Dana and make regular use of Tioga Peak.

Federal Threatened Species

WILDLIFE

Bald eagle
Haliaeetus leucocephalus

General Distribution. The bald eagle can be found over most of North America. It breeds or winters throughout most of California. In the relatively mild climate of California, the breeding population of bald eagles is resident year-round in most areas. In fall and winter, migratory bald eagles from northern areas arrive in the state, where they remain until late winter or early spring.

Status. The bald eagle was listed as a federally endangered species in 1978 after habitat loss and pesticide contamination led to widespread population declines. Measures taken in the United States to protect habitat, outlaw DDT and other persistent organochlorine pesticides, and other recovery efforts resulted in a rebound in bald eagle populations. In 1995, the bald eagle was reclassified as a federal threatened species. In 1999, the USFWS proposed to remove the bald eagle from the List of Endangered and Threatened Wildlife in the lower 48 states of the United States, because available data indicated the species has recovered. A final ruling is expected by the end of 2000.

Reproductive Biology and Breeding Habitat. Breeding generally occurs from February to July. One to three eggs are laid in a stick platform nest placed in a tree, 50 to 200 feet off the ground. Young usually fledge by the end of August. Human activity near the nest, especially during egg-laying and incubation, can lead to nest desertion or disruption of breeding (USFWS 1986).

Nesting usually occurs within two miles of lakes, reservoirs, rivers, or large streams that support adequate food resources (USFWS 1986). Most nesting by bald eagles in California occurs from 1,000 to 6,000 feet in elevation, but can occur from sea level up to over 7,000 feet (Jurek 1988). Nest trees in California are most often ponderosa pines in mixed conifer stands. Bald eagles construct up to five nests in a nesting territory and alternate nests in different years.

Diet and Foraging Habitat. The most common prey of bald eagles in the west are fish, waterfowl, rabbits, and various type of carrion (Zeiner et al. 1990). Typically, large bodies of water or rivers with abundant fish, snags and other perches serve as foraging habitat.

Habitat and Status in the Project Area. According to park records, no bald eagles currently nest in Yosemite. There is a nesting pair at Cherry Lake, immediately outside the park. The Cherry Lake pair uses Lake Eleanor inside the park for foraging.

Transient bald eagles are occasionally seen in Yosemite Valley, El Portal, Wawona, and Foresta. Riparian and meadow areas may provide foraging habitat for transient eagles. The absence of anadromous fish runs in the Merced River probably limits its value as bald eagle habitat. Otherwise, the condition of river, riparian, and forest habitats that could be used by bald eagles is relatively intact.

California red-legged frog
Rana aurora draytonii

General Distribution. The California red-legged frog is known to occur in 22 counties in California, primarily in central coastal California in Butte and El Dorado Counties. Currently, there are two known sites in the Sierra Nevada where the California red-legged frog is found. These sites are both on private land in proximity to Plumas and El Dorado National Forests (Fellers 1997).

The California red-legged frog tends to occur below 4,500 feet in elevation, though they have been found up to 8,000 feet in elevation (Fellers 1997). The most secure populations of California red-legged frog are found in aquatic sites that support substantial riparian and aquatic vegetation, and that lack non-native predators. California red-legged frogs found in coastal drainages are active year-round (Jennings et al. 1992), whereas those found in interior sites may be more seasonally inactive.

California red-legged frogs spend most of their lives in and near sheltered backwaters of ponds, marshes, springs, streams, and reservoirs. The largest densities of California red-legged frogs are associated with deep pools with dense stands of overhanging willows (*Salix spp.*) and an intermixed fringe of cattails (*Typha latifolia*) (Hayes and Jennings 1988; Jennings 1988). This is considered optimal habitat. California red-legged frog eggs, larvae, transformed juveniles, and adults also have been found in ephemeral creeks and drainages and in ponds that do not have riparian vegetation.

Accessibility to sheltering habitat is essential for the survival of the California red-legged frog and can be a factor limiting frog population numbers and survival. Sheltering habitat includes mammal burrows, damp leaf litter, downed wood and other cover objects (both natural and human-made), and dense shrubbery up to several hundred meters distant from aquatic sites. California red-legged frog may shelter in such places for weeks at a time in the wet season. California red-legged frogs may disperse up to eight kilometers from natal areas.

Status. The California red-legged frog has been extirpated or nearly extirpated from 70 percent of its former range. Historically, this species was found throughout the Central Valley and Sierra Nevada foothills. Possible reasons for this decline include habitat loss and change, acid precipitation, chemical pollution, introduced fish, drought, and compounded forces (Drost and Fellers 1994; USFWS 2000). Recent research has been focusing on contaminants (pesticides and herbicides) as the most likely cause of the decline (Fellers 1999). There is also concern about a newly described fungus that has been found associated with amphibian declines in other parts of the world (Fellers 1999).

Reproductive Biology and Breeding Habitat. California red-legged frogs breed from November through March, with earlier breeding records occurring in southern localities (Storer 1925). Females lay 750 to 4,000 eggs in clusters up to 10 inches across, attached to vegetation (Stebbins 1954).

Egg masses contain about 2,000 to 5,000 moderate-sized (0.08 to 0.11 inches in diameter), dark reddish-brown eggs. The egg masses are typically attached to vertical emergent vegetation such as bulrushes *(Scirpus* spp.) or cattail (Jennings et al. 1992). California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Eggs hatch in 6 to 14 days (Jennings 1988). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae.

Larvae undergo metamorphosis 3.5 to 7 months after hatching (Storer 1925). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1% of eggs laid reaching metamorphosis (Jennings et al. 1992). Sexual maturity normally is reached at 3 to 4 years of age (Storer 1925). California red-legged frogs may live 8 to 10 years (Jennings et al. 1992).

Diet and Foraging Habitat. The diet of California red-legged frogs is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food items; vertebrates, such as Pacific tree frogs and California mice, represented over half of the prey mass eaten by larger frogs. Hayes and Tennant (1985) found juvenile frogs to be active diurnally and nocturnally, whereas adult frogs were largely nocturnal. Feeding activity probably occurs along the shoreline and on the surface of the water (Hayes and Tennant 1985). Larvae most likely eat algae (Jennings et al. 1992).

Habitat and Status in the Project Area. Recent field studies in Yosemite found no California red-legged frogs (Fellers and Freel 1995; Fellers 1997). The California red-legged frog probably occurred in Yosemite Valley, El Portal, Foresta, and Wawona in the past. Yosemite Valley is one of two places in the park that would be a suitable site for reintroduction or recolonization of the species (Fellers 1997). Non-native bullfrogs would prevent successful reintroduction or recolonization (Thompson 2000)

Valley elderberry longhorn beetle
Desmoscerus californicus dimorphus

General Distribution. The Valley elderberry longhorn beetle is an insect subspecies endemic to the Central Valley of California. It is found in riparian habitats and associated upland habitats where elderberry (*Sambucus* spp.), the beetle's foodplant, grows. The Valley elderberry longhorn beetle is found in California to an elevation of about 3,000 feet, and ranges as far north as the Shasta/Tehama county line (Barr 1991) and as far south as Kern County (Shields 1990). The Valley elderberry longhorn beetle is most commonly found along the margins of rivers and streams in the lower Sacramento River and upper San Joaquin Valley (USFS 1994a), most often in riparian elderberry savannah or moist valley oak woodlands. The Valley elderberry longhorn beetle is more abundant in dense native plant communities with a mature overstory and a mixed understory (Barr 1991). The species has been observed in the Sierra Nevada foothills, particularly in Fresno, Madera, and Placer Counties, as well as the eastern Coast Ranges foothills.

Status. The Valley elderberry longhorn beetle was listed by the USFWS as threatened on August 8, 1980. Critical habitat has been designated for the beetle in two areas – along the American River near the Sacramento metropolitan area and along Putah Creek in Solano County.

Threats to the beetle arise from loss and alteration of elderberry habitat through urbanization and agricultural use, the use of insecticides and herbicides, and fluctuations in stream water levels (Steinhart 1990). Grazing by domestic or wild herbivores and human pruning or burning are additional persistent threats to elderberry plants and the continued survival of the species (Barr 1991).

Reproductive Biology and Breeding Habitat. Mating and egg-laying occur in May. The Valley elderberry longhorn beetle is most visible during this period. Eggs are laid in crevices in elderberry bark, usually on stems greater than 1 inch in diameter, on healthy, unstressed elderberry plants. The eggs hatch in about 10 days, and the larvae bore into the pith of the stem where they feed and mature for one or two years by tunneling through the spongy pith of the large stems, trunks, and roots of the elderberry. Prior to changing into the adult life stage, the beetle larvae chew an emergence or exit hole in the trunk of the elderberry, through which the brightly colored adult beetle later exits the plant. The adult stage is short-lived.

Exit holes from which the larvae emerge are usually about the diameter of a standard wooden pencil and somewhat oval in shape. They occur on stems greater than 0.5 inches in diameter.

Diet and Foraging Habitat. The Valley elderberry longhorn beetle is completely dependent on its host plant, the elderberry (*Sambucus spp.*). From March to early June, adults feed in the riparian areas in which they breed. Adults utilize the foliage and possibly the flowers of two *Sambucus* species, *S. mexicana* and *S. racemosa* var. *microbotrys*. Larvae feed on the soft core of elderberry stems and excavate passages in the wood as they feed (Steinhart 1990). Both of these species are found in the El Portal area.

Habitat and Status in the Project Area. Potential Valley elderberry longhorn beetle habitat is defined by the presence of elderberry plants in areas below 3,000 feet in elevation. El Portal is the only part of the project area that lies below 3,000 feet in elevation. Though the presence or absence of the beetle itself has never been verified, elderberry plants with Valley elderberry longhorn beetle exit holes have been identified in El Portal.

Elderberry plants are ubiquitous throughout the Sierra Nevada foothills. Though never a dominant species, elderberry plants are a subdominant species of the following communities that surround El Portal: interior live oak forest, interior live oak woodland, blue oak woodland, canyon live oak forest, mixed north slope forest, foothill pine/live oak/chaparral woodland, northern mixed chaparral, interior live oak chaparral, and westside ponderosa pine forest.

In 1995, the National Park Service and the U.S. Geological Survey undertook an initial survey of Valley elderberry longhorn beetle habitat in potential development zones below 3,000 feet. All potential sites below 3,000 feet are located in El Portal. All elderberry plants in potential development sites were identified on the ground and mapped. Followup surveys were undertaken in 1997 and February 2000 in the Middle Road area, which had never been mapped, and in the Hillside East and Hillside West area, which had recently burned. The entire area was resurveyed

in June 2000, including new areas in Rancheria Flat, to obtain plant community information and the proximity of elderberry plants to water.

A total of 213 elderberry plants are in or near the boundaries of the project area. Of this total number, 124 plants have stems over 1 inch in diameter at ground level and are considered potential habitat for the elderberry beetle. Plants are distributed as follows:

Hillside East/Hillside West – This undeveloped grassland and woodland site supports about 17 elderberry plants. Many plants are in dense clusters that are difficult to differentiate as individual plants. None of the plants have stems greater than 1 inch in diameter, due to the effects of a prescribed burn that took place in 1999.

Village Center – This flat site retains an overstory of native oak (and other associated species). Native understory layers are largely missing due to development. A total of 14 elderberry plants occur in this area, all of which have stems greater than 1 inch in diameter. Beetle exit holes were found in one elderberry plant.

Old El Portal – This housing development retains a native, mature overstory layer (primarily oak species) and some native shrubs in the understory. There are six elderberry plants in old El Portal, five of which are on the east edge of Old El Portal in the Crane Creek drainage. These five plants have stems over 1 inch in diameter. None of the plants have beetle exit holes.

Rancheria – This housing development supports 136 elderberry plants, 74 of which have stems greater than 1 inch in diameter. Two plants with beetle exit holes were found.

Middle Road – This mostly undeveloped area supports 22 elderberry plants, 14 of which have stems greater than 1 inch in diameter. Four plants contained beetle exit holes.

Hennessey's Ranch (currently Trailer Village and Abbieville) – A total of 10 elderberry plants were found in this site, nine of which had stems greater than 1 inch in diameter. Some elderberry plants are located directly adjacent to trailers. Beetle exit holes were verified in four elderberry plants (Boroja 1998).

Railroad Flat – This developed site sustains six elderberry plants, all of which had stems greater than 1 inch in diameter.

Federal Species of Concern

WILDLIFE

Harlequin duck
Histrionicus histrionicus

General Distribution. Harlequin ducks are at the extreme southern extent of their range in California. They winter in marine waters along rocky coasts from San Luis Obispo County north, and breed inland along fast-flowing, shallow rivers and streams.

The last known breeding of the harlequin duck in the Sierra Nevada was on the upper Mokelumne River in Amador and Calaveras Counties in the 1970s, but potential breeding habitat in California has not been adequately surveyed.

Status. Both wintering and breeding populations of the harlequin duck have declined all over California, probably due to human disturbance along breeding streams and the damming of rivers (Remsen 1978).

Reproductive Biology and Breeding Habitat. It is likely that harlequin ducks still breed in California, but rarely. Nests are established near swift rivers or streams in recesses sheltered overhead by stream banks, rocks, woody debris, or low shrubs. Nests are usually within 7 feet of the water, but can be up to 90 feet away.

Diet and Foraging Habitat. In breeding areas, harlequin ducks feed primarily on invertebrates from the swift, shallow rivers that are its preferred habitat. In marine wintering habitat, mollusks and crustaceans are major foods.

Habitat and Status in the Project Area. Harlequin ducks are very rarely seen in Yosemite, but a pair was seen twice on the Merced River in Yosemite Valley in April 2000. Before these sightings, the most recent record of harlequin ducks was in 1980. Other areas where harlequin ducks could occur include the Merced River in El Portal and Wawona. Locally, human disturbance in riparian areas has likely caused direct disturbance and has degraded riparian vegetation that is important cover for nest sites and broods. Roads that follow the course of the Merced River have likely destroyed nesting habitat and adversely affected the quality of remaining habitat. Regionally, human disturbance and the destruction of habitat by human-made water impoundments have likely reduced the ability for harlequin ducks to recolonize or maintain a viable population in Yosemite National Park.

Northern goshawk
Accipter gentilis

General Distribution. Northern goshawks occur in Alaska, Canada, and the more northern mountains of the western United States. In California, goshawks breed in most mountain areas, where they generally remain through the winter. Some northern goshawks move downslope after breeding, as low as valley foothill hardwood habitats. Preferred habitat is moderately dense coniferous forests broken by meadows and other openings, between 5,000 and 9,000 feet elevation.

Status. Populations of goshawks have been declining in western North America, including California, primarily due to habitat destruction and human disturbance. Such factors include loss of habitat from logging, toxic chemicals, fire suppression, disease, shooting, and falconry (Bloom et al. 1986). Recent surveys in Yosemite National Park suggest that the density of nesting goshawks in the park is high relative to areas outside the park (Maurer 2000), which probably reflects the high quality of relatively intact forest habitats in the park.

Reproductive Biology and Breeding Habitat. Nesting begins in March or April. From one to five eggs are laid in a stick nest built in mature live trees, usually in dense, north-facing stands of coniferous, mixed, and deciduous forests (Zeiner et al. 1990). In the Sierra Nevada, goshawks breed in elevations that support mixed conifer forests up to higher lodgepole pine forests (Fowler 1988). Pairs of goshawks defend a territory within which one to five alternate nest trees may be used. Other characteristics of preferred goshawk nesting habitat may include older seral stages, high basal area, high canopy closure, open understories, and gentle slopes with east to northerly aspects (Hall 1984; Camilleri 1982; Saunders 1982; McCarthy 1986; Woodbridge et al. 1988; Austin 1993). Nests are also frequently associated with meadow, riparian habitats, or other natural forest openings.

Diet and Foraging Habitat. Goshawk studies indicate a dependence on squirrels such as the Douglas squirrel and golden-mantled ground squirrel, and mid-sized forest birds such as Stellar's jay and northern flicker (Schnell 1958; Bloom et al. 1986; Woodbridge et al. 1988). Goshawks hunt from tree perches, scanning the ground and lower canopy for prey. As such, an open understory improves their chances to detect and capture prey (Reynolds et al. 1992).

Habitat and Status in the Project Area. Except for localized effects from development, goshawk habitats in Yosemite are relatively intact and probably support near-natural numbers of this species. Areas affected by the *Final Yosemite Valley Plan/SEIS* where this species could occur include the Big Oak Flat Entrance, Badger Pass, South Entrance, Tioga Pass, Hazel Green, and Yosemite Valley. Goshawks are usually seen in Yosemite Valley between November and February, but such observations are rare and no breeding has been recorded in this area. As such, the existing impacts to habitats in Yosemite Valley are thought to have a negligible effect on the park's population of goshawks.

California spotted owl
Strix occidentalis occidentalis

General Distribution. The California spotted owl is found throughout the entire Sierra Nevada from the southern Cascades south, and in the central Coast Ranges. Surveys through 1993 estimated approximately 1,600 spotted owl sites (pairs and territorial singles) in the Sierra Nevada (Gould 1993). California spotted owl habitat varies from oak and ponderosa pine forests to lower elevation red fir forests up to 7,600 feet in elevation. Prime habitat occurs between 3,000 and 7,000 feet.

Status. Populations of California spotted owls in the Sierra Nevada have steadily declined, and the subspecies is currently being considered for listing as threatened or endangered by the USFWS. The likely cause of this decline is habitat destruction and fragmentation from logging and development. Currently, the rate of decline of spotted owls in some parts of the Sierra Nevada is 10% per year (Steger 2000b). Comparison of the two most recent studies of spotted owls in Yosemite (Gould and Norton 1993; Steger 2000a) suggests that the population of spotted owls in the park is relatively stable. This is likely because habitats in the park are not subject to the same degradation factors as outside the park.

Reproductive Biology and Breeding Habitat. Breeding occurs from about mid-February to mid- or late-September, at which time the young are largely independent of their parents. Eggs are laid and incubated by the female from early April through mid-May. Nests are usually tree cavities, broken-off trees and snags, abandoned nests of other species, or mistletoe clumps. Trees used for nesting are usually very large. Nesting and roosting habitat of spotted owls is typically dense forest, with a canopy closure of greater than 70%. The presence of black oak in the canopy also enhances habitat quality.

Diet and Foraging Habitat. Spotted owls prey mainly on small mammals, but appear to focus on a few species. In the upper Sierra Nevada (over 4,000 feet), prey in mixed coniferous forests is mainly northern flying squirrels. In mid- to lower-elevation habitats, prey is usually both flying squirrels and dusky-footed woodrats. In foothill habitats, spotted owl prey is almost entirely woodrats.

Spotted owls tend to forage in intermediate to late successional forests with canopy closure greater than 40% and a mixture of tree sizes. Foraging habitat also usually shows signs of decadence and includes snags, old trees, and large downed logs. Flying squirrels also show a preference for mature forests where fungi and lichens may be important foods. Woodrats prefer forests with a brushy understory of shrubs or saplings.

Habitat and Status in the Project Area. Surveys conducted in the summer of 2000 provided the following results on the presence of California spotted owls in the areas that could be affected by the *Final Yosemite Valley Plan/SEIS* (Steger 2000a; Roberts et al. 1988):

Foresta: Six surveys of this area failed to locate any spotted owls. It is apparent that the 1990 A-Rock Fire changed the habitat in this location to the extent that it is no longer suitable for spotted owls. Gould and Norton (1993) found spotted owls in this vicinity during surveys in 1988.

Hazel Green: A male and a female spotted owl of unknown pair status were found northeast of the proposed project site. Although no nest or roosting area could be located for these owls, U.S. Forest Service records suggest a historic roost approximately a mile northeast of the Hazel Green site, and near where these owls were found.

Big Oak Flat Entrance: A single male was detected west, north, and east of the proposed project site during multiple surveys of the area. No main roosting area could be located, but recent U.S. Forest Service records indicate the area has historically been used by a nesting pair, with the likely nest site approximately two-thirds of a mile southeast of the entrance station.

Badger Pass: Two pairs of spotted owls were detected in this area, with one pair about one mile north of the ski area, and the other one about two-thirds of a mile west of the area. Both pairs were determined to be nonreproductive.

Wawona: In six complete surveys of the area, no spotted owls were detected.

South Entrance: Surveys revealed two pairs in this area. One pair had a nest site with two fledged young about 1-1/4 miles southeast of the entrance station. The second pair was found

about 1-1/4 miles northeast of the entrance station, and was once found within a half-mile of the site.

El Portal: In six complete surveys of this area, no spotted owls were found. Noise from the river and traffic may have hampered detection of owls. Habitat on the north side of the river was judged by the researchers to be of marginal quality to spotted owls, providing isolated patches of roosting and foraging habitat for owls likely nesting on the south side of the river, where habitat quality is high.

Yosemite Valley: A total of four spotted owls were found in this location. A nonreproductive pair was found near the base of Cathedral Spires, with their territory likely extending east. A single male was found near Ribbon Creek, on the north side of the Valley. A single female was found south of Mirror Lake. Neither of these owls was apparently paired. In Yosemite Valley, recent park records show spotted owl nest sites near Happy Isles, Mirror Lake, and near the base of Cathedral Rocks. Individual birds have been seen near the Chapel, Yellow Pine Campground, east of Curry Village, and in the government housing area near Yosemite Village.

Based upon these data, no spotted owl core nesting or roosting areas would be directly affected by development projects. Proposed project sites at Hazel Green, Badger Pass, South Entrance, Big Oak Flat Entrance, and Yosemite Valley, however, are all apparently within the territories of spotted owls, and the sites are likely used as foraging areas. California spotted owls are habitat specialists, needing canopy closure greater than 70% for nesting and roosting, and greater than 40% for foraging (Verner et al. 1992). Habitat meeting such criteria in project areas should be considered potential spotted owl habitat. Spotted owls may be sporadic breeders, with many pairs nesting when weather and prey conditions are favorable. Single owls or nonreproductive pairs that were found in this survey may, in such years, have nests near where they were found roosting.

Mount Lyell shrew
Sorex lyelli

General Distribution. The Mount Lyell shrew was originally described from three specimens collected during the original Grinnell surveys (Grinnell and Storer 1924). Two of these specimens were found in the vicinity of Mount Lyell in Yosemite National Park. The third specimen was collected near Williams Butte in Mono County. Two more specimens were collected in 1946 in Mono County. The Mount Lyell shrew was found in moist situations near streams, in grass, or under willows (Grinnell and Storer 1924).

Status. Known only from the five specimens at the Museum of Vertebrate Zoology in Berkeley, California, the Mount Lyell shrew is a vulnerable species because of its apparently very limited distribution.

Reproductive Biology and Breeding Habitat. Litte is known about the reproductive biology and breeding habitat of the Mount Lyell shrew.

Diet and Foraging Habitat. The Mount Lyell shrew probably eats insects and other invertebrates found while foraging on ground, in stumps and logs (Grinnell and Storer 1924).

Habitat and Status in the Project Area. Suitable habitat occurs at Tioga Pass.

Spotted bat
Euderma maculatum

General Distribution. The spotted bat is considered to be one of North America's rarest mammals (Zeiner et al. 1990). It is known from only about 25 sites in California (Pierson and Rainey 1998). The spotted bat is a solitary cliff-dweller, and its distribution is closely linked to the availability of cliff roosting habitat. It is found in a wide variety of habitats, from low desert to coniferous forest (Wildlife Society 1996). It generally roosts on high cliff faces. The spotted bat produces echolocation calls within the range of normal hearing.

Surveys completed between 1992 and 1997 in Yosemite National Park found this species in numerous locations, including Wawona, Crane Flat, Tuolumne Meadows, and especially Yosemite Valley.

Status. The numbers of spotted bats have declined in recent decades, with likely causes including pesticide use and habitat destruction and fragmentation.

Reproductive Biology and Breeding Habitat. Females have one young per year, with birth occurring in June to July.

Diet and Foraging Habitat. The spotted bat feeds on a variety of insects, but predominately moths. In montane habitats, the spotted bat forages over meadows, along forest edges, or in open coniferous woodland. The spotted bat generally forages alone.

Habitat and Status in the Project Area. There is a significant population of spotted bats in Yosemite Valley (Pierson and Rainey 1996). Auditory bat surveys were conducted in 1993 at 24 stations in Yosemite Valley in four habitats: large open meadows, wetlands, forest, and open ponderosa pine forest. Acoustic data indicated the spotted bat was present only in meadow and wetland habitats (Pierson and Rainey 1993). Field surveys have confirmed spotted bats foraging on the north side of El Capitan Meadow, just below El Capitan, Bridalveil Meadow, Leidig Meadow, and Ahwahnee Meadow; the spotted bat was not found in Cook's Meadow or Stoneman Meadow (Pierson and Rainey 1993). It is likely that spotted bats roost on or near Half Dome and El Capitan; Yosemite Valley had the highest population of spotted bats of any location surveyed in California (Pierson and Rainey 1995). Acoustic data collected in 1994 suggest there is a significant population of spotted bats in the Wawona area (Pierson and Rainey 1995). Based upon these surveys, and the habitat and elevation range of this species, the spotted bat is expected to be present at all potential project sites.

Small-footed myotis bat
Myotis ciliolabrum

General Distribution. The small-footed myotis bat is a common bat of arid uplands in California. It is found on the west and east sides of the Sierra Nevada, in Great Basin habitats from Modoc to Kern and San Bernardino Counties, and in coastal California south to the Mexican border. It occurs in a wide variety of habitats, primarily in relatively arid, wooded, and brushy uplands near water. The summer and winter ranges appear to coincide, but there are few records from winter. This species is found from sea level to at least 8,800 feet in elevation.

Status. Populations of small-footed myotis bats have apparently declined over recent decades, with likely causes including habitat destruction and fragmentation and the use of pesticides.

Reproductive Biology and Breeding Habitat. The small-footed myotis bat mates in the fall. The young are born from May through June, with a peak in late May. Usually there is a single young, but twins are common. Lactating females were found in June and July. Most young are flying by mid-August. The maximum-recorded longevity is 12 years.

Diet and Foraging Habitat. This species feeds on a variety of small flying insects. Prey includes moths, flies, beetles, and bugs. Foraging flight is slow and maneuverable. The small-footed myotis bat is often seen foraging among trees and over water.

Habitat and Status in the Project Area. The small-footed myotis bat is known to occur in Yosemite Valley, based on historic records and a specimen at the Museum of Vertebrate Zoology in Berkeley, California. The small-footed myotis bat was not captured during five days of mist netting in Yosemite Valley in 1993, though it was captured in Wawona in 1994 (Pierson and Rainey 1993; 1995). This species has the potential to occur in all of the proposed project areas in the park, except Tioga Pass.

Long-eared myotis bat
Myotis evotis

General Distribution. The long-eared myotis bat is widespread in California but generally is believed to be uncommon in most of its range. This species has been found in nearly all brush, woodland, and forest habitats from sea level to at least 9,000 feet. This species is highly dependent on oak trees for roosting (Pierson 2000).

Mist-net surveys were conducted in the park in 1994 in Tuolumne Meadows, Pate Valley, and Wawona. The long-eared myotis bat was captured at the Wawona Golf Course and along the South Fork of the Merced River in Wawona (Pierson and Rainey 1995).

Status. Populations of long-eared myotis bats have apparently declined over recent decades, with likely causes including habitat destruction and fragmentation and the use of pesticides.

Reproductive Biology and Breeding Habitat. Mating probably occurs in the fall. The young are born from May to July, with a peak in June. The single yearly litter averages one young. Most

young are flying by early August. Nursery colonies of 12 to 30 individuals are found in buildings, crevices, snags, and behind bark.

Diet and Foraging Habitat. The long-eared myotis bat feeds on a variety of arthropods including beetles, moths, flies, and spiders. It consumes more beetles than other myotis species, and there is some evidence that it consumes more beetles when it occupies the same territory as *M. auriculus*. Insects are caught in flight, gleaned from foliage, or occasionally taken from the ground. Foraging flight is slow and maneuverable. This species is capable of hovering. It forages among trees, over water, and over shrubs, preferring the riparian edge (Pierson 2000). It usually forages less than 40 feet above the ground.

Habitat and Status in the Project Area. Mist-net bat surveys took place in Yosemite Valley in 1993 at Mirror Lake, Cook's Meadow, El Capitan Meadow, and at Yosemite Creek below Lower Yosemite Fall. The long-eared myotis bat was captured only at the Yosemite Creek site (Pierson and Rainey 1993). It was also captured in Wawona. This species is likely to occur in low numbers throughout most of the project area, except Tioga Pass.

Fringed myotis bat
Myotis thysanodes

General Distribution. The fringed myotis bat is found throughout much of California and from southern through central Nevada. It is found in a wide range of habitats, from low desert scrub to high elevation coniferous forest. This species is found in the Sierra Nevada in deciduous/mixed conifer habitats to about 6,500 feet in elevation.

Day and night, the fringed myotis bat roosts in mines, caves, trees, and buildings. This species is very sensitive to roost disturbance (Wildlife Society 1996).

Status. Populations of fringed myotis bats have apparently declined over recent decades, with likely causes including habitat destruction and fragmentation and the use of pesticides.

Reproductive Biology and Breeding Habitat. The fringed myotis bat has one young per year, with birth occurring in May to June. Maternity roosts contain adult females and may include several hundred individuals, although most known California roosts are small (fewer than 40 females). Males roost singly or in small groups (Wildlife Society 1996).

Diet and Foraging Habitat. The diet of the fringed myotis bat is primarily beetles, but it includes a variety of other taxa, such as moths (Wildlife Society 1996). It tends to forage over water in river corridors in Yosemite (Pierson 2000).

Habitat and Status in the Project Area. Grinnell and Storer found the fringed myotis bat in 1924 in a location just outside the park boundary. Mist-net bat surveys took place in Yosemite Valley in 1993 at Mirror Lake, Cook's Meadow, El Capitan Meadow, and at Yosemite Creek below Lower Yosemite Fall (Pierson and Rainey 1993). The fringed myotis bat was captured in Cook's Meadow and the Yosemite Creek site. It was not found in mist-netting surveys in 1994 in Yosemite Valley (Pierson and Rainey 1995). The fringed myotis bat is likely to occur in the entire project area, with the exception of Tioga Pass.

Long-legged myotis bat
Myotis volans

General Distribution. The long-legged myotis bat is widespread in California, but generally is believed to be uncommon in most of its range. This species has been found in nearly all brush, woodland, and forest habitats from sea level to at least 9,000 feet in elevation. This species is highly dependent on oak trees for roosting (Pierson 2000), though is also uses rock crevices, mines, and buildings.

Reproductive Biology and Breeding Habitat. The long-legged myotis bat has one young per year, with birth occurring in June to July. Maternity colonies number from 200 to 500 individuals (Wildlife Society 1996).

Status. Numbers of long-legged myotis bats have apparently declined over recent decades, with likely causes including habitat destruction and fragmentation and the use of pesticides.

Diet and Foraging Habitat. This species feeds primarily on moths, but also feeds on other taxa, including beetles, flies, and termites. Foraging occurs in open areas, often at tree canopy height.

Habitat and Status in the Project Area. The long-legged myotis bat was not recorded in recent surveys in the park (Pierson and Rainey 1993; 1995), though it is expected. It was found in the Grinell and Storer survey (1924). The bat is expected in all of the project areas, with the exception of Tioga Pass.

Yuma myotis bat
Myotis yumanensis

General Distribution. This species is found in a wide variety of habitats in the Sierra Nevada below 8,000 feet. It roosts in buildings, trees, mines, caves, or crevices. It also roosts under bridges (Wilderness Society 1996). It is one of the bat species that is most tolerant of human habitation, and one of the few that can survive in a relatively urbanized environment.

Mist-net surveys were conducted in the park in 1994 in Tuolumne Meadows, Pate Valley, and Wawona. The Yuma myotis bat was captured at Pate Valley and along the South Fork of the Merced River in Wawona (Pierson and Rainey 1995).

Status. Populations of Yuma myotis bats have apparently declined over recent decades, with likely causes including habitat destruction and fragmentation and the use of pesticides.

Reproductive Biology and Breeding Habitat. The Yuma myotis bat has one litter per year with an average of one young, with birth occurring in June to July. Maternity colonies can be large (200 to several thousand) and contain only adult females and their young. Males roost singly or in small groups.

Diet and Foraging Habitat. The Yuma myotis bat feeds primarily on emergent aquatic insects (Pierson 2000) and forages directly over the surface of open water and relatively still water such as ponds, or pools in streams and rivers.

Habitat and Status in the Project Area. Mist-net bat surveys took place in Yosemite Valley in 1993 at Mirror Lake, Cook's Meadow, El Capitan Meadow, and at Yosemite Creek below Yosemite Falls (Pierson and Rainey 1993). The Yuma myotis bat was captured at Mirror Lake, El Capitan Meadow, and the Yosemite Creek site. This species was also found in recent mist-netting surveys in Yosemite Valley and Wawona (Pierson and Rainey 1993; 1995). It is expected in all of the project sites, with the exception of Tioga Pass.

Greater western mastiff bat
Eumops perotis californicus

General Distribution. The greater western mastiff bat is found along the west side of the Sierra Nevada, primarily at low to mid-elevations, but has been detected up to 10,000 feet in the summer. It is found in a variety of habitats, from desert scrub and chaparral to montane coniferous forest. Its distribution is tied to the availability of suitable roosting habitat and can sometimes be predicted on the basis of significant rock features, such as large granite formations.

Status. Numbers of greater western mastiff bats have apparently declined over recent decades, with likely causes including habitat destruction and fragmentation and the use of pesticides.

Reproductive Biology and Breeding Habitat. The greater western mastiff bat has one young per year, with birth occurring in June to July. Females form maternity colonies, although males are sometimes present.

Diet and Foraging Habitat. The diet of this species appears to be primarily moths, but also includes beetles and crickets in California. It forages in the open and ranges to high altitudes above ground. Some individuals are known to travel more than 25 miles to reach feeding grounds. It is detected most often over desert washes, grasslands, or meadows, but also feeds above the forest canopy.

Habitat and Status in the Project Area. There is a significant population of greater western mastiff bats in Yosemite Valley, based on mist-netting surveys (Pierson and Rainey 1995). Auditory bat surveys were conducted in 1993 at 24 stations in Yosemite Valley in four habitats: large open meadows, wetlands, forest, and open ponderosa pine forest. Acoustic data indicated the greater western mastiff bat was present in Bridalveil Meadow, El Capitan Meadow, Leidig Meadow, Cook's Meadow, Ahwahnee Meadow, Stoneman Meadow, Wosky Pond, and wetlands near Happy Isles. It was also detected in a few upland habitats east of El Capitan Meadow and Sentinel Picnic Area. It was not detected at Mirror Lake. Yosemite Valley has the highest population of the greater western mastiff bat in any localities surveyed in California (Pierson and Rainey 1995). It also has been captured in Wawona (Pierson and Rainey 1995). The greater western mastiff bat most likely forages in or near all of the project sites.

Sierra Nevada snowshoe hare
Lepus americanus

General Distribution. The Sierra Nevada snowshoe hare is an uncommon resident of upper elevations in the Sierra Nevada as far south as Mariposa, Mono, and Madera Counties. A search for records at the National Museum (Smithsonian), Museum of Vertebrate Zoology in Berkeley, California, and the Los Angeles County Museum found only two specimens from California, suggesting that Yosemite National Park may be near the southern limit of this species' range. Yosemite's faunal database contains records for 18 unconfirmed sightings, all from higher elevations. The hare prefers the edges of forested habitats, heterogeneous habitats, and areas with dense understory, particularly in riparian habitats. It is also found in areas with young firs that have branches drooping to the ground, and in patches of ceanothus and manzanita within or bordering fir or pine forests.

Status. Sierra Nevada snowshoe hares were likely always relatively scarce in Yosemite, since this area is apparently at the southern extreme of their range. However, effects such as logging and fire suppression have likely contributed to the Sierra-wide decline of this species.

Reproductive Biology and Breeding Habitat. The Sierra Nevada snowshoe hare breeds mid-February to June or July. The gestation period is 35 to 37 days. Snowshoe hares have 2 to 3 litters per year. Nests are built with grass, fur, and needles that may line a shallow, bowl-like depression placed under a shrub, log, or in slash.

Diet and Foraging Habitat. The Sierra Nevada snowshoe hare grazes and browses. Summer food primarily consists of grasses, forbs, sedges, and low shrubs. Needles and bark of conifers, and leaves and green twigs of willow and alder are eaten in the winter.

Habitat and Status in the Project Area. Unconfirmed sighting records and information from other locations suggest that forested areas surrounding the Tioga Pass and Badger Pass project areas may provide suitable habitat for this species. Given the elevation range of the snowshoe hare, its occurrence at Hazel Green, Big Oak Flat Entrance, and South Entrance is possible.

Sierra Nevada mountain beaver
Aplodontia rufa californica

General Distribution. The Sierra Nevada mountain beaver is found along the Pacific slope of western North America, from lower British Columbia south to the Sierra Nevada to California (Todd 1990). Mountain beavers are typically associated with moist meadows and riparian zones near small perennial streams and creeks within the montane zone (Todd 1990). Mountain beavers are confined to well-vegetated, moist, cool environments – a function of their poor ability to concentrate urine and low tolerance for temperature extremes (Nungesser and Pfeiffer 1965).

Mountain beaver habitat in Yosemite is found in sandy loam soils that are dominated by one or more of the following woody plants: dogwood (*Cornus* spp.), labrador tea (*Ledum glandulosum),* willow (*Salix* spp.), and alder (*Alnus* spp.). Common herbaceous plants include cow parsnip

(*Heracleum lanatum*), corn lily (*Veratrum californicum*), broad-leaved lupine (*Lupinus latifolius*), fireweed (*Epilobium spp*.), and various grasses (Todd 1990).

There are an estimated 200 to 550 mountain beaver sites in Yosemite National Park. Given rough estimates of two to 12 adults per site, from 400 to 6,600 adults lived in the park in 1990.

Status. Although Yosemite appears to have a relatively healthy population of mountain beavers, impacts such as logging, grazing, and water diversions in other parts of the Sierra Nevada have apparently caused serious declines in this species.

Reproductive Biology and Breeding Habitat. Mountain beavers breed from December through March. Young are born February though May. The litter size averages two to three young. Females usually do not bear young until their second year. Nest chambers are located from 1 to 4.5 feet below the ground surface (Zeiner et al. 1990).

Diet and Foraging Habitat. Mountain beavers feed on vegetative parts of plants including thimbleberry, salmonberry, blackberry, dogwood, salal, ferns, lupines, willow, and grasses. They forage underground, above ground, under snow, on the surface of snow, and up to 15 feet high in trees and bushes. Vegetation is stored near a burrow entrance or in underground chambers (Maser et al. 1981). Mountain beavers in the Sierra Nevada require abundant riparian plants for harvesting, but species composition is relatively unimportant (Todd 1990).

Habitat and Status in the Project Area. Mountain beavers are known to occur in the streams that drain from the meadows and ski slopes at Badger Pass (Monroe Meadow). No suitable habitat occurs in or near the other proposed project areas.

Sierra Nevada red fox
Vulpes vulpes necator

General Distribution. In the Sierra Nevada, the Sierra Nevada red fox prefers forests interspersed with meadows and alpine fell-fields. It is found from 3, 900 to 11,900 feet in elevation, although most sightings and records are from above 7,000 feet in elevation. The Museum of Vertebrate Zoology in Berkeley, California has 12 specimens collected from the immediate vicinity of Tioga Pass. The Museum of Vertebrate Zoology also has two specimens collected from Big Meadow, near Foresta. Open areas are used for hunting, and forested habitats are used for cover and reproduction. Today, this species is exceedingly rare, although a photograph was taken of a red fox at Tioga Pass Resort in January 1991. It could not be determined whether this individual belonged to the native subspecies or was an introduced eastern red fox.

Status. The Sierra Nevada red fox was, at one time, common to uncommon in suitable habitat. Near the turn of the 19th century, wide-scale trapping greatly reduced numbers of Sierra Nevada red foxes. Since then, activities such as logging, grazing, and fire suppression have likely affected the ability of this species to recover.

Reproductive Biology and Breeding Habitat. Breeding takes place in late winter (January-March). After a gestation period of 52 days, young are born in early spring (March-May). Den sites include rock outcrops, hollow logs and stumps, and burrows in deep, loose soil.

Diet and Foraging Habitat. The Sierra Nevada red fox hunts small and medium-sized mammals, ground squirrels, gophers, mice, marmots, woodrats, pikas, and rabbits. It hunts in meadows, fell-fields, grassland, and other open habitats.

Habitat and Status in the Project Area. There is extensive suitable habitat in the Tioga Pass project area. Based on historic occurrence in the Big Meadow area, suitable habitat also exists in all other project areas, except El Portal.

California Wolverine
Gulo gulo luteus

General Distribution. The California wolverine is exceedingly rare, with its distribution scattered over large areas. Optimal habitat for the wolverine is in large tree stages with moderate to dense canopy cover, in red fir, lodgepole pine forests, and in alpine meadows. Special habitat requirements are low human disturbance, and rocky areas, caves, logs, or snags as den sites. Specimens in the Museum of Vertebrate Zoology in Berkeley, California collection originate from Saddlebag Lake and the head of Lyell Canyon. The Yosemite Field Museum has two specimens from Chiquito Lakes. All specimens were collected above 8,000 feet in elevation.

Status. Wolverines were apparently always scarce in the Sierra Nevada, but logging and recreational use of potential habitats have likely further reduced their abundance.

Reproductive Biology and Breeding Habitat. The wolverine mates in summer, with delayed implantation. It bears one to four young the next spring. The wolverine has one litter per year. It excavates burrows under shelving rock or in logs, caves, or snags.

Diet and Foraging Habitat. The wolverine is a solitary hunter and forages on the ground, in trees, burrows, and rock piles for carrion or live prey. It captures prey by digging animals out of their burrows, by pursuit and capture, or by ambush. Prey includes marmots, gophers, squirrels, rats, mice, birds, insects, and occasionally ungulates. The wolverine also eats fruits.

Habitat and Status in the Project Area. Based on the collection of specimens from nearby localities, Tioga Pass lies within the historical range of optimal wolverine habitat.

American marten
Martes americana

General Distribution. The American marten is an uncommon to common resident of the Sierra Nevada. Its optimal habitats are various mixed evergreen forests that have more than 40% crown closure and large trees and snags. Important habitats include red fir, lodgepole pine, subalpine conifer, Jeffrey pine, and eastside pine (Grinnell et al. 1937;Schempf and White 1977;USFS 1994b). A survey for forest carnivores in Yosemite generally found martens inhabiting elevations

above 7,600 feet in lodgepole pine forest, subalpine meadow/forest edges, and rocky areas (Chow 2000).

Status. Numbers of martens in the Sierra Nevada have been reduced by human influences such as logging and fire suppression.

Reproductive Biology and Breeding Habitat. The American marten breeds in summer and has a gestation period of 220 to 290 days, including delayed implantation. Embryos are generally implanted in uterus in February and have an active growing period of about 37 days prior to birth. Most litters are born in March and April, and some as late as June. Females have one litter per year, with an average of 3.5 young. The young stay with females until autumn and then begin a solitary life. Dens are located in cavities in trees, snags, logs, and rock piles. Dens are usually lined with leaves, grass, mosses, or other vegetation.

Diet and Foraging Habitat. Martens are mostly carnivorous, taking primarily small mammals such as tree squirrels, chipmunks, mice, shrews, rabbits, hares, and pikas. In spring through autumn, martens often eat birds, insects, and fruits. Studies over two winters in Yosemite showed substantial differences in diet between the two winters. White-tailed jackrabbits were the principal food items in 1976/1977 (Hargis and McCullough 1984). Voles were the principal food item in 1979/1980 (Hargis and McCullough 1984).

Martens will eat fish and will forage along the edge of water. They may tunnel under snow. Martens may use their forepaws to remove birds from tree cavities. Individuals may travel up to 16 miles while hunting in one night. They forage on the ground as well as in trees, snags, logs, and rocky areas. During winter, wind-thrown trees and log piles are important as entrances into space under snow for hunting.

Habitat and Status in the Project Area. The Museum of Vertebrate Zoology in Berkeley, California has records for 19 specimens collected in or near Yosemite National Park. Six of these were collected in the Tioga Pass area. Grinnell and Storer (1937) indicated that the densest marten populations in the southern Sierra Nevada were in the Tioga Pass – Mono Lake area. Martens are also potentially found at Badger Pass, Hazel Green, the Big Oak Flat Entrance Station, the South Entrance Station, and rarely in Yosemite Valley.

Pacific fisher
Martes pennanti

General Ecology and Distribution. The Pacific fisher is most often found between elevations of 4,000 to 7,000 feet in the Sierra Nevada. Its preferred habitat is mixed-conifer montane hardwood forest with large-diameter trees and a moderate to dense canopy cover. They are also associated with mixed hardwood/conifer forest between 4,000 and 6,000 feet in elevation. Records at the Museum of Vertebrate Zoology in Berkeley, California for specimens collected in Yosemite indicate that fishers were most commonly found between 6,000 and 7,000 feet in elevation. In recent years, the majority of reported fisher sightings and vehicle-related accidents

(road kills) have occurred along the Wawona and Big Oak Flat Roads near Henness Ridge and Crane Flat.

Status. Trapping in the Sierra Nevada near the end of the 19th century severely reduced numbers of fishers. Activities such as logging and fire suppression since then have likely inhibited the recovery of this species. Road kills are the single largest cause of unnatural adult fisher mortality.

Reproductive Biology and Breeding Habitat. Breeding generally occurs in mid- to late spring. Gestation, including delayed implantation, is approximately 327 to 358 days, with the period of active pregnancy following implantation and lasting approximately 30 to 60 days. Young are born in early to mid-spring. Natal dens typically consist of cavities found in large-diameter trees or snags.

Diet and Foraging Habitat. Fishers are largely carnivorous. Fishers eat rabbits and hares, especially snowshoe hares and rodents (mice, porcupines, squirrels, mountain beavers), shrews, birds, fruits, and carrion. They opportunistically forage on the ground surface and in trees.

Habitat and Status in the Project Area. Preferred fisher habitat, as evidenced by the locations of historic records and recent fisher sightings, occurs within all of the proposed project areas, except Tioga Pass and El Portal.

Limestone salamander
Hydromantes brunus

General Distribution. The limestone salamander is found in a highly restricted range outside Yosemite National Park near Briceberg, Mariposa County. This area is protected by the 120-acre Limestone Salamander Ecological Reserve and the Bureau of Land Management's 1,600-acre Limestone Salamander Area of Critical Environmental Concern. The limestone salamander is found in limestone substrates in mixed chaparral habitats along the Merced River and its tributaries from 1,100 to 2,500 feet in elevation (Zeiner et al. 1988). It frequents limestone cliffs and ledges and in talus, especially where overgrown with moss. During periods of surface activity (November to the end of March), this species is uncommon to common on steep north- and east-facing slopes. California buckeye may be an indicator species for optimal habitat.

Status. The limestone salamander is considered vulnerable because of its highly restricted range.

Reproductive Biology and Breeding Habitat. Little is known about habitat requirements for breeding and egg laying for this salamander. A related salamander, *H. shastae*, apparently breeds and is known to lay eggs in limestone caverns.

Diet and Foraging Habitat. The limestone salamander most likely forages on insects and other small invertebrates.

Habitat and Status in the Project Area. The limestone salamander has never been collected in the park. Its closest occurrence is about 30 miles west of El Portal near Briceburg. The Museum of Vertebrate Zoology in Berkeley, California has an extensive collection of specimens originating

from the vicinity of Briceburg on the Merced River. Although the project area in El Portal lies within the elevation range of this species, and suitable vegetative habitat appears to exist, the species is not expected due to a lack of limestone substrate.

Mount Lyell salamander
Hydromantes platycephalus

General Distribution. The Mount Lyell salamander is found in wet habitats in the Sierra above 4,000 feet. It is typically found under large granite slabs and boulders at the edge of talus slopes (Stebbins 1985). Typical habitat includes rock fissures and seeps from streams or melting snow, shade, and low-growing plants. It has been found near cliffs, cave openings, melting snowbanks, and in the spray zone of waterfalls. Winter hibernation probably occurs within deep rock fissures or under slabs of exfoliating granite.

Status. Mount Lyell salamanders are considered a vulnerable species because of their hightly restricted range.

Reproductive Biology and Breeding Habitat. Little is known about specific microhabitat requirements of breeding and egg laying. Eggs probably are deposited beneath granite rocks or slabs covering moist granite soil.

Diet and Foraging Habitat. Centipedes, spiders, termites, beetles, and adult and larval flies are important food items (Stebbins 1972). Food is obtained under surface objects or while foraging on the surface at night.

Habitat and Status in the Project Area. The Museum of Vertebrate Zoology in Berkeley, California has records for nine specimens taken from Yosemite Valley in the vicinity of Vernal Fall and Curry Village, six specimens from the top of Vernal Fall, 30 from the top of Half Dome, and 18 specimens from various parts of Lyell Canyon. There is suitable habitat for the Mount Lyell salamander in Yosemite Valley, Tioga Pass, and Badger Pass.

Yosemite toad
Bufo canorus

General Distribution. The Yosemite toad frequents high mountain meadows and forest borders, emerging soon after the winter snowpack melts. It is found in the central Sierra Nevada at elevations from 6,400 feet to 11,300 feet.

Status. The Yosemite toad has undergone significant population declines in recent years (Fellers and Drost 1993). The cause for the decline of Yosemite toads remains uncertain and does not appear to be strongly linked to either habitat degradation or non-native fish (Drost and Fellers 1994).

Reproductive Biology and Breeding Habitat. Breeding occurs in shallow pools and lake margins, or in quiet water of streams. Egg laying occurs from mid-April to mid-July, depending on local conditions. Eggs are deposited in shallow, quiet pools in wet meadows or in shallow tarns

surrounded by forest. Breeding sites are frequently slow-flowing runoff streams with short emergent sedges.

Diet and Foraging Habitat. The diet of this toad includes beetles, ants, mosquitoes, and spiders (Grinnell and Storer 1924; Mullally 1953). Tadpoles feed on bottom detritus or by filtering suspended plant material and planktonic animals.

Habitat and Status in the Project Area. In 1992, Drost and Fellers resurveyed a transect of the Sierra Nevada mountains that has been surveyed for the Yosemite toad in the early 1900s (Grinnell and Storer 1924). The Grinnell and Storer survey discovered the Yosemite toad and described it as a new species. Drost and Fellers found the Yosemite toad at just over half of the 13 sites where it was found by Grinnell and Storer, and in low numbers at most sites (Drost and Fellers 1994).

In 1997, a survey of over 260 sites in Yosemite found the Yosemite toad at a total of only five sites (Fellers and Freel 1995; Fellers 1997). During 1999, the Yosemite toad was found at 14 out of 291 sites that were surveyed. The number of sites with toads and the number of toads at each site were slightly higher than in recent years and may be indicative of a modest recovery, although it is too early to be certain (Fellers and Freel 1995, Fellers 1999).

Records from the Museum of Vertebrate Zoology in Berkeley, California show that juvenile toads and tadpoles were collected from Ahwahnee Meadow in Yosemite Valley in 1956. The collection also contains more than 150 specimens from the immediate vicinity of the Tioga Pass Entrance Station, suggesting that this species was once abundant in the area.

Sherman and Morton (1984;1993) documented changes in the breeding population of Yosemite toads at Tioga Pass. Their yearly surveys from 1971 to 1982 show a nine-fold decrease in marked males and a drop in the average number of toads. In 1992, Drost and Fellers surveyed the Tioga Pass area. No adults were found, and tadpoles were found in only two small ponds near Tioga Lake, despite an abundance of good habitat in the area (Drost and Fellers 1994).

The areas of likely occurrence of Yosemite toads in project sites, based upon previous observations and collections, are meadows and lakes near Tioga Pass. Assuming the identification of the toads and tadpoles obtained 45 years ago in the one collection from Yosemite Valley 45 years ago is correct, this area could be habitat for Yosemite toads; however, the lack of subsequent observations from this area, and the fact that the Valley is far below the usual elevation range of this species, indicate that Yosemite Valley is an unlikely site for a sustainable population of Yosemite toads.

Foothill yellow-legged frog
Rana boylei

General Distribution. The foothill yellow-legged frog is found from western Oregon to southern California (Behler and King 1979). It was formerly abundant up to 6,000 feet in elevation in the Sierra Nevada, though it has virtually disappeared from its range from uncertain causes.

Remaining foothill yellow-legged frogs live in or near permanent freshwater rocky streams and rivers in a variety of habitats, including valley-foothill hardwood and conifer, chaparral, and wet meadow types (Zeiner et al. 1988). The yellow-legged frog prefers shallow, partially shaded streams with rocky substrates that are at least cobble-sized, with water less than 2 feet deep and fast-flowing water with riffles (Hayes and Jennings 1988). Streams with at least 40% riffles and at least 40% cobble-sized or greater substrates may best suit this species (Hayes and Jennings 1988).

Status. The mountain yellow-legged frog was formerly one of the most abundant amphibian species in California, but is now virtually extinct from its former range. Causes of this extreme decline are unknown at this point, but could include introduction of non-native amphibian (bullfrog) and fish species, pesticides, and disease. Recent data also suggest that fungal infections may be an important factor.

Reproductive Biology and Breeding Habitat. Breeding usually occurs during a two-week period after spring flooding between March and May. Clusters of 100 to 1,000 eggs are attached to gravel or rocks in moving water near stream edges (Zeiner et al. 1988). Tadpoles transform in three to four months (Zeiner et al. 1988).

Diet and Foraging Habitat. Adults feed on both aquatic and terrestrial invertebrates, favoring adult insects. Tadpoles probably graze on algae and diatoms along rocky stream bottoms (Zeiner et al. 1988).

Habitat and Status in the Project Area. Recent surveys found no foothill yellow-legged frogs in Yosemite National Park (Fellers and Freel 1995; Fellers 1997). Suitable habitat for this species occurs in Yosemite Valley, Foresta, Wawona, and El Portal.

Mountain yellow-legged frog
Rana muscosa

General Distribution. The mountain yellow-legged frog is found in the Sierra Nevada, in the extreme western part of Nevada, and in portions of southern California (Behler and King 1979). In the Sierra Nevada it is found in streams, rivers, ponds, and lakes from 4,500 feet to over 12,000 feet in elevation (Jennings and Hayes 1994).

Mountain yellow-legged frogs are seldom found far from water. They occur in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitats (Zeiner et al. 1988). In the Sierra Nevada, this species is most abundant in lakes formed in glaciated terrain. It is rare or absent in high-elevation lakes where introduced trout have been established (Zweifel 1968). The mountain yellow-legged frog prefers well-illuminated, sloping banks of meadow streams, riverbanks, isolated pools, and lake borders with vegetation that is continuous to the water's edge (Zeiner et al. 1988). They are especially abundant along lakes and low-gradient streams with irregular shorelines and plentiful rocks (Mullally and Cunningham 1956).

Status. Mountain yellow-legged frogs were once one of the most abundant amphibians at elevations above 6,000 feet in the Sierra Nevada. As surveyed by Drost and Fellers (1994), this

frog has undergone significant declines and is now increasingly rare. Lack of frogs probably relates to a number of factors, including the presence of introduced trout and possible airborne contaminants that blow into the Sierra Nevada from the Central Valley (Fellers 1997).

Reproductive Biology and Breeding Habitat. Breeding in the Sierra Nevada usually occurs from June to August when lakes and streams are free from ice. Clusters of 100 to 500 eggs are attached to gravel or submerged rocks in shallow water (Zeiner et al. 1988). Tadpoles usually overwinter and may require two winters to complete their development (Zeiner et al. 1988).

Diet and Foraging Habitat. Mountain yellow-legged frogs feed primarily on aquatic and terrestrial invertebrates and favor terrestrial insects (Zeiner et al. 1988). Tadpoles graze on algae and diatoms along rocky bottoms in shallow water (Zeiner et al. 1988).

Habitat and Status in the Project Area. Though not found in the project area, recent surveys found the mountain yellow-legged frog in 43 sites in Yosemite (Fellers and Freel 1995; Fellers 1997). Suitable habitat is found at or near Badger Pass and Tioga Pass.

Northwestern pond turtle ***Clemmys marmorata marmorata***	**Southwestern pond turtle** ***Clemmys marmorata pallida***

[Note: Yosemite is in a zone of intergradation between these two subspecies, where interbreeding makes them indistinguishable. They will, therefore, be addressed here as a single species.]

General Distribution. The western pond turtle is found in the Sierra Nevada up to 6,000 feet in elevation. It is found in permanent ponds, rivers, streams, and irrigation ditches that typically have rocky or muddy bottoms and are overgrown with vegetation. Basking areas are required by this species and include partially submerged logs, rocks, mats of vegetation, or open mud banks.

Status. This species has decreased by up to 80% in numbers, probably due to habitat alternation and non-native predators.

Diet and Foraging Habitat. The diet of the western pond turtle includes small fish, frogs, various aquatic insects, and some plants. Insects probably make up the greatest part of the pond turtle diet, particularly the larvae and nymphs of caddisflies and dragonflies.

Reproductive Biology and Breeding Habitat. The western pond turtle depends on upland habitats in which individuals can over-winter, construct nest chambers, and lay eggs. Most nest chambers are excavated in compacted soils on south-facing slopes that have grassland or scrub vegetation. Eggs are laid between May and July. (VOLPE 1997).

Habitat and Status in the Project Area. Park records show sightings of the western pond turtle in Yosemite Valley and El Portal. Suitable habitat for this species occurs in Yosemite Valley, El Portal, and Wawona.

Merced Canyon shoulderband snail
Helminthoglypta allynsmithi

General Distribution. The Merced Canyon shoulderband snail lives in stable rock slides where there is tree or shrub cover.

Status. This species is vulnerable due to its apparent limited distribution in the Merced River canyon.

Reproductive Biology, Breeding Habitat, and Diet. Little is known about the reproduction and diet of the Merced Canyon shoulderband snail. It likely deposits its eggs in moist locations.

Habitat and Status in the Project Area. The California Academy of Sciences has records for seven specimens collected in the Merced River canyon between 1923 and 1932. These specimens were collected from 0.5 mile west of El Portal to 5.3 miles west of El Portal in rockslide areas (Roth 1972). No specimens have been collected in potential project sites in El Portal, and the habitat at these sites does not appear suitable for this species. The proximity of historic collections of this species, however, requires evaluation of potential impacts at project sites.

Mariposa sideband snail
Monadenia hillebrandi

This species is also known as Yosemite Mariposa sideband snail (formerly *Monadenia hillebrandi yosemitensis*).

General Distribution. The Mariposa sideband snail is a narrowly distributed land snail known from the Glacier Point, Curry Village, and Vernal Fall area of Yosemite, and the Merced River canyon west of El Portal (Pilsbry 1939). This snail lives in mossy rockslides with a cover of trees or shrubs (Roth 1972). It prefers stable rather than active rockslides, and rock piles with open crevices rather than those filled with silt. Roth's 1987 examination of the type specimen (*Monadenia hillebrandi yosemitensis*) revealed that the type specimen is really another species, *M. mormonum* (VOLPE 1997). As a result, the scientific name was changed.

Status. This species is vulnerable due to its apparent limited distribution in the Merced River canyon.

Reproductive Biology, Breeding Habitat, and Diet. Little is known about the reproduction and diet of the Mariposa sideband snail. It likely deposits its eggs in moist locations in its habitats.

Habitat and Status in the Project Area. Roth (1972) reports this species as inhabiting rockslides near Vernal Fall and Curry Village. The California Academy of Sciences has records for five specimens collected in the vicinity of Vernal Fall and the Mist Trail from prior to the period 1916 – 1932. Suitable habitat for the Mariposa sideband snail is found in Yosemite Valley and El Portal.

Sierra pygmy grasshopper
Tetrix sierrana

General Distribution. Pygmy grasshoppers are often found in riparian areas, particularly in the spring and early summer. They are generally small (less than 2 inches) with vestigial wings. This species has been found in only a few areas: in the vicinity of El Portal (Rehn and Grant 1956); and in the Sugar Pine area of Madera County at an elevation of 4,300 to 5,000 feet (VOLPE 1997).

Status. The apparent limited distribution of this species makes it vulnerable.

Reproductive Biology, Breeding Habitat, and Diet. Little is known of the breeding habitat of this species or its diet, but it likely lays its eggs in the moist soil of its habitat.

Habitat and Status in the Project Area. Suitable habitat is found in El Portal, Yosemite Valley, Wawona, and at the South Entrance.

Wawona riffle beetle
Atractelmis wawona

General Distribution. The Wawona riffle beetle occurs in rapid streams of California from 2,000 to 5,000 feet in elevation and is considered rare (Usingner 1956). The Wawona riffle beetle was previously known only from a few locations in California (Chandler 1954; Brown 1972), until more recently when it was found in several widely scattered locations in northern California, as well as southern Oregon and Idaho (Shepard and Barr 1991).

The beetle is small, measuring less than 1 inch. Both the larvae and adult life stages are aquatic, but neither life stage actually swims. Rather, both life stages move by crawling on underwater plants and debris. Adults and larvae are found together, usually in cool, small to medium-sized mountain streams and rivers. They are most abundant in aquatic mosses. Many taxa in this family (Elmidae riffle beetles) are typically found clinging to stones or beneath rocks in cold, fast-running water. They are rarely found in streams with seasonal variations in flow, heavy sediments, muddy or sandy bottoms, or low oxygen content (VOLPE 1997).

Status. The Wawona riffle beetle is limited in distribution and difficult to collect for assessment of its distribution and abundance, but appears to be rare where it does occur.

Reproductive Biology, Breeding Habitat, and Diet. Members of this family deposit eggs singly or in small groups on submerged rocks, organic debris, and vegetation. Larvae go through six to eight instars and may take three or more years to mature. They construct terrestrial pupal chambers in moist soils, under rocks, or in rotting wood. The newly emerged adults fly for a short period of time, then enter the water and lose the ability to fly (Merritt and Cummins 1984). Little is known about the diet of this species.

Habitat and Status in the Project Area. Suitable habitat for the Wawona riffle beetle occurs in the Merced River through Yosemite Valley and El Portal and in the South Fork of the Merced

River in Wawona. It was described and named after specimens collected in the South Fork of the Merced River in Wawona.

Bohart's blue butterfly
Philotiella speciosa bohartorum

General Distribution. The Bohart's blue butterfly has been collected in Briceburg (Mariposa County), the Merced area, Fresno County, and east of Johnsondale in Tulare County; however, additional collecting efforts would probably indicate a broader distribution (USFS 1994a).

Status. The Bohart's blue butterfly is vulnerable due to its limited distribution and its apparent dependence upon one plant species.

Reproductive Biology, Breeding Habitat, and Diet. Adults are active in late April, May, and early June and have been observed on flowers of the pink spineflower (*Chorizanthe membranacea)*, which may also be the larval foodplant. The pink spineflower is common in grassland, chaparral, and foothill woodland habitat at about 5,000 feet throughout much of central and northern California (Hickman 1993). At the type locality in Briceburg, chaparral is present on slopes above the Merced River, with scattered patches of riparian scrub and woodland along the banks of the river (VOLPE 1997).

Habitat and Status in the Project Area. Suitable habitat in the form of vegetation and host plants appears to be present in El Portal, but no specimens of Bohart's blue butterfly have been seen or collected in this area.

Plants

Tiehm's rock cress
Arabis tiehmii

General Ecology and Distribution. This native perennial herb in the mustard family occurs in California and Nevada and is considered to be extremely rare.

Habitat and Status in the Project Area. Tiehm's rock cress occurs above Tioga Pass on granitic soils in alpine fell-fields on the slopes of Mt. Dana.

Congdon's lomatium
Lomatium congdonii

General Ecology and Distribution. Congdon's lomatium is a perennial herb restricted to serpentine and metamorphic soils in chaparral, gray pine, and oak woodlands. This Sierra Nevada endemic is known only from Tuolumne and Mariposa Counties.

Habitat and Status in the Project Area. Habitat for this species occurs in the El Portal area.

Slender-stemmed (Hetch Hetchy) monkeyflower
Mimulus filicaulis

General Ecology and Distribution. The slender-stemmed (Hetch Hetchy) monkeyflower is an annual herb in the snapdragon family. It is endemic to California and limited to Mariposa and Tuolumne Counties. It is found in vernally moist habitats, typically in gravelly soils and meadows and seeps, in the lower to montane forest zone of the Sierra Nevada.

Habitat and Status in the Project Area. Occurs in the open meadow and woodland area of Hazel Green Ranch.

Bolander's clover
Trifolium bolanderi

General Ecology and Distribution. Bolander's clover is an annual herb endemic to meadows of the Sierra Nevada in the montane coniferous zone (Ratliff and Harding 1993). It is found in a narrow elevation band between about 6,500 to 7,500 feet in elevation. It is limited to Fresno, Madera, and Mariposa Counties and found only in Yosemite National Park and the Sierra National Forest in California (Ratliff and Denton 1993). In 1991, there were only 20 meadows with known populations (Ratliff and Denton 1993).

Habitat and Status in the Project Area. Bolander's clover is not found in the project area. Though it does not occur in Monroe Meadow, which is directly adjacent to Badger Pass, it is found in moist meadows and wet forest understory in meadows in the Badger Pass area.

CALIFORNIA STATE ENDANGERED SPECIES

Wildlife

Sierra Nevada bighorn sheep (see Federal Endangered Species section)

Peregrine falcon
Falco peregrinus

General Distribution. The peregrine falcon is a neotropical migrant that occurs throughout the world, except in Antarctica. This species is found breeding, migrating, or wintering throughout most of California, except in the southeast. Active nesting sites are known along the coast north of Santa Barbara, in the Sierra Nevada, and in other mountains of northern California (Zeiner et al. 1990). Nest cliffs are found up to 7,500 feet in elevation, but most are below 4,500 feet (Monk et al. 1988). In the western Sierra Nevada, peregrines are found from the annual grassland through the lodgepole pine zones, in all successional stages (Verner et al. 1980).

Status. The peregrine falcon was recently delisted from federal endangered status, but is remains a California state endangered species.

Reproductive Biology and Breeding Habitat. Peregrines have relatively strict nesting requirements: vertical cliff habitat with large potholes or ledges that are inaccessible to land predators. They appear to prefer sheer cliffs at least 150 feet high that have a large cave or overhung ledge large enough to accommodate three to four nestlings (Monk et al. 1988). Pairs tend to return to the same nesting cliff (DeGraaf et al. 1991) or alternate between two different nesting cliffs in different years (Monk et al. 1988). They favor habitats with a high avian prey population, such as coastal areas or wetlands with large breeding populations of birds (Monk et al. 1988).

Diet and Foraging Habitat. The primary prey of peregrine falcons is a variety of bird species, ranging up to ducks in size, with pigeons and doves preferred prey in some areas. Mammals, insects, and fish are also sometimes taken (Zeiner et al. 1990). In inland California, including the Sierra Nevada, band-tailed pigeons, woodpeckers, and jays are among preferred prey (Verner et al. 1980). Peregrine falcons forage over a variety of habitats, including wooded areas, marshes, open grasslands, and bodies of water (USFWS 1982). Areas with high populations of birds, such as coasts or wetlands, are especially valuable (Monk et al. 1988).

Prey Habitat Needs. The bird species preyed upon by peregrine falcons are best supported in a landscape made up of various habitat types in various successional stages. This would include hardwood and coniferous forests, open woodlands and shrublands, riparian areas, and abundant snags. The assemblage of such habitats in natural distribution and structure would provide prey in natural abundance and diversity.

Habitat and Status in the Project Area. Prior to 1978, there was a 37-year absence of nesting records for the peregrine falcon in Yosemite, which roughly coincides with declines in numbers throughout North America and Europe (Assay and Davis 1984). Currently, there are three active nest sites in Yosemite Valley and one historic nest site near the Coulterville Road in the Merced River canyon (Thompson 2000). A pair of peregrine falcons appeared to be nesting on Wawona Dome in 1990, but no young were fledged, and no subsequent observations of peregrine falcons in this location have been made.

Great gray owl
Strix nebulosa

General Distribution. The great gray owl is a circumpolar species, but is considered rare throughout its range. In California, the center of abundance of this species is the Sierra Nevada, specifically in the Yosemite area (Winter 1986). The Sierra Nevada population of great gray owls marks the most southerly population in the world (Winter 1985; Reid 1989).

Status. Surveys in Yosemite National Park and adjacent national forests estimate the California population of great gray owls at 100 to 200 birds (Winter 1986). Recent population declines in California may be due to habitat degradation from logging and grazing.

Reproductive Biology and Breeding Habitat. Great gray owls form monogamous pairs that breed from about March to August. Eggs hatch from mid-May to mid-June, and young fledge in early June to early July. The young leave the nest before they can fly and remain around the nest through August. In the Sierra Nevada, great gray owls nest in mature red fir, mixed conifer, or lodgepole pine forests near wet meadows or other vegetated openings (Zeiner et al. 1990). Preferred breeding habitat is pine and fir forests near montane meadows that ranges from 2,460 to 7,380 feet in elevation (Winter 1986). In California, all reported great gray owl nests have been in the tops of large-diameter broken snags (Winter 1980). Nest snags are usually within a few hundred feet of a meadow. High snag densities may be critical for nesting habitat, since not all snags form top depressions suitable for nests. Nesting success is believed to depend on the abundance of voles (Winter 1986).

Diet and Foraging Habitat. Great gray owls feed primarily on rodents captured in meadows, but may also take some birds (Zeiner et al. 1990). In Yosemite National Park, recent surveys found that voles and pocket gophers make up 90% of the prey biomass in pellets (Winter 1986; Reid 1989). Owls in Yosemite restrict foraging to open meadows (Reid 1989). Adequate numbers of hunting perches are also important (Winter 1981; 1982). Meadows used by great gray owls are generally at least 25 acres in area and are in good ecological condition.

The great gray owl migrates downslope in winter. Winter ranges of the great gray owl in the Yosemite area include Big Meadow in Foresta, Wawona, Ackerson Meadow in the Stanislaus National Forest, and ranch land near Midpines (Mariposa County) in Jerseydale, Lush Meadows, and Bootjack (Skiff 1995).

Forested land from about 2,000 to 5,000 feet in elevation that contains openings suitable for vole and gopher populations is critical to sustain owls during the winter (Skiff 1995).

Habitat and Status in the Project Area. Great gray owls are regularly seen in meadows at Crane Flat, Foresta, Wawona, and along the Glacier Point Road. McCauley Meadow near Foresta is occasionally used by juvenile males driven out of primary meadows by dominant males, or as a transition meadow when there is a large snowpack in primary meadows. It is not used for nesting. Although great gray owls have not been seen in Monroe Meadow at Badger Pass, the species is frequently seen in nearby meadows (Skiff 1995) and could occasionally use Monroe Meadow without being detected.

Past research and recent surveys have not confirmed the presence of great gray owls at Hazel Green Ranch, but the meadows at this location are recognized as potential habitat, based upon their size and elevation (Skenfield 1999).

Meadows in Yosemite Valley appear to be good winter and staging habitat for great gray owls, but recent records in this location are rare. This could be due to the amount of human disturbance that occurs in this area. The fact that the range of nearly the entire California population of great gray owls is centered over Yosemite reflects the relatively intact condition of habitats in the park.

Willow flycatcher
Empidonax trailii

General Distribution. The willow flycatcher is a neotropical migrant that breeds in riparian and moist meadow willow thickets in the U.S. and southern Canada (AOU 1983). In California, it is a rare to locally uncommon summer resident in wet meadow and montane riparian habitats from 2,000 to 8,000 feet in elevation. Three subspecies of willow flycatcher are present in California, with two subspecies—*E. t. brewsteri* (which is also a federal species of concern) and *E. t. adastus*—possible in Yosemite. Research currently underway is attempting to determine the exact range of each subspecies, or whether areas like Yosemite represent an area of intergrade between the two subspecies (Whitfield 2000). A statistically significant association has been found between meadow size and the occurrence of the willow flycatcher, showing that birds favor larger meadows (Serena 1982).

Status. Willow flycatchers historically nested in California wherever mesic willow thickets occurred (Grinnell and Miller 1944). In recent decades, however, breeding populations have disappeared from most lower-elevation habitats in the state. Alteration and destruction of riparian and meadow habitats is thought to be the principal cause for this decline (Remson 1978). Other contributing factors may include nest parasitism by brown-headed cowbirds, disturbance from grazing, and disturbance on wintering grounds (Serena 1982). The entire state population of willow flycatchers is thought to number around 200 pairs (CDFG 1991).

Reproductive Biology and Breeding Habitat. Breeding occurs from late May/early June to September, when an average of three to four eggs are laid in an open-cup nest placed about 1.5 to 10 feet high in a willow or other deciduous riparian shrub, usually near slow-moving streams, seeps, or standing water (Valentine et al. 1988). Nests are typically placed on the edges of vegetation clumps, which makes them susceptible to damage from wind, cattle, and predators (KRCD 1985). Willow flycatcher nests are frequently parasitized by brown-headed cowbirds. Parasitism occurs more often in lowland habitats than in higher elevations of the Sierra Nevada (Harris 1991), apparently due to differences in breeding period of cowbirds and willow flycatchers at higher elevations (Verner and Ritter 1983).

Diet and Foraging Habitat. Willow flycatchers forage by either gleaning insects from vegetation while flying, or by waiting on an exposed perch and capturing insects in flight (Ettinger and King 1980; Sanders and Flett 1989). As such, deciduous trees and shrubs interspersed with open areas enhance the quality of foraging habitat.

Habitat and Status in the Project Area. Willow flycatchers formerly nested in Yosemite Valley, but were last observed in 1966. It is likely that human disturbance, habitat destruction, and brown-headed cowbird parasitism were factors in this disappearance. A greater factor, however, has probably been the Sierra-wide decline of the species that has limited the ability of park habitats to sustain a viable population. Recent records of willow flycatchers in the park include Wawona Meadow, Hodgdon Meadow near the Big Oak Flat Entrance Station, and Westfall Meadow near Badger Pass.

CALIFORNIA STATE THREATENED SPECIES

Wildlife

Sierra Nevada red fox (see Federal Species of Concern section)

California wolverine (see Federal Species of Concern section)

Limestone salamander (see Federal Species of Concern section)

CALIFORNIA STATE RARE SPECIES

Plants

Yosemite onion
Allium yosemitense

General Ecology and Distribution. The Yosemite onion is a narrow endemic that occurs in five known populations in the central Sierra Nevada (McNeal and Mortola 1985). This species in the lily family is found from the foothills into montane coniferous forests in rocky soils, primarily on metamorphic substrates. It is found on talus and scree slopes, ridges, metamorphic outcrops, and on the margins and cracks of large granitic slabs (Taylor 1982). It is limited in distribution to Mariposa and Tuolumne Counties.

Habitat and Status in the Project Area. The Yosemite onion is found in the vicinity of El Portal and Wawona on steep slopes generally inaccessible to casual visitation.

Tompkin's sedge
Carex tompkinsii

General Ecology and Distribution. This perennial herb in the sedge family is endemic to the Sierra Nevada and is found only in Fresno, Madera, Mariposa, and Tuolumne Counties. Tompkin's sedge is limited to foothill oak woodland and chaparral areas and along lower talus slopes in moist and shaded areas.

Habitat and Status in the Project Area. Tompkin's sedge is found sporadically from El Portal east to the vicinity of Cascade Creek.

Congdon's woolly-sunflower
Eriophyllum congdonii

General Ecology and Distribution. This species, a native annual herb in the aster family, is endemic to California and restricted to Mariposa County. It is found on dry, mostly south-facing metamorphic and metasedimentary outcrops in chaparral and oak woodlands. It is endemic to the

main stem of the Merced River canyon near El Portal and the South Fork of the Merced River downstream of Wawona.

Habitat and Status in the Project Area. Habitat for this species occurs throughout the Merced River gorge, El Portal, and lower portions of the South Fork of the Merced River downstream of Wawona.

Congdon's lewisia
Lewisia congdonii

General Ecology and Distribution. This perennial native herb is endemic to California and limited to Fresno, Madera, and Mariposa Counties. It grows on moist, exposed metamorphic rock faces and slopes in chaparral and mixed conifer forests. The lewisia (or "bitterroot") is often found on shaded, north-facing slopes (Taylor 1982).

Habitat and Status in the Project Area. This species is known from the slopes above the Merced River above El Portal and the Merced River gorge.

CALIFORNIA STATE SPECIES OF SPECIAL CONCERN

Wildlife

Yosemite toad (see Federal Species of Concern section)

California red-legged frog (see Federal Threatened Species section)

Foothill yellow-legged frog (see Federal Species of Concern section)

Mountain yellow-legged frog (see Federal Species of Concern section)

Northwestern/Southwestern pond turtle (see Federal Species of Concern)

Mount Lyell salamander (see Federal Species of Concern section)

Harlequin duck (see Federal Species of Concern section)

Cooper's hawk
Accipiter cooperi

General Distribution. Cooper's hawks are found across most of the United States, inhabiting discontinuous woodlands and riparian woodlands, especially deciduous woodlands. In California, they range up to 9,000 feet in elevation in the Sierra Nevada. Dense stands of live oak, riparian deciduous, and other forest habitats near water are most frequently used by the Cooper's hawk.

Status. Numbers of Cooper's hawks have apparently declined, but this decline began to reverse after the banning of DDT in the United States in 1972 (Ehrlich et al. 1988). Low numbers of this species, however, are still of concern. Habitat destruction and the continued presence of

pesticide residues could be factors that contribute to low numbers of this species. Records of Cooper's hawk in Yosemite are relatively numerous.

Reproductive Biology and Breeding Habitat. Typical nests are in the crotches of deciduous trees between 20 and 50 feet above the ground, but nests are also found on the horizontal branches of conifers, often just below the lowest live branches. Cooper's hawks usually nest in second-growth conifer stands, or in deciduous trees in riparian areas, usually near streams (Zeiner et al. 1990). Peak breeding activity occurs May through July. Only the female incubates, while the male provides food during this period.

Diet and Foraging Habitat. Cooper's hawks feed primarily on small birds, especially young birds during nesting season, but will also take small mammals, reptiles, and amphibians. They hunt in sudden flights from a perch in dense cover, pursuing prey in the air through branches. Use of cover is an important hunting strategy for hiding, approaching, and attacking prey. Cooper's hawks will also search for prey from the air, using low, gliding flights (Zeiner et al. 1990). Broken woodland and forest edges are important foraging areas.

Habitat and Status in the Project Area. Suitable habitat for Cooper's hawks is largely intact in Yosemite National Park, except for localized impacts from development, especially in Yosemite Valley. Nonetheless, Cooper's hawks are regularly seen in the Valley, often near developed areas. Habitat for the Cooper's hawk is found in all of the project areas, with the exception of Tioga Pass.

Northern goshawk (see Federal Species of Concern section)

Sharp-shinned hawk
Accipiter striatus

General Distribution. Sharp-shinned hawks occur across most of North America, inhabiting woodlands and forests, hunting in openings and along edges. In California, they breed in a variety of forested habitats between 4,000 and 7,000 feet in elevation. They winter in all but the most barren and open habitats, and often descend to lower elevations.

Status. North American numbers of sharp-shinned hawks declined greatly in the early 1970s, apparently from the effects of DDT and other pesticides in the environment that caused eggshell thinning. Populations rebounded somewhat after the banning of DDT in the United States in 1972, but populations continue to be low. Likely causes include habitat destruction and continued pesticide contamination. Observations of this species in Yosemite National Park are relatively rare; some records classified as Cooper's hawk may have been sharp shinned hawks, due to their similar appearance. One record exists of a sharp-shinned hawk nest in Yosemite Valley in 1930.

Reproductive Biology and Breeding Habitat. Nests of the sharp-shinned hawk are typically located in dense stands of small conifers which are moist, cool, and well-shaded. They are often present in areas near water with little ground cover. The nest is usually placed in dense foliage against the trunk or in the main crotch of a tree, usually between 6 and 80 feet above the ground.

The nest is usually very inconspicuous (Zeiner et al. 1990). Breeding habitats include ponderosa pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine. Riparian habitats are preferred, and habitat with north-facing slopes are critical.

Diet and Foraging Habitat. Diet is almost entirely small birds, with small mammals, reptiles, and insects rarely taken. Prey is surprised in sudden flights from a perch; the hawk may also hunt in low, gliding flights. Hunting often occurs in forest openings and edges, and brushy areas.

Habitat and Status in the Project Area. Sharp-shinned hawks are found throughout wooded habitat in the park from 4,000 to 7,000 feet in elevation. Habitat is largely intact in the park, except for localized habitat destruction from roads and development. Suitable habitat for the sharp-shinned hawk is found at Yosemite Valley, Badger Pass, Hazel Green, El Portal, and the Big Oak Flat Entrance Station.

Prairie falcon
Falco mexicanus

General Distribution. Prairie falcons have a widespread distribution in open habitats of mountains, plains, deserts, and grasslands of western North America. In California, the species is found in most open habitats, avoiding densely forested areas. Their range includes southern deserts, Sierra Nevada Coast Ranges, San Joaquin Valley, and Great Basin habitats. The prairie falcon is also found in annual grasslands and alpine meadows, but prefers perennial grasslands, savannahs, rangeland, desert scrub, and some agricultural fields (Zeiner et al. 1990). Prairie falcons are not found along coastlines. In the Sierra Nevada, the species is found from open foothill habitats to alpine meadows and open lodgepole pine forests, and ranges to above the treeline in late summer.

Status. Declines of prairie falcons in California have been linked to pesticide and mercury poisoning, as well as habitat destruction, primarily from agriculture (Ehrlich et al. 1988). Surveys in 1971 and 1972 of former traditional prairie falcon nest sites within 48 miles of the San Joaquin Valley found 32 of 33 sites unoccupied (Garrett and Mitchell 1973).

Reproductive Biology and Breeding Habitat. Breeding occurs from mid-February to mid-September, with a peak between early May and early August. Formerly, breeding mostly occurred below coniferous forests, but most remaining pairs breed at higher elevations. Nest sites are usually on a cliff ledge that overlooks a large open area (Verner and Boss 1980). Clutch size ranges from three to six, with five the most common.

Diet and Foraging Habitat. Prey is primarily small mammals and small to medium-sized birds taken in open habitats. Prey are hunted in high, soaring flight or flushed and pursued in low flight.

Habitat Status in the Project Area. With the great declines in prairie falcon numbers in lower elevations of California, the open mountain habitats of the Sierra Nevada, as occur in Yosemite, are apparently among the last strongholds of the species in the state. Suitable habitat in potential project areas, as confirmed by observations, includes Tioga Pass, Yosemite Valley, and Foresta.

The 1990 A-Rock Fire likely improved the extent and quality of habitat for prairie falcons by creating a more open landscape. The reduction in meadow habitats in Yosemite Valley from conifer invasion has likely reduced habitat quality in that area.

Golden eagle
Aquila chrysaetos

General Distribution. Golden eagles occur over most of North America, ranging from high alpine habitats to low deserts. Nearly all nesting in the United States occurs west of the Great Plains, with the rest of the range used primarily by migrants (Palmer 1988). In California, the preferred habitat is typically rolling foothills, mountainous areas, sage-juniper flats, and desert (Zeiner et al. 1990). In the Sierra Nevada, golden eagles favor grasslands and areas of shrubs or saplings, and open-canopied woodlands of young blue oaks. In late summer, they often range to above timberline (Zeiner et al. 1990).

Reproductive Biology and Breeding Habitat. In the Sierra Nevada, golden eagles breed from mid-January to late September, with a peak between late April and August. Nests are typically on a cliff ledge with a good view of surrounding habitat, at elevations usually below 8,000 feet. Large trees or snags are also occasionally used (Verner and Boss 1980). Clutch size ranges from 1 to 3 eggs, but is usually 2, which are laid from early February to mid-May. Incubation lasts from 43 to 45 days, and the nestling period lasts 65 to 70 days (Zeiner et al. 1990).

Diet and Foraging Habitat. Golden eagles feed mostly on rabbits and rodents, but may also take other mammals, birds, reptiles, and carrion. Open terrain is needed for hunting, such as grasslands, deserts, savannahs, and forest and shrub habitats in early successional stages (Zeiner et al. 1990). Golden eagles most often hunt by soaring 100 to 300 feet above the ground, or may fly low, following the terrain to surprise prey. They may also hunt from a perch, flying directly to sighted prey.

Habitat Status in Project Area. The most recent observations of golden eagles come from El Portal and Foresta, likely due to the relatively open terrain in these areas. In most years, a nesting pair of golden eagles occupies a nest site on Elephant Rock in the Merced River gorge east of El Portal. Sightings also occur in Yosemite Valley, although these appear to be transient birds. Summer sightings at high-elevation areas, such as Tioga Pass, are not uncommon. Overall, the relatively intact habitats in Yosemite are beneficial to golden eagles, and recent large fires in the park have likely expanded the area of suitable habitat by providing more open terrain.

Bald eagle (see Federal Threatened Species section)

Merlin
Falco columbarius

General Distribution. Merlins have wide distribution in the northern hemisphere. Their range covers all of North America, except for some arctic regions. Merlins do not breed in California.

Birds seen here are migratory, wintering from September to May, and usually below 4,000 feet in elevation.

Status. In recent decades, numbers of merlin have declined markedly from unknown causes. Some data suggest pesticides or heavy metals in the food chain may be a factor (Ehrlich et al. 1988). Records of merlin in Yosemite are rare. The last reported sighting occurred in 1989 in Foresta.

Reproductive Biology and Breeding Habitat. Merlins do not breed in California, but in the northern parts of North America where they do breed, tree cavities and the abandoned nests of other birds are primary nest sites. In some areas, cliffs may be used, and some nests may even be established on the ground (Palmer 1988). Nearby open terrain for hunting appears to be an important factor. Clutches of 4 to 6 eggs are laid, usually in May, and incubated for around 30 days.

Diet and Foraging Habitat. Primary prey are small birds, but small mammals and insects are also taken. In California, coastlines, open grasslands, savannahs, woodlands, lakes, wetlands, edges, and early successional stages are preferred habitat. Hunting occurs in low flights, capturing prey in short dives and pursuits.

Habitat Status in the Project Area. Likely areas for merlins, based upon elevation and habitat, include Foresta, El Portal, Wawona, and Yosemite Valley. Concentrated development in these areas, especially in east Yosemite Valley, has likely affected local habitat quality for merlins. Overall, however, park habitats are relatively intact. Recent large fires in Yosemite have likely improved merlin habitat quality by creating more forest openings.

Long-eared owl
Asio otus

General Distribution. Long-eared owls are found across most of the United States, but are uncommon throughout their range. In the Sierra Nevada, this species is found from blue oak savannah up to ponderosa pine and black oak habitats, usually in association with riparian habitats. Long-eared owls will also use live oak thickets and other dense stands of trees for roosting and nesting (Zeiner et al. 1990).

Status. Numbers of long-eared owls in California have been declining since the 1940s. Known factors in this decline are destruction and fragmentation of riparian and live oak habitats, but other factors may also be present. Records of long-eared owls in Yosemite are few, including one nesting record in Yosemite Valley in 1915.

Reproductive Biology and Status. Preferred nest sites are in trees with dense canopy coverage. Proximity of this habitat to meadow edges for hunting enhances quality. Old crow, hawk, magpie, or squirrel nests are often used as nests. Breeding occurs from early March to late July, with usually four to five eggs per nest.

Diet and Foraging Habitat. Prey is searched for in low, gliding flights in open areas and occasionally woodland and forested habitats (Zeiner et al. 1990). Prey consists mostly of voles and other small rodents, and occasionally other birds.

Habitat and Status in Project Area. Long-eared owl habitat is largely intact in the park, except for localized habitat destruction from roads and development. Suitable habitat for the long-eared owl is found in El Portal, Wawona, and Yosemite Valley.

California spotted owl (see Federal Species of Concern section)

Yellow warbler
Dendroica petechia

General Distribution. Breeding range of the yellow warbler extends over most of North America, and wintering range extends to northern South America. In California, yellow warblers breed over much of the state where suitable breeding habitat occurs. Some yellow warblers winter in extreme southern California.

Status. Destruction of riparian habitats and nest parasitism by brown-headed cowbirds have led to declines in lowland populations of yellow warblers.

Reproductive Biology and Habitat. Yellow warblers breed primarily in riparian woodlands from coastal, valley, and desert lowlands, up to 8,000 feet in the Sierra Nevada. Other breeding habitat includes montane chaparral, ponderosa pine, and mixed conifer where substantial amounts of brush occur (Zeiner et al. 1990). Breeding occurs from mid-April to early August, with peak activity in June. Three to six eggs are laid in an open-cup nest placed from 2 to 16 feet above the ground in a shrub or deciduous sapling. Nesting territories often contain heavy brush understory for nesting and tall trees for foraging and singing (Zeiner et al. 1990).

Diet and Foraging Habitat. Food of yellow warblers consists primarily of insects and spiders that are gleaned from the canopy of deciduous trees and shrubs. Occasionally, insects are hawked from the air, or berries are eaten.

Habitat and Status in the Project Area. Overall, riparian habitats are relatively intact, compared to areas outside the park, but localized destruction of such habitat from foot traffic, primarily in east Yosemite Valley, has likely affected yellow warblers. Breeding habitats in forested areas are, likewise, relatively intact, but a long history of fire suppression in the park may have affected habitat quality in areas where an unnaturally high degree of canopy closure limits understory growth. Suitable habitat for the yellow warbler occurs at all potential project sites except Tioga Pass.

Pallid bat
Antrozous pallidus

General Distribution. The pallid bat is found throughout California, primarily in the low to mid elevations, although it has been found to elevations of over 10,000 feet in the Sierra Nevada. It is

found in a variety of habitats, from desert to coniferous forest and nonconiferous woodlands. It is particularly associated with ponderosa pine, redwood, and giant sequoia habitats. It selects a variety of day roosts, including rock outcrops, mines, caves, hollow trees, buildings, and bridges. Recent research suggests a high reliance on tree roosts. It commonly uses bridges for night roosts.

In 1994, mist-net bat surveys took place in Tuolumne Meadows, Pate Valley, and Wawona. The pallid bat was captured in Pate Valley and Wawona (Pierson and Rainey 1995). It was also captured in Yosemite Valley in 1993 (Pierson and Rainey 1993).

Status. Declining populations of pallid bats may be caused by habitat destruction and fragmentation and the use of pesticides.

Reproductive Biology and Breeding Habitat. The pallid bat produces one to two young per year, but usually two, with birth occurring in May to June. Nursery colonies may contain up to several hundred females, but generally fewer than 100.

Diet and Foraging Habitat. The diet of the pallid bat is primarily ground-dwelling arthropods (scorpions, grasshoppers, long-horned beetles, Jerusalem crickets), but also includes large moths. Foraging occurs in and among vegetation as well as on the ground surface. Pallid bats may land and pursue prey on the ground.

Habitat and Status in the Project Area. Mist-net surveys took place in Yosemite Valley in 1993 at Mirror Lake, Cook's Meadow, El Capitan Meadow, and Yosemite Creek at the base of Lower Yosemite Fall. The pallid bat was captured only at the Yosemite Creek site (Pierson and Rainey 1993). It was also captured in 1994 in mist-net surveys in Wawona (Pierson and Rainey 1995). The pallid bat is expected in all of the project sites, with the exception of Tioga Pass.

Townsend's big-eared bat
Corynorhinus townsendii townsendii

General Distribution. In California, the Townsend's big-eared bat is found from low desert to mid-elevation montane habitats. The majority of records are from low to moderate elevations, though the Townsend's big-eared bat has been found from sea level to almost 10,000 feet in elevation. Maternity colonies have been found to more than 5,000 feet in elevation in the Sierra Nevada. The Townsend's big-eared bat is concentrated in areas with mines (particularly in the desert regions to the east and southeast of the Sierra Nevada) or caves (in the northeast portion of California and karstic regions in the Sierra Nevada and Trinity Alps) as roosting habitat (Pierson and Fellers 1998).

In 1994, mist-net bat surveys took place in Tuolumne Meadows, Pate Valley, and Wawona. The Townsend's big-eared bat was captured in Wawona (Pierson and Rainey 1995). It was also captured in Yosemite Valley in 1993 (Pierson and Rainey 1993).

Status. Numbers of Townsend's long-eared bat appear to have decreased due to habitat destruction and fragmentation, pesticides, and disturbance of maternity colonies in mines and buildings.

Reproductive Biology and Breeding Habitat. Mating takes place in winter roosts from October to February. Females form maternity colonies and support one young per year. The gestation length varies from 56 to 100 days. Young bats are capable of flight at 2.5 to 3 weeks of age (Pierson and Fellers 1998). Birth occurs from May to July. Historically, maternity colonies contained several hundred females. Males roost individually. Current research shows that colony size is now typically made up of 35 to 150 individuals (Wildlife Society 1996).

Diet and Foraging Habitat. The Townsend's big-eared bat feeds primarily on small moths. In California, the bats tend to forage near native vegetation (Wildlife Society 1996).

Habitat and Status in the Project Area. Mist-net surveys took place in Yosemite Valley in 1993 at Mirror Lake, Cook's Meadow, El Capitan Meadow, and Yosemite Creek at the base of Yosemite Falls. The Townsend's big-eared bat was captured only at Mirror Lake (Pierson and Rainey 1993). It was also captured in 1994 in mist-net surveys in Wawona in close proximity to the South Fork of the Merced River (Pierson and Rainey 1995). The Townsend's big-eared bat is expected in all of the project sites, with the exception of Tioga Pass.

The Townsend's big-eared bat is also found in a barium mine on U.S. Forest Service land in El Portal. This mine is fenced and protected from disturbance.

Spotted Bat (see Federal Species of Concern section)

Yuma myotis bat (see Federal Species of Concern section)

Greater western mastiff bat (see Federal Species of Concern section)

White-tailed hare
Lepus townsendii

General Distribution. White-tailed hares have a wide distribution over the plains and shrubby mountain areas of the northern United States and southern Canada. In California, the preferred habitats of the white-tailed hare are sagebrush, subalpine conifer, juniper, alpine dwarf-shrub, and perennial grasslands. It is also known to use wet meadows and early successional stages of various conifer types (Zeiner et al. 1990). White-tailed hares are most abundant above 8,500 feet, but may descend to lower elevations in winter, mostly on the east slope of the Sierra.

Status. Numbers of white-tailed hares in California have declined drastically in recent decades, and now the hare exists in fragmented populations. Overgrazing by livestock has been identified as a principal factor in this decline, with cultivation and other development in habitat also having negative effects (Zeiner et al. 1990). Although habitats in Yosemite are relatively intact, reported observations of white-tailed hares are rare, either due to the mainly nocturnal behavior of the species or reduction in numbers from regional effects on the species.

Reproductive Biology and Breeding Habitat. In California, white-tailed hares breed from February to July. An average of 4 to 5 young are born in a litter. In other parts of its range, 3 to 4 litters may be produced in a year, but, in California, no more than one litter may be produced. Young are born in a shallow nest on the ground, usually concealed under a bush.

Diet and Foraging Habitat. In spring through early fall, grasses and forbs form the bulk of the white-tailed hare's diet. Important habitats at this time of year are open alpine and mountain meadows, and open stands of trees with some brush and an herbaceous understory. In winter, the bark, buds, and twigs of shrubs such as sagebrush, creambush, and small trees are consumed.

Habitat Status in Project Area. Tioga Pass is the only project site that is likely to have white-tailed hares. The meadows, willow thickets, shrubby ridgetops, and open stands of lodgepole pine in this location are likely habitats.

Sierra Nevada mountain beaver (see Federal Species of Concern section)

Pacific fisher (see Federal Species of Concern section)

PARK RARE SPECIES

Plants

SUGAR STICK (ALLOTROPA VIRGATA)

General Ecology and Distribution. Sugar stick is found on dry, well-drained soils with abundant coarse woody debris and deep humus. It is found at lower elevations in closed-canopy forest stands with trees as young as 60 years, and in mature and old growth forests of Douglas-fir, white fir, and other vegetation types. It is widespread but rare throughout its range. It is a perennial saprophytic plant that requires an association with a fungus and vascular plants for establishment. During the growing season, the plant is unmistakable and conspicuous, with pink and white striped stems up to over 3 feet in height.

Habitat and Status in the Project Area. This species occurs at scattered locations throughout Yosemite Valley. Fire is thought to play an important role in its life cycle, and this species may be at risk because of many decades of successful fire suppression, as well as destruction and fragmentation of its habitat. Low-intensity underburns might be essential for its survival.

SNAPDRAGON (ANTIRRHINUM LEPTALEUM)

General Ecology and Distribution. Spurred snapdragon, an annual herb, is endemic to California and limited to the seasonally moist areas in the foothill and Sierra Nevada counties.

Habitat and Status in the Project Area. The snapdragon is restricted to small washes and shallow ditches in disturbed areas in Foresta and Wawona.

SWEETWATER MOUNTAINS MILKVETCH (ASTRAGALUS KENTROPHYTA *VAR.* DANAUS)

General Ecology and Distribution. This perennial herb in the pea family is endemic to California and is restricted to the subalpine and alpine areas of the park, in rocky soils and fell-fields.

Habitat and Status in the Project Area. The milkvetch occurs on alpine summits above Tioga Pass on metamorphic bedrock substrates.

Black and white sedge (Carex albonigra)

General Ecology and Distribution. This perennial herb in the sedge family occurs in meadow, marsh, and seep spring areas and slopes in rocky soils within alpine fell-fields. It is a strictly an alpine species and is restricted to the southern Sierra Nevada in California, although it occurs in other mountainous areas of North America.

Habitat and Status in the Project Area. It is locally rare and occurs in the vicinity of Tioga Pass in perennially moist sites.

Capitate sedge (Carex capitata)

General Ecology and Distribution. This perennial herb is in the sedge family and is found throughout the Sierra Nevada as well as other high-elevation sites in North America. It occurs in meadow and perennially moist areas in subalpine and alpine forests and fell-fields, in rocky to loamy soils.

Habitat and Status in the Project Area. This herb is restricted to the Sierra Nevada and is strictly an alpine species in Yosemite.

Congdon's sedge (Carex congdonii)

General Ecology and Distribution. This perennial herb in the sedge family is restricted to subalpine and alpine talus slopes and fell-fields and is endemic to California.

Habitat and Status in the Project Area. It is found at high elevations in metamorphic and granitic talus slopes.

Indian paintbrush (Castilleja foliolosa)

General Ecology and Distribution. This perennial herb is found primarily in California in low-elevation foothill woodlands, grasslands, and chaparral regions. The species has reddish bracts covered with a dense mat of fine hairs.

Habitat and Status in the Project Area. It is found on dry, rocky, open slopes on the edge of chaparral areas in the El Portal area, and habitat exists throughout the Merced River gorge and El Portal area.

Alpine cerastium (Cerastium beeringianum)

General Ecology and Distribution. This perennial herb in the pink family is native to California and isolated to subalpine and alpine areas. It commonly occurs adjacent to perennial or nearly perennial snow banks where moisture is consistently available.

Habitat and Status in the Project Area. This herb is found near snow banks on granitic and metamorphic slopes above Tioga Pass.

Small's southern clarkia (Clarkia australis)

General Ecology and Distribution. This annual herb is endemic to California and restricted to Madera, Mariposa, and Tuolumne Counties. It is found in foothill woodlands and lower montane forests.

Habitat and Status in the Project Area. This herb is found in Foresta in open areas.

Sierra claytonia (Claytonia nevadensis)

General Ecology and Distribution. This perennial herb is endemic to California and limited to alpine fell-fields in perennially moist areas in granitic and metamorphic substrates. In Yosemite, it remains from pre-glacial periods in small, isolated populations.

Habitat and Status in the Project Area. This herb is found along small streams flowing from higher peaks above Tioga Pass.

Child's blue-eyed Mary (Collinsia childii)

General Ecology and Distribution. This annual herb is endemic to California and limited to the central and southern Sierra Nevada, reaching the northern extent of its range in southern Mariposa County. It occurs on shaded slopes and in open California black oak and mixed coniferous woodlands.

Habitat and Status in the Project Area. This species occurs in Wawona; habitat exists throughout the basin on shaded slopes.

Collinsia (Collinsia linearis)

General Ecology and Distribution. This annual herb in the snapdragon family is primarily limited to California, with some extensions into adjacent states. It is found in lower- to mid-elevation coniferous forests on rock outcrops and dry slopes. It reaches the southern extent of its range in Mariposa County.

Habitat and Status in the Project Area. Habitat for this species occurs throughout the Merced River gorge and in the El Portal area, where it is restricted to dry, metamorphic rock outcrops along the metamorphic-granitic contact zone.

Draba (Draba praealta)

General Ecology and Distribution. Draba is a perennial herb in the mustard family and is confined to western North America in alpine wetland environments. Its westernmost populations are found along the crest of the Sierra Nevada in Inyo and Mono Counties, residing in localized perennially wet seeps.

Habitat and Status in the Project Area. This herb occurs on the slopes of Mt. Dana above Tioga Pass in small, isolated populations.

Round-leafed sundew (Drosera rotundifolia)

General Ecology and Distribution. This species, an insectivorous perennial herb, is found throughout North America, but it is limited to sphagnum bogs and acidic wetlands, which is an unusual habitat in the Sierra Nevada in the lower to upper montane coniferous forests.

Habitat and Status in the Project Area. Habitat for this species exists in isolated areas in Wawona and Yosemite Valley.

Stream orchid (Epipactis gigantea)

General Ecology and Distribution. This species, a perennial herb in the orchid family, is widely distributed throughout California and North America. In Yosemite, it is restricted to moist granitic ledges and planted in landscaped areas.

Habitat and Status in the Project Area. This species occurs in Yosemite Valley within a number of landscaped areas. Former populations above Happy Isles were obliterated by the rockfall in 1996. Natural habitat for this species exists throughout the Valley in perennially moist, shaded areas.

Desert fleabane (Erigeron linearis)

General Ecology and Distribution. This is a perennial herb in the aster family, native to California and confined to western North America. It reaches the southwestern extent of its range on the Sierra Nevada crest in the vicinity of Mt. Dana in rocky soils on slopes.

Habitat and Status in the Project Area. This species occurs at the granitic-metamorphic contact zone on the slopes of Mt. Dana.

Rambling fleabane (Erigeron vagus)

General Ecology and Distribution. This perennial herb in the aster family is confined to western North America. It reaches the northern extent of its range on the Sierra Nevada crest in Tuolumne County. It occurs exclusively in rocky soils throughout alpine fell-fields.

Habitat and Status in the Project Area. Occurs in isolated populations on the slopes of Mt. Dana and on adjacent alpine peaks surrounding Tioga Pass.

Fawn-lily (Erythronium purpurascens)

General Ecology and Distribution. This perennial herb is endemic to California and the Sierra Nevada. It grows along shaded streams and river corridors in montane coniferous forests.

Habitat and Status in the Project Area. This species is known from riparian corridors in the eastern end of Yosemite Valley. It was collected in the past for its showy flowers.

Northern bedstraw (Galium boreale *ssp.* septentrionale)

General Ecology and Distribution. This species, a perennial herb in the bedstraw family, is found in moist areas within montane coniferous forests. It has a disjunct population in Mariposa

County, within Yosemite Valley meadows. The remainder of its range is in northern California and the Pacific Northwest.

Habitat and Status in the Project Area. In Yosemite, this species is known from a number of wet meadows in Yosemite Valley, and wet portions of drier meadows and oxbows.

Dane's dwarf gentian (Gentianella tenella *ssp.* tenella)

General Ecology and Distribution. This annual herb in the gentian family is found in subalpine forests and alpine fell-fields, meadows, and seeps throughout North America. In Yosemite, relict populations left intact from Pleistocene glaciation are found on the slopes of the Sierra Nevada crest.

Habitat and Status in the Project Area. It is found in alpine fell-fields at high elevations on the slopes of Mt. Dana and other peaks surrounding Tioga Pass.

Goldenaster (Heterotheca sessiliflora *ssp.* echioides)

General Ecology and Distribution. This perennial herb in the aster family is limited to grasslands and open California black oak woodlands throughout the southern portions of California. It reaches the northernmost extent of its range in Tuolumne County.

Habitat and Status in the Project Area. Small, isolated populations of this species occur in the Foresta area. New populations have recently been discovered that are likely a result of the 1990 A-Rock Fire, which opened the forest canopy and removed unnaturally deep layers of litter and duff in the basin.

Yosemite ivesia (Ivesia unguiculata)

General Ecology and Distribution. This perennial herb in the rose family is endemic to California and limited to the southern Sierra Nevada. It occurs in meadow habitats within upper montane forests and reaches the northern extent of its limited range in Mariposa County.

Habitat and Status in the Project Area. This herb occurs in meadow and wet areas east of Badger Pass.

Common juniper (Juniperus communis)

General Ecology and Distribution. This coniferous shrub in the cypress family is found throughout North America. In Yosemite, it is limited in distribution to montane and subalpine sites, where it grows on open, rocky, dry slopes.

Habitat and Status in the Project Area. This shrub grows in isolated patches at Tioga Pass and lodgepole pine forest to the west of the Tioga Road.

Pitcher sage (Lepechinia calycina)

General Ecology and Distribution. Pitcher sage, a shrub in the mint family, is endemic to California and is found on rocky slopes within foothill and lowland chaparral and canyon live oak woodlands.

Habitat and Status in the Project Area. Habitat for this species occurs throughout the Merced River gorge and El Portal.

Sierra laurel (Leucothoe davisiae)

General Ecology and Distribution. This shrub, a perennial in the heath family, is found slightly beyond California's boundaries and is restricted to wetland, bog, and moist habitats.

Habitat and Status in the Project Area. In Yosemite, sierra laurel grows adjacent to iron-rich springs and seeps in isolated locations along the Merced River and Tenaya Creek in Yosemite Valley.

False pimpernel (Lindernia dubia *var.* anagallidea)

General Ecology and Distribution. This annual herb in the snapdragon family is found in freshwater wetlands and meadows at low to mid elevations in California and North America.

Habitat and Status in the Project Area. False pimpernel is found in meadow soils throughout Yosemite Valley that remain moist for the duration of the plant's seasonal life span.

Congdon's monkeyflower (Mimulus congdonii)

General Ecology and Distribution. This annual herb in the snapdragon family is endemic to California. It reaches the northern extent of its range in the Sierra Nevada in Yosemite and is found in granitic soils in disturbed areas, seeps, and runoff areas on slopes.

Habitat and Status in the Project Area. Habitat for this species occurs in portions of the Merced River gorge and at El Portal.

Inconspicuous monkeyflower (Mimulus inconspicuus)

General Ecology and Distribution. This annual herb in the snapdragon family is endemic to California. It is restricted to wetlands and seasonally moist sites in lower montane forests and foothill woodlands in partial shade.

Habitat and Status in the Project Area. Isolated populations of this species occur throughout Foresta where small hillside streams and seeps provide suitable habitat.

Palmer's monkeyflower (Mimulus palmeri)

General Ecology and Distribution. This monkeyflower, an annual herb in the snapdragon family, is endemic to California and Baja California. It reaches the northern extent of its range in

Yosemite. It is restricted to damp, shaded slopes under canyon live oaks in foothill, chaparral, and lower montane forests.

Habitat and Status in the Project Area. Habitat for this species occurs in portions of the Merced River gorge and at El Portal.

Pansy monkeyflower (Mimulus pulchellus)

General Ecology and Distribution. This annual herb in the snapdragon family is endemic to California and limited to Mariposa, Tuolumne, and Calaveras Counties. It is restricted to wetlands and seasonally moist sites and reaches the southern extent of its range in Foresta.

Habitat and Status in the Project Area. It is found in small, isolated, vernally moist, open, gravelly places throughout the Foresta basin.

Dwarf sandwort (Minuartia pulchellus)

General Ecology and Distribution. This annual herb is confined to western North America. It reaches the southern extent of its range in the Sierra Nevada in Mariposa County and occurs in open montane coniferous forests.

Habitat and Status in the Project Area. This herb is found on dry slopes and forest openings east of Badger Pass.

Sierra sweet-bay (Myrica hartwegii)

General Ecology and Distribution. This perennial shrub in the wax-myrtle family is endemic to California. It is limited in occurrence to streambanks and riparian communities at low to moderate elevations in the Sierra Nevada, where it forms small thickets along the river.

Habitat and Status in the Project Area. It has a patchy distribution along the South Fork of the Merced River through Wawona as well as along tributaries to the South Fork and Big Creek near the South Entrance Station.

Azure penstemon (Penstemon azureus *ssp.* angustissimus)

General Ecology and Distribution. This perennial herb in the snapdragon family is endemic to California and is near its southern extent in Yosemite. It is generally found in moist woodlands and open forests at lower to moderate elevations in the Sierra Nevada.

Habitat and Status in the Project Area. This herb is found in scattered locations in Yosemite Valley. It was first described from collections taken in Yosemite Valley, although that original population appears to have disappeared.

Phacelia (Phacelia platyloba)

General Ecology and Distribution. Broad-leaved phacelia is an annual herb endemic to California. It is restricted to Mariposa, Madera, and eastern Fresno Counties and is found in gravelly or rocky soils in chaparral and canyon live oak woodlands.

Habitat and Status in the Project Area. Habitat for this species occurs throughout the Merced River gorge and at El Portal.

PHACELIA (PHACELIA TANACETIFOLIA)

General Ecology and Distribution. This annual herb in the waterleaf family is found throughout California and is confined to western North America. It grows in seasonally moist, sandy and gravelly open areas.

Habitat and Status in the Project Area. This species occurs at scattered locations throughout Yosemite Valley, where it blooms and sets seed early each spring.

SNOW WILLOW (SALIX RETICULATA)

General Ecology and Distribution. This low-growing willow shrub is confined to western North America in subalpine and alpine habitats. It reaches the westernmost extent of its range in relict populations along the crest of the Sierra Nevada in Yosemite.

Habitat and Status in the Project Area. This scrub is found in wet areas and seeps within alpine fell-fields on the slopes of Mt. Dana and adjacent peaks surrounding Tioga Pass.

WOOD SAXIFRAGE (SAXIFRAGA MERTENSIANA)

General Ecology and Distribution. This perennial herb in the saxifrage family is endemic to California and limited to the northern and central Sierra Nevada. It reaches its southern extent in Mariposa County, where it grows on mossy rocks and moist cliffs in lower to montane coniferous forests.

Habitat and Status in the Project Area. This species occurs at scattered locations in moist, shaded sites throughout Yosemite Valley.

BOLANDER'S SKULLCAP (SCUTELLARIA BOLANDERI)

General Ecology and Distribution. This perennial herb in the mint family is endemic to California. It is primarily found in lower montane forests in the Sierra Nevada, where it occurs in gravelly soils along streambanks and in California black oak woodlands and ponderosa pine forests.

Habitat and Status in the Project Area. This species is known from isolated populations scattered throughout the Wawona basin.

GROUNDSEL (SENECIO SERRA *VAR.* SERRA)

General Ecology and Distribution. This perennial herb in the aster family is confined to western North America in montane to subalpine coniferous forests.

Habitat and Status in the Project Area. It is restricted to open coniferous forests or sagebrush scrub on the lower slopes of Mt. Dana and the slopes west of Tioga Pass.

GIANT SEQUOIA (SEQUOIADENDRON GIGANTEUM)

General Ecology and Distribution. Giant sequoias are endemic to California and grow in 70 discrete groves in the central and southern Sierra Nevada within the montane forest belt. In Yosemite National Park, sequoias grow naturally in the Merced, Tuolumne, and Mariposa Groves.

Habitat and Status in the Project Area. Individual sequoia trees have been planted in Yosemite Valley and Wawona in landscaped and natural areas, both historically and in recent times.

LADIES' TRESSES (SPIRANTHES PORRIFOLIA)

General Ecology and Distribution. This perennial herb in the orchid family is found throughout western North America. It grows in wet meadows and bogs at low to mid elevations.

Habitat and Status in the Project Area. This species occurs at scattered locations throughout Yosemite Valley where deep, loamy soils and moist conditions prevail.

TRILLIUM (TRILLIUM ANGUSTIPETALUM)

General Ecology and Distribution. This perennial herb in the lily family is almost entirely restricted to California. It is most common in the coastal ranges of the state, but occurs in limited, small populations in the Sierra Nevada where it is found in shady areas within mature montane coniferous forests with well-developed duff and litter layers. This species may be at risk due to the lack of natural fire patterns, which allows an unnatural buildup of duff and litter to the exclusion of the plant, as well as overly intense fire behavior resulting in loss of root and plant materials through overheating.

Habitat and Status in the Project Area. This species is scattered over a 10-acre area along the south side of the South Fork of the Merced River in Wawona, near the eastern end of River Road.

HALL'S WYETHIA (WYETHIA ELATA)

General Ecology and Distribution. This species, a perennial herb in the aster family, is endemic to California. It is restricted to the southern Sierra Nevada foothills and lower montane forests and reaches the northern extent of its range in Yosemite.

Habitat and Status in the Project Area. It is found in open woodlands and forests in the Wawona basin.

CHAPTER V. ENVIRONMENTAL EFFECTS

Methods Used to Assess Effects

ASSUMPTIONS

The following assumptions were used as a basis in the analysis of effects on special-status species:

- The greater the size of a biotic community and the stronger its links to neighboring communities, the more valuable it is to the integrity and maintenance of biotic processes that sustain special-status species. Development limits the size of a community and fragments and disassociates communities from each other.
- The more developed areas become, the less valuable they are as habitat for special-status species. New development would increase human presence and increase the potential for soil, wildlife, and vegetation disturbance. The potential for negative wildlife interactions (such as human injury from wildlife and the introduction of unnatural food sources) also would increase. If development were removed from an area, the value of the habitat for special-status species would increase. In some cases, the dispersal of visitors over a wider area that may follow removal of developed facilities may well have a greater impact than focused visitor use within the well-defined area of development. Human effects can also improve habitat quality for non-native species and unnaturally increase the abundance of some native species, both of which can have an adverse effect on special-status species.
- The presence of humans and the effects of human food on the behavior, distribution, and abundance of wildlife species would continue in existing developments.
- Roads can change water inflow and outflow patterns and may dewater sections of meadow or wetland habitat (USFS 1996). Roads can also cause mortality of wildlife and may form barriers and fragment wildlife habitat.
- Development and effects in riparian zones may influence critical water quality elements such as temperature, suspended sediments, and nutrients. These elements interact in complex ways in aquatic systems and directly and indirectly influence patterns of growth, reproduction, and migration of aquatic organisms.
- Development that has an adverse effect on habitat features that are important to certain special-status species (e.g., particular plant species upon which a species relies, or habitat features that define suitable habitat for a species) can have an acute, negative effect on those species.
- Radiating effects of human use can affect use of habitats adjacent to developed areas by special-status species, even though such habitats are not directly affected by the development.
- Implementation of threatened or endangered species recovery plans and other formal agreements between the U.S. Fish and Wildlife Service and the National Park Service would not be affected by the management direction resulting from the *Final Yosemite*

Valley Plan/SEIS. The current management direction for special-status species would continue to remain in effect.

Special-Status Plants

The assessment of effects on special-status plants was based on the following:

- The sensitivity of the individual species to effects (based on the rarity, resilience, size of population, and extent of the species throughout the park)
- The location of the species in relation to the Preferred Alternative

Special-Status Wildlife

The assessment of effects on special-status wildlife was based on the following:

- The possibility of a species or its preferred habitat occurring in those areas expected to be affected
- The direct loss of habitat
- The partial loss of habitat from its modification
- The species' sensitivity to disturbance from human activities that may alter use of habitats in areas adjacent to development

Habitat fragmentation was also a critical component of the analysis. Restored blocks of habitat should be large enough to support viable populations, and intact habitat must not be reduced or affected to the point that it will no longer support viable populations.

Impact Analysis

Actions proposed in the *Final Yosemite Valley Plan/SEIS* were evaluated in terms of the context, intensity, and duration of the effects, as defined below, and whether the effects were considered to be beneficial or adverse to the natural environment. Generally, the methodology for natural resource impact assessment follows direction provided in the *Council of Environmental Quality Regulations for Implementing the National Environmental Policy Act*, Section 1508.27.

Context. Certain effects of actions under the Preferred Alternative are dependent upon the setting in which they occur. For instance, actions that could reduce connectivity between habitat types could be minor if such connections are abundant in a given region; they would be moderate or major if they are not. The context of the impact determines whether the impact would be local or regional.

Intensity. The intensity and magnitude of effects are described as negligible, minor, moderate, or major. These designations are used to describe both beneficial and adverse effects. Both short- and long-term effects are relevant to the analysis.

- Negligible effects are imperceptible or not detectable.

- Minor effects are those that are slightly detectable, localized within a relatively small area, and would not effect the overall viability of the species. Without further effects, negative effects would be reversed and the species would recover.
- Moderate effects are those that are sufficient to cause a change in species in terms of abundance, distribution, or habitat quality or quantity, but the change would remain localized. Moderate effects are readily apparent and have the potential to become major effects.
- Major effects are substantial, highly noticeable, and can be permanent.

Impact Duration. The expected duration of effects is described as long term or short term.

- Short-term effects would occur over a period of less than 20 years.
- Long-term effects would occur over a period of 20 years or longer.

CUMULATIVE ANALYSIS

The cumulative analysis in this Biological Assessment is based on the cumulative projects identified in Appendix H of the *Final Yosemite Valley Plan/SEIS.* These projects were included in the cumulative analysis process based on observations of natural boundaries, the recognition of potential ecological relationships to Yosemite National Park, and with a general understanding of the common issues to be addressed in the impact analysis.

Federal Endangered Species

WILDLIFE

Sierra Nevada bighorn sheep (Ovis canadensis sierrae)

Direct and Indirect Effects

There would be no direct effects on the Sierra Nevada bighorn sheep or its preferred habitat.

Habitat for the Sierra Nevada bighorn sheep in the Tioga Pass area is located in steep terrain that is relatively inaccessible to casual visitors. Though there would be increased visitor use at Tioga Pass, it is not likely that visitors would often traverse areas used by the Sierra Nevada bighorn sheep. Therefore, there would be negligible effects on the Sierra Nevada bighorn sheep.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, and the Fire Management Plan Update (NPS) could provide benefits to the size, integrity, and connectivity of suitable habitat for the Sierra Nevada bighorn sheep. These regional plans would have a long-term, moderate, beneficial effect on the Sierra Nevada bighorn sheep.

Federal Threatened Species

Bald eagle (Haliaeetus leucocephalus)

Direct and Indirect Effects

Bald eagles are rarely seen within Yosemite and are not known to nest in the park. However, riparian and meadow areas of Yosemite Valley, Foresta, El Portal, and Wawona may provide foraging habitat for transient eagles. Actions proposed in this plan, such as restoration of at least 135 acres of meadow and riparian habitat and implementation of the River Protection Overlay, would have a moderate, beneficial impact on potential foraging habitat for the bald eagle. Upland habitats are not the primary habitats used by the bald eagle, and the size of the proposed new developments in Yosemite Valley, El Portal, Wawona, and Foresta are relatively small in relation to the range of the bald eagle. Therefore, development and fragmentation in upland habitats would have negligible effects on this species. There would be a relatively large amount of restoration of meadow and riparian habitat in relation to development in upland habitats; therefore, the Preferred Alternative would have an overall long-term, minor, beneficial effect on the bald eagle.

Cumulative Effects

Projects associated with the Merced River, such as the Yosemite View Parcel Land Exchange (NPS) could adversely affect habitat that is used by transient bald eagles. The River Protection Overlay prescribed in the Merced Wild and Scenic River Comprehensive Management Plan (NPS) has the potential to benefit eagles by preserving and restoring riparian and meadow habitat.

The overall cumulative effects on the bald eagle would be minor and beneficial because the River Protection Overlay prescribed in the *Merced Wild and Scenic River Comprenhensive Management Plan/FEIS* would benefit transient eagles.

California red-legged frog (Rana aurora draytonii)

Direct and Indirect Effects

This species is not found in the project area, but likely occurred there at one time. Its absence from suitable habitat in the project area is thought to be a result of habitat loss and change, acid precipitation, chemical pollution, introduced fish and other species, drought, and a combination of factors (Drost and Fellers 1996).

The Preferred Alternative would restore a large tract of previously disturbed meadow and riparian habitat in the east end of Yosemite Valley, totaling at least 135 acres. Fellers (1999) states that Yosemite Valley is one of two places in the park where it might be possible to re-establish the California red-legged frog provided the non-native bullfrog population is removed. Construction of the Yosemite Village Visitor/Transit Center could directly impact riparian habitat. Overall, there would be a moderate gain in the size of suitable habitat for the California red-legged frog.

The Preferred Alternative would also establish the River Protection Overlay, which would offer increased protection to areas adjacent to the Merced River in Yosemite Valley, El Portal, and Wawona. The Preferred Alternative would maintain and restore:

- Riparian microhabitats and microclimates
- Riparian and aquatic vegetation
- Reduced sediment input levels during breeding season
- Surface and subsurface hydrologic processes
- The structural integrity of stream breeding habitats
- The connectivity of riparian habitats

The Preferred Alternative would also support the recruitment of large, woody debris into riparian areas and allow a shifting mosaic of habitats. These actions would have a moderate, beneficial impact on suitable habitat for the species. Development in areas outside of Yosemite Valley where California red-legged frogs could be present (El Portal, Wawona, and Foresta) would have a negligible effect on the species, because such development would occur in upland areas and have no effect on suitable habitat.

There would be a minor to moderate, beneficial effect on the species, due to the large area of suitable habitat that would be restored in relation to the suitable habitat that would be removed. Although California red-legged frogs are no longer present in these areas, preservation of suitable habitat would allow future reintroduction or recolonization of the species.

Cumulative Effects

Projects in the vicinity of Yosemite National Park are unlikely to affect any known existing populations of red-legged frogs. Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could provide benefits to the size, integrity, and connectivity of suitable habitat for the California red-legged frog. Overall, these actions have the potential to have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time. Foreseeable projects that could have adverse effects on suitable habitat for the California red-legged frog include the Rio Mesa Area Plan (Madera Co.); University of California, Merced Campus (Merced Co.), and the City of Merced General Plan. Environmental compliance carried out in association with these projects would result in further surveys to evaluate whether unknown populations of red-legged frogs could be affected.

Overall, cumulative impacts would be minor to moderate and beneficial, based on potential protection of red-legged frog habitat through implementation of plans that cover wide areas. Although this species is nearly extinct in the Sierra Nevada, habitat would be protected for potential reintroduction or recolonization of the species. Projects with a possible negative impact on red-legged frogs would affect a relatively small area of habitat compared to projects with potential beneficial effects. These projects could have a major, negative impact if they affected an

unknown population of red-legged frogs, which could be among the last in the Sierra Nevada. However, site surveys would be completed in compliance with state and federal regulations to ensure that all populations are known and avoided.

Valley elderberry longhorn beetle (Desmocerus californicus dimorphus)

Direct and Indirect Effects

Potential Valley elderberry longhorn beetle habitat is defined by the presence or absence of elderberry plants in areas below 3,000 feet in elevation. El Portal is the only part of the project area where potential habitat has been identified. About 124 elderberry plants of a size sufficient to support the Valley elderberry longhorn beetle occur in areas of existing or potential development in El Portal. These plants could be adversely affected by activities such as grading, removal of trailers and infrastructure, and construction of new buildings as proposed in the *Final Yosemite Valley Plan/SEIS*. However, planning and implementation would strive to avoid or mitigate such effects. Valley elderberry longhorn beetle exit holes which verify beetle activity were found in 11 elderberry plants, though beetle larvae could still be present in elderberry plants without exit holes. Plants retained in developed areas could be subject to future damage from human activities, such as unauthorized pruning and vehicles. Clearance for fire protection around newly developed sites would be accomplished through a combination of selected clearing, perimeter firebreaks (that may overlap with roads), and clearing around individual structures. Clearing would not be necessary beyond the construction boundaries identified in the plan, and therefore would not remove more elderberry plants.

There is an abundance of host plants for the Valley elderberry longhorn beetle in areas that surround proposed development sites in El Portal. Should any of the 124 elderberry plants need to be removed, there would be a minor to moderate, adverse effect on the beetle because of the abundance and wide distribution of elderberry plants outside of development zones. The National Park Service will work with the USFWS to develop mitigation procedures to avoid, minimize, or mitigate effects on the Valley elderberry longhorn beetle. The results of consultation with the USFWS will be incorporated into the *Final Yosemite Valley Plan/SEIS* and planning process.

Cumulative Effects

Foreseeable projects that could have adverse effects on the Valley elderberry longhorn beetle and its habitat include the Yosemite View Parcel Land Exchange (NPS), Yosemite Motels expansion (Mariposa Co.), Mariposa Creek Pedestrian/Bike Path (Mariposa Co.), Univerisity of California, Merced campus (Merced Co.), the City of Merced General Plan, and the Merced River Canyon Trail Acquisition (BLM). These projects would have the potential to damage or destroy elderberry plants and directly affect local Valley elderberry longhorn beetle populations.

Long-term, beneficial effects would be expected from the Sierra Nevada Framework for Conservation and Collaboration (USFS) and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) because these planning efforts could lead to greater protection of elderberry plants. Overall, cumulative effects would be minor and beneficial because of potential

protection of Valley elderberry longhorn beetle and its habitat through these wide-reaching regional plans. Actions with adverse impacts would potentially affect relatively small numbers of Valley elderberry longhorn beetle and small areas of habitat compared with the regional plans that would protect the beetle.

Federal Species of Concern

WILDLIFE

Harlequin duck (Histrionicus histrionicus)

Direct and Indirect Effects

Harlequin ducks breed along large, swift-moving mountain rivers, but are very rarely seen in Yosemite National Park. A pair was seen twice on the Merced River in Yosemite Valley in April 2000. Before these sightings, the most recent record of harlequin ducks in the park was 1980. Records show that harlequin ducks nested in Yosemite Valley at one time and were also present on the Merced River in Wawona and El Portal.

The Preferred Alternative would establish the River Protection Overlay and restore or protect about 100 acres of suitable riparian and aquatic habitat for the harlequin duck in areas adjacent to the Merced River. This would provide a minor benefit with respect to habitat for the harlequin duck.

Construction of the Yosemite Village Visitor/Transit Center could remove habitat suitable for harlequin ducks, which would be a minor effect because of the small size of the areas affected and the existing level of disturbance in these areas. Development in Wawona would not affect river or riparian habitats and therefore would have a negligible effect on harlequin ducks. Overall, there would be a minor, beneficial effect on the harlequin duck, because the amount of riparian habitat lost would be minor in comparison with riparian habitat that would be protected and restored along the Merced River.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could provide benefits to the size, integrity, and connectivity of suitable habitat for the harlequin duck. The *Final Yosemite Valley Plan/SEIS* would restore or protect about 100 acres of suitable riparian and aquatic habitat. These actions could to have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time.

A foreseeable project that could have adverse effects on suitable habitat for the harlequin duck is the Yosemite View Parcel Land Exchange (NPS). There are no known populations of harlequin duck in this area. Cumulative projects are thus unlikely to affect any existing population of the

harlequin ducks. Overall, there would be a minor beneficial impact on the harlequin duck, based on the potential protection of suitable habitat offered by wide-reaching regional plans.

Northern goshawk (Accipiter gentilis)

Direct and Indirect Effects

The northern goshawk is typically found between 5,000 and 9,000 feet in elevation in dense coniferous forests broken by meadows and other openings. Possible development of a parking/transit center and access road at Hazel Green would directly displace an area of forested habitat, possibly affecting the local population of northern goshawks. However, the area is small and surrounded by large areas of suitable goshawk habitat, and a portion has already been affected by previous operations.

New development that is proposed at the Big Oak Flat Entrance Station, the South Entrance Station, and Tioga Pass would cause negligible effects due to the small size of the proposed development. Increased use of Badger Pass in the summer could cause a minor, adverse impact to local goshawks from increased human disturbance in the area. Goshawks are usually seen in Yosemite Valley between November and February, but such observations are rare, and no breeding has been recorded in this area. As such, proposed new development in Yosemite Valley would have a negligible effect on the park's population of goshawks. Overall, there would be a long-term, minor, adverse impact on the northern goshawk due to the possible development in partially undisturbed upland habitat at Hazel Green.

Cumulative Effects

Projects likely to have a beneficial effect on northern goshawk habitat include the Fire Management Plan Update (NPS) and the Sierra Nevada Framework for Conservation and Collaboration (USFS). Projects that could have an adverse effect on northern goshawk habitat include the Hazel Green Ranch project (guest rooms, food services, University of California research station) and the Evergreen Lodge Expansion (Tuolumne Co.). Overall, there would be a long-term, moderate, beneficial cumulative impact on the northern goshawk, primarily from the potential protection of wide areas of habitat through implementation of regional land management plans, compared to adverse effects on small, localized areas of habitat from individual projects.

California spotted owl (Strix occidentalis)

Direct and Indirect Effects

California spotted owl habitat ranges from oak and ponderosa pine forests to lower-elevation red fir forests up to 7,600 feet. Known or occupied habitat for the California spotted owl in Yosemite National Park totals approximately 142,400 acres (van Wagtendonk 2000). Forested areas with greater the 70% canopy closure are potential spotted owl nesting and roosting areas, while areas with greater than 40% closure are potential foraging areas.

The following actions would have beneficial effects on spotted owls:

- The removal of motor vehicle traffic from Northside Drive between Yosemite Lodge and El Capitan
- The removal of cabins at the Terrace in Curry Village

The following actions would have adverse effects on spotted owls:

- Construction of employee housing in El Portal at Hillside East and West and parking in El Portal
- Construction of a transit center and parking at Hazel Green
- New construction at the Big Oak Flat Entrance Station and South Entrance
- Rerouting of roads from meadows into upland habitats
- Development of housing in Wawona

There would be losses and gains in the quantity and quality of spotted owl habitat in Yosemite National Park. The removal of motorized traffic from Northside Drive is expected to have the most far-reaching beneficial effects, because disturbance from vehicles most likely extends far beyond the dimensions of the road. Recent surveys indicate that no developments under the *Final Yosemite Valley Plan/SEIS* would directly affect spotted owl nesting or roosting areas, but could affect some foraging habitat at South Entrance, Badger Pass, Yosemite Valley, Hazel Green, and Big Oak Flat Entrance. Overall, the actions listed above would have a negligible to minor, beneficial effect on California spotted owls; the area of potential habitat benefit in Yosemite Valley is large, but the beneficial impact would be offset by individual, localized, minor, adverse effects on foraging habitat from various new developments in the park.

Cumulative Effects

Declines of the California spotted owl in the Sierra Nevada have been linked to degradation of its forest habitats from logging, which affects the size of forested tracts as well as tree density and age. Projects likely to have a beneficial effect on spotted owl habitat, through long-term habitat improvements, include the Fire Management Plan Update (NPS), Sierra Nevada Framework for Conservation and Collaboration (USFS), Orange Crush Fuels Treatment Projects (USFS, Stanislaus), A-Rock Reforestation (USFS, Stanislaus), Rogge-Ackerson Fire Reforestation (Tuolumne Co.), and the Fire Management Action Plan for Wilderness (USFS, Stanislaus). Projects with potentially adverse effects include the Hazel Green Ranch project (guest rooms, food services, University of California research station) and Evergreen Lodge Expansion (Tuolumne).

Overall, the cumulative impacts on this species would be moderate and beneficial due primarily to regional plans that would either protect large areas of owl habitat or hasten a return of forested habitat that is more suitable for spotted owls. Projects with negative impacts would affect relatively small areas of local California spotted owl habitat, but would not have far-reaching impacts.

Mount Lyell shrew (Sorex lyelli)

Direct and Indirect Effects

The Mount Lyell shrew is found only in California, in a few locations in the vicinity of Mt. Lyell within or near the park (Ingles 1965). Only five individuals have been reported, all prior to 1924.

Any future parking facilities at Tioga Pass could have an adverse effect on habitat for the Mount Lyell shrew. The extent of habitat loss at this time is uncertain. Additional evaluation and compliance would be required to address potential effects on the Mount Lyell shrew.

Increased human use at Tioga Pass could increase foot traffic in meadows and vehicle-polluted runoff from paved areas. Under the Preferred Alternative, human use would be restricted from meadow areas, and parking area runoff would be collected for treatment. This would result in negligible, adverse effects on the Mount Lyell shrew from increased human use.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could provide benefits to the size, integrity, and connectivity of suitable habitat for the Mount Lyell shrew. These regional plans would have a long-term, minor, beneficial effect on suitable habitat for the Mount Lyell shrew.

Spotted bat (Euderma maculatum)

Direct and Indirect Effects

This species forages in a wide variety of suitable habitats in the park, such as Yosemite Valley, where there are rock crevices in high cliffs and canyons, areas of standing water, and healthy populations of moths and other flying insects. Crevices in rockfaces are used for roosting and reproduction.

The Preferred Alternative would restore a large tract of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. This would improve foraging habitat for spotted bats over a wide area of Yosemite Valley, where the species has been found in relatively high density.

New construction would take place in spotted bat foraging habitat at the Yosemite Village Visitor/Transit Center, the traffic check station near El Capitan crossover, new stables in Foresta, and campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and along Tenaya Creek. Potential foraging habitat could also be directly affected by construction of a transit and parking facility at Hazel Green. Alternatively, if parking is developed in Foresta, foraging habitat of spotted bats in this location could be affected, causing minor adverse effects.

Development of housing and parking in El Portal and housing in Wawona could result in a loss of spotted bat foraging habitat. Minor expansion of facilities at Big Oak Flat Entrance, South

Entrance, and Tioga Pass could cause disturbance of small areas of potential habitat adjacent to existing development. Because use of Badger Pass for parking would not result in additional habitat disturbance, this action would have a negligible effect. These effects, in total, would be minor and adverse because of the limited area of impact, the existing human disturbance in the area, and the large area of suitable, unaffected habitat that would continue to exist in surrounding areas.

The Preferred Alternative would not impact rockface habitat in the park. Therefore, roosting and breeding habitat would not be affected.

Data collected in 1993 (Pierson and Rainey) suggest that the spotted bat forages primarily in meadow and wetland habitats. There would be localized, minor, direct, adverse effects on bat foraging habitat from new development in upland habitats, which is less favored by spotted bats. Overall, the Preferred Alternative would have a moderate, beneficial impact on the spotted bat, because a large tract of meadow and riparian habitat would be restored in relation to upland habitat that would be removed.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green Ranch project (guest rooms, food services, University of California research station), Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could provide benefits to the size, integrity, and connectivity of suitable habitat for the spotted bat. These actions could have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time.

Projects that could have adverse effects on suitable habitat for the spotted bat include the Yosemite View Parcel Land Exchange (NPS), El Portal Road Improvement Project (NPS), Yosemite Motels Expansion (Mariposa Co.), and Evergreen Lodge Expansion (Tuolumne Co.), which would be expected to have a minor, adverse effect on spotted bats, based upon their limited areas of effect. In total, there would be a moderate, beneficial impact on the spotted bat, due primarily to the protection of suitable habitat that could occur under wide-reaching regional plans. The projects with a possible adverse impact on the spotted bat would affect a relatively small area of habitat compared to projects with potential beneficial impacts.

Small-footed myotis bat (Myotis ciliolabrum)

Direct and Indirect Effects

The small-footed myotis bat is primarily found in wooded and brushy habitats up to about 8,800 feet in elevation near water.

The Preferred Alternative would restore a large tract of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160

acres. This would improve foraging habitat for the small-footed myotis bat, although this species also forages in forest habitats.

Actions that could have an adverse effect on forest habitat include new campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and north of Tenaya Creek, as would construction of employee housing near Huff House at Curry Village. The widening of Southside Drive and a parallel pedestrian/bicycle path and the establishment of a traffic check station at El Capitan crossover could result in removal of trees from small areas. Development of a transit center and parking at Hazel Green, and parking and housing at El Portal and possible minor expansion of facilities at South Entrance and Big Oak Flat Entrance would result in removal of some forested habitat. If parking is established in Foresta instead of Hazel Green, a similar amount of foraging habitat would be affected in this location. In either area, development would require hazard tree mitigation, which could affect some bat roost sites, causing minor, adverse effects.

In total, the impact of these actions on small-footed myotis bats is expected to be minor and adverse, due to restoration of large areas of foraging habitat in Yosemite Valley, offset by localized adverse effects on forest habitats in the Valley and out-of-Valley areas from development.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green Ranch project (guest rooms, food services, University of California research station), the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could provide benefits to the size, integrity, and connectivity of suitable habitat for the small-footed myotis bat. These actions could have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time. Projects that could have adverse effects on suitable habitat for the small-footed myotis bat include the Yosemite View Parcel Land Exchange (NPS), Yosemite Motels Expansion (Mariposa Co.), El Portal Road Improvement Project (NPS), and Evergreen Lodge Expansion (Tuolumne Co.). These projects would primarily affect forest habitat, except for the El Portal Road project, which affects mostly riparian areas.

In total, cumulative impacts on the small-footed myotis bat would be moderate and beneficial, based primarily on implementation of large-scale regional land management plans that could protect wide areas of habitat, compared to the small areas of adverse effects from individual projects.

Long-eared myotis bat (Myotis evotis)

Direct and Indirect Effects

The long-eared myotis bat is found primarily in forested habitat, especially coniferous, where it forages among trees and over shrubs and water, especially favoring riparian edges. Long-eared

myotis bats tend to roost in snags and lightning-scarred trees and are especially dependent upon oaks for roost sites.

Therefore, actions that affect forest habitats are most likely to affect this species. Adverse effects could result from the development of new campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and north of Tenaya Creek. The widening of Southside Drive and a parallel foot/bike path and the establishment of a traffic check station at El Capitan crossover could result in removal of trees from small areas. Development of a transit center and parking at Hazel Green, parking and housing at El Portal, and possible minor expansion of facilities at South Entrance and Big Oak Flat Entrance would result in removal of some forested habitat. If parking is established at Foresta instead of Hazel Green, a similar amount of foraging habitat would be affected in this location. In either area, development would require hazard tree mitigation, which could affect some bat roost sites and cause minor, adverse effects. Development of employee housing near Huff House at Curry Village is likely to result in the removal of trees, including some oaks.

Restoration of approximately 160 acres of black oak, riparian, and meadow habitats in Yosemite Valley would beneficially affect long-eared myotis, especially where oak roosting habitat and riparian foraging habitat are restored.

In total, effects under the Preferred Alternative would be minor and beneficial, due to restoration of large areas of highly suitable roosting and foraging habitat, offset by scattered new development in forest habitats, where large areas of suitable habitat adjacent to project areas would remain undisturbed.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green Ranch project (guest rooms, food services, University of California research station) the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the long-eared myotis bat. These actions could have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time.

Foreseeable projects that could have adverse effects on suitable habitat for the long-eared myotis bat include the the Yosemite View Parcel Land Exchange (NPS), El Portal Road Improvement Project (NPS), Yosemite Motels Expansion (Mariposa Co.), and Evergreen Lodge Expansion (Tuolumne Co.). These projects would primarily affect forest habitat, except for the El Portal Road project, which affects mostly riparian areas.

In total, cumulative impact on the long-eared myotis bat would be moderate and beneficial, based primarily on implementation of large-scale regional land management plans that could protect wide areas of habitat, compared the small areas of adverse effects caused by individual projects.

Overall, there would be a moderate, beneficial cumulative impact on long-eared myotis bats. This is based on the potential protection of suitable habitat resulting from implementation of wide-reaching regional plans. The projects with a possible adverse impact on the long-eared myotis bat would affect a relatively small area of habitat compared to projects with potential beneficial impacts.

Fringed myotis bat (Myotis thysanodes)

Direct and Indirect Effects

The fringed myotis bat is found in the Sierra Nevada in deciduous/mixed conifer habitats up to at least 6,400 feet in elevation. Foraging occurs over a variety of habitats, but the fringed myotis bat prefers forest edges and canopies. Fringed myotis bats roost in caves, mines, buildings, and trees.

The Preferred Alternative would restore a large tract of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. This would improve foraging and roosting habitat for the fringed myotis bat.

New construction would take place in fringed myotis bat habitat at the parking site at the Yosemite Village Visitor/Transit Center, the traffic check station near El Capitan crossover (if necessary), new stables in Foresta, and campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and along Tenaya Creek. Most of this construction would take place in upland habitats. Southside Drive would be widened from El Capitan crossover to Curry Village. This would directly displace habitat and increase the need for hazard tree reduction, slightly reducing the availability of trees for roosting and reproduction. These actions would have minor, direct, adverse effects on primarily upland habitat.

Development of a transit center and parking at Hazel Green, parking and housing at El Portal, and possible minor expansion of facilities at South Entrance and Big Oak Flat Entrance would result in removal of some forested habitat, although development in these areas already displaces a substantial area of potential habitat. The development of employee housing in Wawona would also affect forest habitat.

Overall, the Preferred Alternative would have a minor, beneficial impact on the fringed myotis bat, because a large area of bat foraging habitat would be restored in relation to the upland habitat displaced by new construction. If parking is established at Foresta instead of Hazel Green, a similar amount of foraging habitat would be affected in this location. In either area, development would require hazard tree mitigation, which could affect some bat roost sites and cause minor, adverse effects.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green eco-tourism project (guest rooms, food services, University of California Research Station), the Sierra Nevada Framework for Conservation and Collaboration, Forest Service plans for adjacent wilderness, the Yosemite National Park Fire Management Plan Update, and the *Merced River Wild and Scenic Comprehensive Management Plan/Environmental Impact Statement* could provide benefits to the

size, integrity, and connectivity of suitable habitat for the fringed myotis bat. These actions have the potential to have long-term moderate to major beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation, and the extent of their implementation over time.

Foreseeable projects that could have adverse effects on suitable habitat for fringed myotis bats include the Yosemite View Parcel Land Exchange (NPS), El Portal Road Improvement Project (NPS), Yosemite Motels Expansion (Mariposa Co.), and Evergreen Lodge Expansion (Tuolumne Co.). These projects would primarily affect forest habitat, except for the El Portal Road project, which affects mostly riparian areas.

Overall, there would be a moderate, beneficial cumulative impact on the fringed myotis bat. This is based on the potential protection of suitable habitat resulting from wide-reaching regional plans. The projects with a possible adverse impact on the fringed myotis bat would affect a relatively small area of habitat compared to projects with potential beneficial impacts.

Long-legged myotis bat (Myotis volans)

Direct and Indirect Effects

This species is found up to high elevations in the Sierra Nevada in montane coniferous habitats. It forages over water, close to trees and cliffs, and in forest openings such as meadows. It roosts primarily in large-diameter snags.

The Preferred Alternative would restore a large tract of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. This would improve foraging and roosting habitat for the long-legged myotis bat.

New construction would take place in suitable habitat for the long-legged myotis bat at the parking site at the Yosemite Village Visitor/Transit Center, the traffic check station near El Capitan crossover, new stables in Foresta, and campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and along Tenaya Creek. Most of this construction would take place in upland habitats. Southside Drive would be widened from El Capitan crossover to Curry Village. This would directly displace habitat and increase the need for hazard tree reduction, slightly reducing the availability of trees for roosting and reproduction. Development of a transit center and parking at Hazel Green, parking and housing at El Portal, and housing at Wawona would affect areas of forest habitat. Possible minor expansion of facilities at South Entrance, Big Oak Flat Entrance, and Tioga Pass would likely result in removal of small areas of forest habitat. If parking is established at Foresta instead of Hazel Green, a similar amount of foraging habitat would be affected in this location. In either area, development would require hazard tree mitigation, which could affect some bat roost sites and cause minor, adverse effects.

Overall, the Preferred Alternative would have a minor, beneficial impact on the long-legged myotis bat from restoration of a large area of potential bat foraging habitat in relation to the new construction that would displace primarily upland habitat.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green Ranch project (guest rooms, food services, University of California research station) the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the long-legged myotis bat. These actions could have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time.

Foreseeable projects that could have adverse effects on suitable habitat for the long-legged myotis bat include the Yosemite View Parcel Land Exchange (NPS), El Portal Road Improvement Project (NPS), Yosemite Motels Expansion (Mariposa Co.), and Evergreen Lodge Expansion (Tuolumne Co.). These projects would primarily affect forest habitat, except for the El Portal Road project, which affects mostly riparian areas.

Overall, there would be a moderate, beneficial cumulative impact on the long-legged myotis bat due to the potential for protection of suitable habitat through implementation of wide-reaching regional plans. The projects with a possible adverse impact on the spotted bat would affect a relatively small area of habitat compared to projects with potential beneficial impacts.

Yuma myotis bat (Myotis yumanensis)

Direct and Indirect Effects

The Yuma myotis bat is found in a variety of habitats in the Sierra Nevada, but appears to prefer forested areas near open water, where it feeds primarily on emergent aquatic insects.

The Preferred Alternative would restore large areas of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. Restoration of natural river and meadow hydrology would improve quality of foraging habitat for the Yuma myotis bat.

New development that would occur in suitable habitat for the Yuma myotis bat includes the Yosemite Village Visitor/Transit Center, the traffic check station near El Capitan crossover, and campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and north of Tenaya Creek. Development of parking and housing at El Portal, and housing at Wawona and at Huff House near Curry Village could affect Yuma myotis habitat, because these areas are relatively close to water. Other out-of-Valley areas of potential development, such as a transit center and parking at Hazel Green, possible minor expansion of facilities at South Entrance and Big Oak Flat Entrance, and development of stables at Foresta, would be expected to have minimal effect on Yuma myotis bats, because the preferred foraging habitat over open water does not occur near these sites. Likewise, development of parking at Foresta instead of Hazel Green would affect some upland habitat, but not preferred foraging habitat of Yuma myotis bats. In either area, development would require hazard tree mitigation, which could affect some bat roost sites, which would be a minor, adverse effect.

The Yuma myotis is a bat species that commonly uses buildings and bridges for roosting, maternity colonies, and hibernation. Actions that would remove these structures could therefore have a detrimental effect on the species. The buildings and three bridges that would be removed in Yosemite Valley would be surveyed for bats prior to their deconstruction. Should bats be found, deconstruction would not occur during reproduction or hibernation, and bats would be excluded from these structures prior to deconstruction. This would minimize the impact on Yuma myotis bats from these actions.

In total, the Preferred Alternative would have a moderate, beneficial effect on Yuma myotis bats, due primarily to the restoration of large areas of foraging habitat, which is sparse in comparison to the forested habitat that would be adversely affected, but is more abundant.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green Ranch project (guest rooms, food services, University of California research station) the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the Yuma myotis bat. These actions have the potential to have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time.

Foreseeable projects that could have adverse effects on suitable habitat for the Yuma myotis bat include the Yosemite View Parcel Land Exchange (NPS), El Portal Road Improvement Project (NPS), Yosemite Motels Expansion (Mariposa Co.), and Evergreen Lodge Expansion (Tuolumne Co.). These projects would primarily affect forest habitat, except for the El Portal Road project, which affects mostly riparian areas.

Overall, there would be a moderate, beneficial cumulative impact on the Yuma myotis bat due to the potential for protection of suitable habitat from implementation of wide-reaching regional plans. The projects with a possible adverse impact on Yuma myotis bats would affect a relatively small area of habitat compared to projects with potential beneficial impacts.

Greater western mastiff bat (Eumops perotis californicus)

Direct and Indirect Effects

The greater western mastiff bat forages in a variety of suitable habitats in the park where there are rock crevices in cliff faces for roosting and healthy populations of flying insects in adjacent habitats. Trees are also occasionally used for roosting. The greater western mastiff bat is detected most often over meadows and other open areas, but will also feed above the forest canopy.

The Preferred Alternative would restore large areas of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. This would improve foraging habitat for the greater western mastiff bat. This restoration

would also reduce the need for hazard tree removal in the area, which would improve the availability of roosting sites.

New construction would take place in suitable foraging habitat for the greater western mastiff bat at the Yosemite Village Visitor/Transit Center, the traffic check station near El Capitan crossover, new stables in Foresta, and campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and along Tenaya Creek. Most of this construction would take place in upland habitats. Southside Drive would be widened from El Capitan crossover to Curry Village. This would directly displace habitat and increase the need for hazard tree reduction, slightly reducing the availability of trees for roosting and reproduction. These actions would have a minor, direct, adverse effect on bat foraging habitat in upland habitats.

Under this alternative, potential habitat would also be directly impacted by construction of a transit center and parking at Hazel Green. This would be a minor, adverse impact because of the limited area involved, the existing human disturbance in the area, and the large area of suitable, unaffected habitat that would continue to exist in surrounding areas. If parking is established at Foresta instead of Hazel Green, a similar amount of foraging habitat would be affected in this location. In either area, development would require hazard tree mitigation, which could affect some bat roost sites; this would be a negligible, adverse effect, since trees are not the preferred roost sites of mastiff bats.

Development of new housing and parking in El Portal and housing in Wawona could result in a loss of bat foraging habitat, causing a minor, adverse effect.

The Preferred Alternative would not affect rockface habitat in the park. Therefore, primary roosting and breeding habitat would not be affected.

Overall, the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS* would have a moderate, beneficial impact on the greater western mastiff bat, because large areas of mastiff bat foraging habitat in meadows and riparian areas would be restored relative to primarily upland habitat that would be displaced.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green Ranch project (guest rooms, food services, University of California research station) the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could provide benefits to the size, integrity, and connectivity of suitable habitat for the greater western mastiff bat. These actions could have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time.

Foreseeable projects that could have adverse effects on suitable habitat for the greater western mastiff bat include the Yosemite View Parcel Land Exchange (NPS), El Portal Road Improvement Project (NPS), Yosemite Motels Expansion (Mariposa Co.), and Evergreen

Lodge Expansion (Tuolumne Co.). These projects would primarily affect forest habitat, except for the El Portal Road project which affects mostly riparian areas.

Overall, there would be a minor, beneficial cumulative impact on the greater western mastiff bat due to the potential for protection of suitable habitat from implementation of wide-reaching regional plans. The projects with a possible adverse impact on the greater western mastiff bat would affect a relatively small area of habitat compared to projects with potential beneficial impacts.

Sierra Nevada snowshoe hare (Lepus americanus tahoensis)

Direct and Indirect Effects

This species is generally found between 4,500 feet and 8,000 feet (Williams 1986) in a variety of habitats. It prefers montane riparian areas with thickets of deciduous trees such as willow and alder. It also is found in young conifer stands that are interspersed with chaparral (Williams 1986; Zeiner et al. 1990).

Under this alternative, potential snowshoe hare habitat would be directly impacted by construction of parking at Hazel Green, and minor expansion of facilities at Big Oak Flat Entrance and South Entrance. This would be a minor, adverse impact because of the limited area that is impacted, the existing human disturbance in the area, and the large area of suitable habitat that would remain unaffected in surrounding areas. If parking is developed at Foresta instead of Hazel Green, a similar amount of potential habitat would be removed; but would have a negligible effect on snowshoe hares since Foresta is at the lower end of the elevation range for this species and few, if any, snowshoe hare are likely to be present.

There would be potential indirect effects on the snowshoe hares from increased human disturbance at Badger Pass. This indirect impact is expected to be minor and adverse because human use would be restricted in adjacent habitats. Overall, there would be a minor adverse impact on the Sierra Nevada showshoe hare.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for snowshoe hares. These actions could have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time.

A foreseeable project that could have adverse effects on suitable habitat for snowshoe hares includes Evergreen Lodge Expansion (Tuolumne Co.). This project would primarily affect forest habitat.

Overall, there would be a minor, beneficial impact on snowshoe hares due to the potential for protection of suitable habitat from implementation of wide-reaching regional plans. The projects

with a possible adverse impact on snowshoe hares would affect a relatively small area of habitat compared to projects with potential beneficial impacts.

Sierra Nevada mountain beaver (Aplodontia rufa californica)

Direct and Indirect Effects

Increased human use at Badger Pass as a result of new parking facilities in the area would have an adverse effect on the Sierra Nevada mountain beaver through increased foot traffic in meadows and increased vehicle-polluted runoff from paved areas. Under the Preferred Alternative, human use would be restricted from meadow areas, and parking area runoff would be collected for treatment. This would result in long-term, minor, adverse impact on the mountain beaver.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the mountain beaver. These regional plans would have a long-term, moderate, beneficial effect on suitable habitat for the mountain beaver.

Sierra Nevada red fox (Vulpes vulpes necator)

Direct and Indirect Effects

This very rare species is typically found in upland forests above 7,000 feet, but the collection of a pair of red foxes at Big Meadow in Foresta suggests that the species may rarely occur at elevations as low as 4,500 feet. Records indicate, however, that the area around Tioga Pass offers the best habitat.

Given this distribution, the possible minor expansion of facilities at Tioga Pass has the greatest chance of affecting Sierra Nevada red foxes, although such impact would be minor because of the existing level of development and human disturbance in the area, and the expected limited area of expansion. Increased summer use of Badger Pass could affect red foxes by causing increased human disturbance in the area, but such impact would be expected to be minor, given the large area of potential habitat in the area that would remain unaffected. If the low elevation record of this species is taken as a valid reflection of its range, the transit and parking facility at Hazel Green or Foresta and minor expansion of facilities at Big Oak Flat Entrance and South Entrance could affect red foxes; however, the existing development, the expected limited area affected, and the apparent scarcity of the species at these elevations would result in minor, adverse effects.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green Ranch project (guest rooms, food services, University of California research station) the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the

Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for red foxes. These actions could have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time.

A foreseeable project that could have adverse effects on suitable habitat for red foxes includes the Evergreen Lodge Expansion (Tuolumne Co.). This project would primarily affect forest habitat.

Overall, there would be a minor beneficial impact on Sierra Nevada red foxes due to the potential for protection of suitable habitat with implementation of wide-reaching regional plans. The projects with a possible adverse impact on red foxes would affect a relatively small area of habitat compared to projects with potential beneficial impact.

California wolverine (Gulo gulo luteus)

Direct and Indirect Effects

Wolverines typically inhabit semi-open terrain at or above the timberline from spring through fall, and then move to lower-elevation forests in winter. They have been seen in a variety of habitats, including treeless barrens, alpine meadows, and mixed coniferous forests (Thelander et al. 1994). The most important habitat characteristic appears to be a low level of human disturbance (Thelander et al. 1994).

Tioga Pass is the only project location likely to contain wolverine habitat. Minor expansion of the existing facilities would remove a small area of potential habitat. Increased human presence in this area could cause greater disturbance, especially since wolverines avoid contact with humans. However, given the existing level of development and disturbance, and the apparent scarcity of wolverines in the Sierra Nevada, development at Tioga Pass would be expected to cause minor, adverse impact to the species.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for wolverines. These actions have the potential for long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen for implementation and the extent of their implementation over time.

Given the high-elevation occurrence of wolverines and their aversion to human contact, no foreseeable projects would have an effect on this species.

Cumulative effects on wolverines would be minor and beneficial due to the potential for protection of habitat through implementation of wide-ranging land management plans.

American pine marten (Martes americana)

Direct and Indirect Effects

The American pine marten is dependent upon dense, complex coniferous forests with large trees and snags. A habitat with structural complexity near the ground appears to be especially important, as it provides cover from predators, foraging areas, and thermal cover during winter. Logging and land management practices that change these forest characteristics would have the most effect on martens.

Under this alternative, a transit center and parking at Hazel Green would cause direct impacts to potential marten habitat. This would be a minor, adverse impact because of the limited area involved, the existing human disturbance in the area, and the large area of suitable, unaffected habitat that would continue to exist in surrounding areas. If parking is developed at Foresta instead of Hazel Green, the resulting effect on martens would be negligible; habitat for martens at Foresta is marginal, because of its relatively low elevation and open canopy from the 1990 A-Rock Fire.

New development in Yosemite Valley would occur primarily in upland, forested habitat, which could have an adverse effect on martens. Such development, however, would occur primarily in east Yosemite Valley, where prior development would continue to affect habitat quality. In west Yosemite Valley, habitats would remain relatively unaffected, and removal of vehicle traffic from Northside Drive between Yosemite Lodge and El Capitan crossover would improve a broad swath of potential marten habitat. However, martens are quite rare in Yosemite Valley, probably because the Valley is much lower in elevation than prime marten habitat. As a result, changes in potential marten habitat in Yosemite Valley (beneficial and adverse) are expected to have a negligible effect on the species in that location.

Minor expansion of facilities at Tioga Pass, Big Oak Flat Entrance Station, and South Entrance would affect small areas of forest habitat and increase human presence in these areas. Increased use of Badger Pass for parking in summer would likewise increase human disturbance in the area. These effects are expected to be minor and adverse because of the limited areas that would be affected, and because human use would be controlled in adjacent habitats.

Overall, impact to marten under the Preferred Alternative would be minor and adverse due to development in various areas outside of Yosemite Valley.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green Ranch project (guest rooms, food services, University of California research station), Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, Orange Crush Fuels Treatment Projects (USFS, Stanislaus), A-Rock Reforestation (USFS, Stanislaus), Rogge-Ackerson Fire Reforestation (Tuolumne Co.), and the Fire Management Action Plan for Wilderness (USFS, Stanislaus) could benefit the martens by preserving forest habitat and hastening the post-fire regrowth of forests.

The Evergreen Lodge Expansion Project is likely to have an adverse effect on marten habitat. However, this project would affect relatively small areas of forest.

Overall, the cumulative impact would be moderate and beneficial as a result of regional plans and projects that could protect and hasten regrowth of forest habitats over wide areas of the Sierra Nevada.

Pacific fisher (Martes pennanti)

Direct and Indirect Effects

Fisher habitat is primarily conifer and mixed conifer forests. Development of a transit and parking facility at Hazel Green would have a minor, adverse effect on fishers, because previous fire and logging have affected the quality of forest habitats in this area. If parking is developed at Foresta instead of Hazel Green, the resulting effect on fishers would be negligible, since a severe fire in 1990 destroyed nearly all forest habitat in Foresta. Because roadway accidents are a major cause of unnatural fisher mortality, a parking facility at Hazel Green could minimize such mortality by reducing the amount of traffic between this location and Yosemite Valley. The area around Crane Flat has been identified as prime fisher habitat (Chow 2000). There would be direct and indirect effects on fishers from minor expansion of facilities at Big Oak Flat Entrance and South Entrance, and from the increased human presence around these areas. Increased summer use of Badger Pass for parking would likewise increase human disturbance in that area. These effects are expected to be minor and adverse because of the limited area of forest habitat involved, and because human use would be controlled in adjacent habitats.

Although fishers are very rare at lower elevations, records indicate that the species could also occur in Yosemite Valley, Wawona, and Foresta. In Yosemite Valley, projects that could adversely affect forest habitats could cause impacts to fishers. Such projects include the traffic check station near El Capitan crossover; campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and north of Tenaya Creek; and relocation of roads out of meadows. These projects would cause minor, adverse effects. However, removal of traffic from Northside Drive, from Yosemite Lodge to El Capitan crossover, could provide minor benefit to fishers by reducing disturbance and the chance of roadway accidents. Development of employee housing at Wawona would affect forest habitat and cause minor, adverse effects on fishers.

Overall, impacts on fishers under the Preferred Alternative would be minor to moderate and adverse.

Cumulative Effects

Regional and parkwide planning efforts such as the Hazel Green Ranch project (guest rooms, food services, University of California research station), Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, Orange Crush Fuels Treatment Projects (USFS, Stanislaus), A-Rock Reforestation (USFS, Stanislaus), Rogge-Ackerson Fire Reforestation (Tuolumne Co.), and the Fire Management Action Plan for Wilderness (USFS, Stanislaus) could provide benefits to the fisher.

The Evergreen Lodge Expansion (Tuolumne Co.) project is likely to have an adverse effect on fisher habitat.

Overall, the cumulative impact would be moderate and beneficial as a result of regional plans and projects that could protect and hasten regrowth of forest habitats over wide areas of the Sierra Nevada. Reforestation projects could hasten the return of forest habitats that are more favorable to the fisher. In comparison, projects with the potential for adverse impacts on martens would affect relatively small areas of forest.

Limestone salamander (Hydromantes brunus)

Direct and Indirect Effects

El Portal falls within the elevation range and habitat type of the limestone salamander, but the nearest documented occurrence of this species is approximately 30 miles west of Yosemite National Park, near Briceburg. The limestone substrate that is characteristic of the habitat of limestone salamanders is scarce in El Portal and would be avoided in development sites. Effects on this species would therefore be negligible.

Cumulative Effects

This species is found in a highly restricted and well-defined range near Briceburg, Mariposa County. Its habitat is protected by the 120-acre Limestone Salamander Ecological Reserve and the Bureau of Land Management's 1,600-acre Limestone Salamander Area of Critical Environmental Concern. Future proposed projects are not likely to impact habitat for the limestone salamander; therefore, cumulative effects on the limestone salamander would be negligible.

Mount Lyell salamander (Hydromantes platycephalus)

Direct and Indirect Effects

The Mount Lyell salamander is found in wet habitats above 4,000 feet and is associated with granite slabs and boulders at the edge of talus slopes (Stebbins 1985). New development proposed in the *Final Yosemite Valley Plan/SEIS* is not expected to take place in suitable habitat for the Mount Lyell salamander. Removal of housing from the Terrace at Curry Village could have a minor, beneficial effect on potential habitat for the species. Although records are lacking for the occurrence of Mount Lyell salamanders at Tioga Pass, suitable rocky habitat appears to occur on the surrounding ridges and mountains. The limited size of any further development at Tioga Pass, and its distance from likely Mount Lyell salamander habitat, indicate that effects on this species would be negligible

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat

for the Mount Lyell salamander. These actions could have long-term, minor, beneficial effects on suitable habitat, depending upon the alternatives chosen and the extent of their implementation over time. No foreseeable projects are expected to have an adverse effect on Mount Lyell salamanders.

Yosemite toad (Bufo canorus)

Direct and Indirect Effects

Any future new parking facilities at Tioga Pass could have an adverse effect on Yosemite toads through a direct loss of habitat. The extent of habitat loss at this time is uncertain, but in the event of development at Tioga Pass additional evaluation and compliance would be required to address potential effects on the Yosemite toad.

Increased human use at Tioga Pass could increase foot traffic in meadows and vehicle-polluted runoff from paved areas. Under the Preferred Alternative, human use would be controlled in meadow areas, and parking area runoff would be collected for treatment. This would result in negligible effects on the Yosemite toad at Tioga Pass. Surveys at Badger Pass did not detect Yosemite toads, but the species occurs in nearby meadows. It is possible that activities associated with winter use of the ski area (e.g., movement and compaction of snow) have reduced habitat quality at Badger Pass for Yosemite toads. The lack of detections at this location, combined with control of human use and polluted runoff, would result in negligible effects on Yosemite toads.

The Yosemite toad is regarded as a high-elevation species. There is a single historic record of this species in Yosemite Valley that places it approximately 2,500 feet below its usual range. It is unlikely that this record reflects the sustainable range of Yosemite toads. Meadow restoration in Yosemite Valley would have a negligible benefit to Yosemite toads.

Overall, effect of the Preferred Alternative on Yosemite toads is expected to be negligible.

Cumulative Effects

Projects that have an appreciable effect on high-elevation meadow habitats are most likely to affect the Yosemite toad. Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the Yosemite toad. These actions could have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen, and the extent of their implementation over time.

Projects that could have a potentially adverse effect on the Yosemite toad include the Tioga Inn, Lee Vining (Mono Co.); Highlands, June Lake (Mono Co.); and the Double Eagle Resort Construction at June Lake (Mono Co.), though the presence of the Yosemite toad in these areas is unconfirmed.

Overall, cumulative impacts would be moderate and beneficial, based primarily on the potential for the protection of habitat and populations that would result from implementation of regional

and parkwide plans that would affect high-elevation areas. Adverse impacts would affect relatively small areas where the presence of the Yosemite toad is uncertain.

Foothill yellow-legged frog (Rana boylei)

Direct and Indirect Effects

This species has virtually disappeared from its range in the Sierra Nevada from unknown causes. However, projects that affect suitable habitat (e.g., wet meadows and rocky streams) may affect reintroduction and/or recolonization of this species. Suitable habitat for this species occurs in Yosemite Valley, Foresta, Wawona, and El Portal.

The Preferred Alternative in the *Final Yosemite Valley Plan/SEIS* would restore a large tract of previously disturbed meadow and riparian habitat in the east end of Yosemite Valley, totaling at least 135 acres. This would be potential habitat for the foothill yellow-legged frog, provided that the non-native bullfrog population is removed. The Preferred Alternative would also establish the River Protection Overlay, which would offer increased protection to areas adjacent to the Merced River. These actions under the Preferred Alternative would maintain and restore riparian microhabitats and microclimates; riparian and aquatic vegetation; appropriate sediment input levels during breeding season; surface and subsurface hydrologic processes; the structural integrity of stream breeding habitats; and the connectivity of riparian habitats.

The Preferred Alternative would support the recruitment of large woody debris into riparian areas and allow a shifting mosaic of habitats. The actions under this alternative would have a moderate, beneficial impact on potential habitat for the species.

Construction of the Yosemite Village Visitor/Transit Center could affect riparian and meadow habitat, which could provide suitable habitat for this species. This habitat loss would be minor because of the small size of the impact area in relation to habitat that would be restored. If parking is developed at Foresta, effects on potential foothill yellow-legged frog habitat would be negligible, since such development would be confined to upland areas.

Development of housing and parking in El Portal and housing in Wawona is expected to have a negligible effect on foothill yellow-legged frogs, because the development would not occur in habitat suitable for the species. Given that the foothill yellow-legged frog is no longer known to occur within the project area, but that there would be a relatively large amount of restoration of suitable habitat, the *Final Yosemite Valley Plan/SEIS* would have an overall minor to moderate, beneficial effect on the foothill yellow-legged frog.

Cumulative Effects

The impact on the foothill yellow-legged frog is similar to that on the California red-legged frog; because this species is virtually extinct in the Sierra Nevada, projects in its area of former occurrence would not affect any existing populations. However, projects that impact suitable habitat (e.g., wet meadows and rocky streams) may affect reintroduction and/or recolonization of this species.

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the foothill yellow-legged frog. These actions could have long-term, moderate to major, beneficial effects on suitable habitat, depending upon the alternatives chosen, and the extent of their implementation over time. Foreseeable projects that could have adverse effects on suitable habitat for the foothill yellow-legged frog include the Rio Mesa Area Plan (Madera Co.); University of California, Merced Campus (Merced Co.); and the City of Merced General Plan.

Overall, the cumulative impact would be beneficial due to the potential for protection of foothill yellow-legged frog habitat through implementation of plans that cover wide areas of the Sierra Nevada. Intensity would be minor, as this species is almost extinct from the Sierra Nevada region, but habitat would be protected for potential reintroduction or recolonization of the species. Projects with a possible negative impact on foothill yellow-legged frogs would affect a relatively small area of habitat compared to projects with potential beneficial impacts. These projects could have a major, negative impact if they affected an unknown population of foothill yellow-legged frogs, which could be among the last in the Sierra Nevada. However, site surveys would be completed in compliance with state and federal regulations to ensure that populations are known and avoided.

Mountain yellow-legged frog (Rana muscosa)

Direct and Indirect Effects

Mountain yellow-legged frog habitat occurs from 4,500 feet to over 12,000 feet in elevation in streams, lakes, and ponds in a variety of vegetation types. The species is known to occur in lakes and ponds at Tioga Pass and has been found in meadows near Badger Pass. Recent surveys at Badger Pass did not indicate the presence of mountain yellow-legged frogs in this location, although suitable habitat appears to be available.

Increased human use at Tioga Pass and Badger Pass as a result of new parking facilities in the area could have an indirect, adverse effect on the mountain yellow-legged frog through increased foot traffic in meadows and increased vehicle-polluted runoff from paved areas. Under the Preferred Alternative, human use would be restricted from meadow areas, and parking area runoff would be collected for treatment. An increase in the presence of ravens could arise from expanded human use in these areas. Ravens are known to prey on adult frogs. Thorough trash collection and maintenance of these proposed new facilities would be performed on a regular basis. Overall, there would be negligible effects on the mountain yellow-legged frog.

Cumulative Effects

The foreseeable projects that would have beneficial impact to the mountain yellow-legged frog include the Fire Management Plan Update (NPS), the Sierra Nevada Framework for Conservation and Collaboration (USFS), and the Fire Management Action Plan for Wilderness (USFS, Stanislaus).

Overall, the cumulative impact would be long-term, moderate, and beneficial due to the amount of habitat and number of populations that would be affected by the wide-reaching regional plans.

Northwestern pond turtle (Clemmys marmorata marmorata) and Southwestern pond turtle (Clemmys marmorata pallida)

Direct and Indirect Effects

The increased protection that would occur under the River Protection Overlay and restoration of aquatic and riparian habitat in Yosemite Valley would generally maintain the quality of turtle habitat and enhance shading, water quality, root strength, input of large and small woody debris, and input of organic matter to the river ecosystem. These are important components of western pond turtle habitat. This would constitute a long-term, moderate, beneficial effect on the western pond turtle.

Construction of the Yosemite Village Visitor/Transit Center could directly impact existing riparian habitat. The increased human population in El Portal could result in additional foot traffic and possible trampling of habitat for this species. Because western pond turtles are also dependent upon upland areas for hibernation and nesting, actions such as increased development in El Portal, construction of the Yosemite Village Visitor/Transit Center, and construction of new campsites could have a minor, adverse effect on this species. These habitat losses would have a minor adverse impact on western pond turtles because of the small size of the areas affected. If parking is developed in Foresta, there would be a negligible effect on western pond turtles, because such development would occur outside of the potential habitat for this species (Crane Creek).

Overall, the effect on western pond turtles would be minor and beneficial due to restoration and protection of suitable habitat in Yosemite Valley.

Cumulative Effects

Cumulative effects that could provide large-scale benefits to western pond turtle habitat include regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS) and the Merced Wild and Scenic River Comprehensive Management Plan (NPS). The Yosemite View Parcel Land Exchange (NPS) would directly remove suitable habitat for the western pond turtle. Overall, there would be a minor beneficial effect on the western pond turtle. This benefit would largely derive from implementation of regional and parkwide planning that would protect turtle habitat.

Merced Canyon shoulderband snail (Helminthoglypta allynsmithi)

Direct and Indirect Effects

This species is a land snail (as opposed to aquatic); thus, development in El Portal that would remove or alter talus could potentially affect habitat quality. However, no such development in El Portal would occur to implement actions in the *Final Yosemite Valley Plan/SEIS*. Therefore, there would be no effects on likely habitat for the Merced Canyon shoulderband snail.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS) and U.S. Forest Service plans for adjacent wilderness could improve the size, integrity, and connectivity of suitable habitat for the Merced Canyon shoulderband snail. These actions could have long-term, minor, beneficial effects on suitable habitat, though the proposed management direction has not been finalized.

Overall, there would be a minor, beneficial cumulative impact on the Merced Canyon shoulderband snail, due to the potential for protection of suitable habitat from wide-reaching regional plans.

Mariposa sideband snail (Monadenia hillebrandi)

Direct and Indirect Effects

The removal of housing from the Terrace at Curry Village could restore potential habitat for the Mariposa sideband snail. This would be a long-term, moderate, beneficial impact. There are no expected adverse effects on the Mariposa sideband snail.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS) and U.S. Forest Service plans for adjacent wilderness could improve the size, integrity, and connectivity of suitable habitat for the Mariposa sideband snail. These actions could have long-term, minor, beneficial effects on suitable habitat, although chosen alternatives and the chronology of their implementation have yet to be finalized.

Overall, there would be a minor, beneficial impact on the Mariposa sideband snail due to the potential for protection of suitable habitat from wide-reaching regional plans.

Sierra pygmy grasshopper (Tetrix sierrana)

Direct and Indirect Effects

The Sierra pygmy grasshopper has been found in El Portal. Suitable habitat for the Sierra pygmy grasshopper exists in El Portal, Yosemite Valley, and Wawona. Because this species favors riparian areas, restoration of riparian habitat and the establishment of the River Protection Overlay in Yosemite Valley, El Portal, and Wawona would have a beneficial effect on suitable habitat for the grasshopper. These benefits are tempered by the loss of suitable habitat at the Yosemite Village Visitor/Transit Center. In El Portal, suitable habitat would be displaced at Hillside East, Hillside West, Rancheria Flat, and Middle Road. Minor expansion of facilities at the South Entrance would have a negligible effect on the Sierra pygmy grasshopper, due to the expected small size of the affected area and the lack of riparian habitat in the area. The increased human population in El Portal could promote additional foot traffic and possible trampling of habitat for this species. This would be a long-term, minor, adverse effect. Overall, the Preferred Alternative could have a long-term, negligible to minor, adverse effect on suitable habitat for the Sierra pygmy grasshopper.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the Sierra pygmy grasshopper. These actions could have long-term, minor, beneficial effects on suitable habitat, though the proposed management direction from these plans has not been finalized.

Wawona riffle beetle (Atractelmis wawona)

Direct and Indirect Effects

Because the Wawona riffle beetle spends most of its lifecycle in rapid streams from 2,000 to 5,000 feet in elevation, the increased protection afforded by the River Protection Overlay and restoration of riparian and aquatic habitat (about 100 acres) would protect Wawona riffle beetle habitat. These actions would generally maintain the quality of Wawona riffle beetle habitat and enhance shading, water quality, root strength of riparian vegetation, input of large and small woody debris, and input of organic matter (USFS 1994a). Construction of the Yosemite Village Visitor/Transit Center could have direct impacts to riparian habitat. Potential development in Wawona and El Portal is expected to have a negligible impact on Wawona riffle beetles, because riparian and river habitats would not be affected. Overall, there would be a long-term, moderate, beneficial effect on Wawona riffle beetle habitat due to the large amount of restored habitat in relation to habitat that would be impacted.

Cumulative Effects

Cumulative effects that could have large-scale benefits to riffle beetle habitat include regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS) and the Merced Wild and Scenic River Comprehensive Management Plan (NPS). The Yosemite View Parcel Land Exchange (NPS) would directly remove suitable habitat for the riffle beetle. Overall, there would be a minor, beneficial effect, due largely to regional and parkwide planning that would protect habitat for the riffle beetle.

Bohart's blue butterfly (Philotiella speciosa bohartorum)

Direct and Indirect Effects

Though the presence or absence of the Bohart's blue butterfly has not been verified in El Portal, apparently suitable habitat may be found in this location. The construction of new housing at Hillside East and West and Rancheria Flat, and the construction of parking at Middle Road could directly remove suitable habitat. The increased human population in El Portal could promote additional foot traffic and possible trampling of habitat for this species. These actions could have a long-term, minor, adverse effect on the Bohart's blue butterfly.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS) and U.S. Forest Service plans for adjacent wilderness could improve the size, integrity, and connectivity of suitable habitat for the Bohart's blue butterfly. These actions could have long-term, minor, beneficial effects on suitable habitat, though the proposed management direction from these plans has not been finalized.

PLANTS

Tiehm's rock cress (Arabis tiehmii)

Direct and Indirect Effects

Tiehm's rock cress is found on granitic soils in alpine fell-fields on the slopes of Mt. Dana above Tioga Pass. There would be no direct impact on this species. Future development and increased facilities at Tioga Pass could result in indirect effects from increased visitor use. A new or expanded entrance station at Tioga Pass could encourage more day use and associated foot traffic in the area as well as increased hiking on Mt. Dana. The popular hike to the top of Mt. Dana is a cross-country path, without a formal route. Increased use on this route could have a long-term, moderate, adverse impact on Tiehm's rock cress.

Cumulative effects

There would be no direct effects on the species as a result of potential cumulative projects. Regional and parkwide planning efforts, such as the Sierra Nevada Framework for Conservation and Collaboration (USFS) and U.S. Forest Service plans for adjacent wilderness, could provide added protection to potential habitat for Tiehm's rock cress.

Congdon's lomatium (Lomatium congdonii)

Direct and Indirect Effects

Habitat for this species occurs in portions of the Merced River gorge and in the El Portal area. There would be no direct effects on this species. There would be negligible, indirect effects from an increased population in El Portal, as the plant is isolated on inaccessible, steep, north-facing slopes south of the river.

Cumulative Effects

There would be no direct impacts on the species as a result of potential cumulative projects.

Slender-stemmed (Hetch Hetchy) monkeyflower (Mimulus filicaulis)

Direct and Indirect Effects

This species could be directly impacted by development of a transit and parking facility at Hazel Green. Plants could also be affected by picnicking and trampling as a result of random use of

sites adjacent to parking and proposed lodging. This would result in a minor, adverse impact on this species.

Cumulative Effects

There could be a minor impact on the slender-stemmed monkeyflower from the Hazel Green Ranch project (guest rooms, food services, University of California research station). Plants could also be affected by picnicking and trampling due to random use of areas adjacent to the site. This would result in a minor, adverse impact on this species.

Bolander's clover (Trifolium bolanderi)

Direct and Indirect Effects

There would be no direct effects on this species.

Summer use of the Badger Pass area would increase as a result of use of the Badger Pass facility as a parking/transit area. This could encourage foot traffic into Bolander's clover habitat in neighboring meadows. Ratliff and Denton (1993) concluded that Bolander's clover occurs under varied environmental situations within the meadow environment. Where other environmental minimums are met, soil water is the most important variable in controlling the distribution of Bolander's clover (Ratliff and Harding 1993). Therefore, to protect the Bolander's clover, it is most important to preserve the meadow system as a whole, in particular, the consistency of water availability and dispersal throughout the meadow (Allen-Diaz 1991).

The design of the site as out-of-Valley parking would emphasize rapid transport of visitors to and from their vehicles, minimizing effects to neighboring meadows. These indirect effects are not expected to change the consistency of water availability and dispersal in neighboring meadows. Therefore, there would be a negligible adverse impact on Bolander's clover.

Cumulative Effects

There would be no direct impacts on the species as a result of potential cumulative projects. Regional and parkwide planning efforts, such as the Sierra Nevada Framework for Conservation and Collaboration, U.S. Forest Service plans for adjacent wilderness, and the Fire Management Plan Update, could provide added protection to potential habitat for the Bolander's clover.

California State Endangered Species

WILDLIFE

American peregrine falcon (Falco peregrinus anatum)

Direct and Indirect Effects

The Preferred Alternative would restore a large tract of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. This would have a moderate, beneficial impact on potential foraging habitat for the peregrine falcon. In the west end of Yosemite Valley, construction of a traffic check station on

Southside Drive near El Capitan crossover could have a short-term, moderate, adverse impact during periods of construction. Construction would not take place when the peregrine falcon is nesting or foraging in the vicinity of Cathedral Rocks. Development in forested habitats in Yosemite Valley and Wawona would have a negligible effect on peregrine falcons because this habitat type is abundant in these locations, and the falcon prefers to hunt in open areas such as along cliff faces and over meadows and water. Overall, there would be a long-term, moderate, beneficial effect on the American peregrine falcon as a result of habitat restoration in Yosemite Valley under the Preferred Alternative.

Cumulative Effects

No cumulative actions are expected to have an impact on peregrine falcons. Overall, there would be a minor, beneficial effect due primarily to actions proposed in the *Final Yosemite Valley Plan/SEIS.* These actions would help return a diversity of habitats to Yosemite Valley over which the peregrine falcon hunts.

Great gray owl (Strix nebulosa)

Direct and Indirect Effects

The great gray owl is known to nest in the Crane Flat area, meadows near the Glacier Point Road, and near Hodgdon Meadow. The species also uses meadows in Foresta and Wawona as wintering and staging areas. Habitat suitable for wintering and staging great gray owls appears to occur in Yosemite Valley, but records of the species in this location are rare.

The restoration of meadows and riparian habitat in Yosemite Valley could increase the size, integrity, and continuity of important habitat for this species. Research suggests that great gray owls are sensitive to human disturbance (Wildman 1992), which may explain its rarity in Yosemite Valley. Vehicles and human use would be reduced in the restored habitat in Yosemite Valley, which could provide a long-term, moderate, beneficial effect on the great gray owl, but it is unknown whether such improvements would be adequate to allow the return of this species.

The overall impact of new parking at Badger Pass in the summer would be minor and adverse, given that great gray owls are not known to forage at Badger Pass, although the species is known to use neighboring meadows. Visitor use would be controlled in other meadow areas, including Hodgdon Meadow near the Big Oak Flat Entrance where increased human presence is expected, to limit the effect on great gray owls.

Construction of stables at McCauley Meadow near Foresta could impact great gray owls. McCauley Meadow is occasionally used by juvenile males driven out of primary meadows by dominant males, or as a transition meadow when there is a large snow pack in primary meadows. It is not used for nesting. Because McCauley Meadow is not nesting habitat, and rarely used by great gray owls, there would be a minor, adverse effect on great gray owls.

The development of a transit center and parking facility at Hazel Green would occur adjacent to but not within meadow habitat. Past studies and recent surveys at Hazel Green Ranch did not confirm use of meadows in this area by great gray owls; however, based upon their size and

elevation, the meadows have been identified as potential habitat for this species (Skenfield 1999). Increased human presence in this area could affect its use by great gray owls through increased disturbance of its habitat, resulting in minor, adverse effects. If parking is developed at Foresta instead of Hazel Green, human disturbance in adjacent areas would increase. This facility and the McCauley Ranch stables would be used primarily during periods when great gray owls are in nesting areas at higher elevations. Effects on great gray owls would therefore be moderate and adverse.

Overall, the effects of the Preferred Alternative on great gray owls would be minor and adverse for effects on the limited number of owls that use the McCauley Ranch area. Also, human disturbance could increase at Badger Pass, Hazel Green or Foresta, and Hodgdon Meadow (near Big Oak Flat Entrance), possibly affecting the owl.

Cumulative Effects

Nearly the entire California population of great gray owls breeds in the Yosemite National Park region, where habitats are relatively intact. The Hazel Green Ranch project (guest rooms, food services, University of California research station), because of its meadow habitats and proximity to the park, has the greatest potential to affect the great gray owl. Past and recent surveys, however, indicate the meadows are seldom used by great gray owls, and then probably by transient owls moving between wintering and nesting areas (Skiff 1995; Skenfield 1999). Development at Hazel Green would likely not occur in meadow habitats, but increased human disturbance in the area could deter owls from using these areas, resulting in minor, adverse effects. Habitats at other cumulative project sites are unsuitable for great gray owls, or previous effects at these sites have rendered habitats unsuitable. Therefore, no reasonably foreseeable development projects are expected to have an adverse effect on great gray owls.

Projects that could have a beneficial effect on the species by preserving or restoring habitat include the Sierra Nevada Framework for Conservation and Collaboration (USFS), Fire Management Plan Update (NPS), Merced Wild and Scenic River Comprehensive Management Plan (NPS), and the Fire Management Action Plan for Wilderness. In total, these actions would result in moderate, beneficial impacts on great gray owls.

In total, cumulative impacts on great gray owls would be moderate and beneficial due to implementation of land management plans that would have wide-ranging effects in preserving and restoring forest and meadow habitats. The Hazel Green Ranch project, in comparison, would affect an area of potential habitat that is probably used only transiently by migrating owls.

Willow flycatcher (Empidonax traillii)

Direct and Indirect Effects

Willow flycatchers have not been observed in Yosemite Valley for over 30 years. The species is typically found in meadows with a lush growth of willow shrubs. Threats to this species include habitat destruction, grazing, and nest parasitism by brown-headed cowbirds. Riparian and meadow restoration within Yosemite Valley would increase the size, integrity, and connectivity of potential habitat for this species and increase the chances for its recolonization. These effects

would be enhanced by the reduction in stable operations in Yosemite Valley, thus reducing cowbird abundance. Control of cowbird numbers in and near the relocated concession stables in Yosemite Valley would further reduce cowbird parasitism.

The development of new stables at McCauley Meadow in Foresta could increase the local abundance of cowbirds, which could affect willow flycatchers in this area. Mitigation of this impact could include trapping of cowbirds and use of processed feeds, which would limit the impact to minor and adverse. Increased development at Wawona and the Big Oak Flat Entrance would have a negligible effect on willow flycatchers in these areas, because these actions are not expected to affect meadow habitat. Development of parking at Hazel Green could cause increased human disturbance of adjacent meadows. Recent surveys, however, indicate that no willow flycatchers exist in this area, probably because the meadows lack thick willow growth necessary for nesting (Skenfield 1999). Therefore, the impact would be negligible.

There would be an overall minor to moderate, beneficial effect on the willow flycatcher due to the large amount of suitable habitat that would be restored in Yosemite Valley and the removal of National Park Service and concessioner administrative stables from Yosemite Valley. These would be reduced to minor benefits by the development of a new stable at McCauley Ranch, which could increase local cowbird populations.

Cumulative Effects

Projects that would cause degradation of meadow habitat or increased abundance of brown-headed cowbirds would adversely affect willow flycatchers through respective habitat loss and nest parasitism. The site of the Hazel Green Ranch project contains meadows that could be directly or indirectly affected. No willow flycatchers were found in this location during recent surveys, and habitat in the meadows appears to be unsuitable for the species.

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the willow flycatcher. Implementation of these plans could help restore habitats, control the effects of grazing, and reduce cowbird abundance by reducing fragmentation of forest communities. Overall, the cumulative impact on willow flycatchers would be minor and beneficial.

California State Threatened Species

WILDLIFE

Sierra Nevada red fox (see Federal Species of Concern section)

California wolverine (see Federal Species of Concern section)

California State Rare Species

PLANTS

Yosemite onion (Allium yosemitense)

Direct and Indirect Effects

The Yosemite onion is found in the vicinity of El Portal and Wawona on steep slopes that are generally inaccessible to casual visitation. Direct effects would not occur as a result of implementation of the Preferred Alternative. Increased residential populations in Wawona and El Portal could result in increased foot traffic and minor, adverse effects on the Yosemite onion.

Cumulative Effects

There would be no direct impact on the species as a result of potential cumulative projects. Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could provide added protection to potential habitat for the Yosemite onion.

Tompkin's sedge (Carex tompkinsii)

Direct and Indirect Effects

Tompkin's sedge is found sporadically, from above Arch Rock Entrance Station to El Portal. Construction in the El Portal area at Middle Road, Rancheria Flat, Merced Flat Trailer Village, Hillside West, Hillside East, and the levee adjacent to Hennessey's Ranch (currently Trailer Village and Abbieville) would result in the direct removal of Tompkin's sedge. Continued and increased use of the El Portal area and road corridors could result in indirect, adverse effects on this species through the introduction and establishment of non-native species that may out-compete Tompkin's sedge. Overall, these effects on the species would be moderate and adverse.

Cumulative Effect

The Yosemite View Parcel Land Exchange could result in the direct removal of Tompkin's sedge. Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS)could provide added protection to potential habitat for Tompkin's sedge. Overall, these cumulative projects would have a minor, adverse effect on Tompkin's sedge.

Congdon's woolly-sunflower (Eriophyllum congdonii)

Direct and Indirect Effects

Habitat for Congdon's woolly-sunflower occurs throughout the Merced River gorge, El Portal, and lower portions of the South Fork of the Merced River. There would be no direct effects on

Congdon's woolly-sunflower as a result of the *Final Yosemite Valley Plan/SEIS*. Continued and increased use of the El Portal area could result in indirect, adverse effects to this species as a result of increased population and associated foot traffic in El Portal. Non-native species could be introduced and become established in newly developed areas and spread into Congdon's woolly-sunflower habitat. These indirect effects would have a long-term, minor, adverse impact on the species.

Cumulative Effects

Cumulative projects considered in relation to the *Final Yosemite Valley Plan/SEIS* would not affect Congdon's woolly-sunflower. Therefore, cumulative effects would be negligible.

Congdon's lewisia (Lewisia congdonii)

Direct and Indirect Effects

This species is known from the lower portion of the South Fork of the Merced River, El Portal, and through portions of the Merced River gorge. Continued and increased use of the El Portal area could result in indirect, adverse effects to this species through introduction and establishment of non-native species that could out-compete Congdon's lewisia, and through additional foot traffic that could result from an increased residential population. Most Congdon's lewisia plants are found in relatively inaccessible areas that have steep slopes and poison oak. Potential adverse effects on the species would be minor.

Cumulative Effects

Cumulative projects considered in relation to the *Final Yosemite Valley Plan/SEIS* would not affect Congdon's lewisia. Therefore, cumulative effects would be negligible.

California State Species of Special Concern

WILDLIFE

Coopers's hawk (Accipiter cooperi)

Direct and Indirect Effects

The Cooper's hawk is found in wooded areas up to 9,000 feet in the Sierra Nevada. It frequently hunts along wooded edges.

The Preferred Alternative would restore a large tract of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. This would improve hunting habitat for the Cooper's hawk.

New construction would take place at the visitor/transit center at Yosemite Village, the traffic check station near El Capitan crossover, new stables in Foresta, and campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and north of Tenaya Creek. Roads would be moved out of meadows and into upland habitats, and Southside Drive would be widened from El Capitan crossover to Curry Village. These actions would directly

displace wooded habitat in Yosemite Valley. In Yosemite Valley, there would be an overall minor, beneficial impact on the Cooper's hawk, because a relatively large area of suitable habitat would be restored in relation to the habitat that would be removed.

Potential habitat would also be directly impacted by construction of a transit center and parking at Hazel Green. This would cause a minor, adverse impact because of the limited area that would be involved, the existing human disturbance in the area, and the large area of suitable, unaffected habitat that would continue to exist in surrounding areas. If parking is established at Foresta instead of Hazel Green, effects on Cooper's hawks would be negligible, since most of the forest in this location was destroyed by recent fire making the habitat marginal for the species.

In El Portal, development of parking and housing could result in a loss of forest habitat, but existing high levels of development in this area have likely already affected the quality of Cooper's hawk habitat.

Development of housing in Wawona would result in the removal of some forested habitat, which could adversely affect Cooper's hawks, but the limited size of this area, the existing level of development, and the presence of large amounts of suitable habitat in the surrounding areas would limit this impact to minor. Minor expansion of facilities at Big Oak Flat Entrance and South Entrance would have a negligible effect on Cooper's hawks, for the same reasons listed for Wawona. Increased visitor use of Badger Pass in summer would have a negligible effect on Cooper's hawks, because no new effects to habitat would occur.

The overall, long-term effect on the Cooper's hawk under the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS* would be minor and beneficial, because a large tract of suitable habitat would be restored in relation to suitable habitat that would be displaced by new development.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the Cooper's hawk. These regional plans would have a long-term moderate, beneficial, effect on the Cooper's hawk. Foreseeable projects that could have adverse effects on suitable habitat for the Cooper's hawk include the Hazel Green Ranch project (guest rooms, food services, University of California research station), Yosemite View Parcel Land Exchange, Yosemite Motels Expansion, the El Portal Road Improvement project, and the Evergreen Lodge Expansion.

Overall, cumulative impacts on Cooper's hawks would be moderate and beneficial, due primarily to implementation of wide-ranging plans that would protect large areas of the Sierra Nevada, compared to localized adverse effects on relatively small areas from individual projects.

Northern goshawk (see Federal Species of Concern section)

Sharp-shinned hawk (Accipiter striatus)

Direct and Indirect Effects

Sharp-shinned hawks are rarely but regularly seen in Yosemite Valley, usually in the fall and early spring as they move between wintering and breeding areas. Only one nesting record exists for the park, from Yosemite Valley in 1930. It is possible that increasing human disturbance has affected the quality of Valley habitats to sharp-shinned hawks. Restoration of about 160 acres of previously disturbed meadow, riparian, and oak woodland habitats would improve overall habitat quality for sharp-shinned hawks. If human disturbance has been a factor in use of Yosemite Valley by sharp-shinned hawks, then removal of vehicle traffic from Northside Drive, from Yosemite Lodge to El Capitan crossover could improve habitat quality over a wide area of the Valley. These actions would result in overall moderate, beneficial effects on sharp-shinned hawks.

Under the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS*, potential habitat would be directly impacted by transit center and parking construction at Hazel Green. This would be a minor, adverse impact because of the limited area involved, the existing human disturbance in the area, and the large area of suitable, unaffected habitat that would continue to exist in surrounding areas. Minor expansion of facilities at Big Oak Flat Entrance and South Entrance would affect small areas of forest habitat, but the existing level of development and human disturbance, and the large area of suitable habitat that would remain unaffected in the surrounding areas, would limit the impacts in these locations to minor and adverse. Increased visitor use at Badger Pass in summer could cause increased human disturbance to surrounding areas, but such effects on sharp-shinned hawks are expected to be negligible.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve to the size, integrity, and connectivity of suitable habitat for the sharp-shinned hawk. These regional plans would have a long-term, moderate, beneficial effect on the sharp-shinned hawk.

Foreseeable projects that could have adverse effects on suitable habitat for the sharp-shinned hawk includes the Hazel Green Ranch project (guest rooms, food services, University of California research station), Yosemite View Parcel Land Exchange, Yosemite Motels Expansion, the El Portal Road Improvement projects, and the Evergreen Lodge Expansion.

Overall, cumulative impacts on sharp-shinned hawks would be moderate and beneficial, due primarily to implementation of wide-ranging plans that would protect large areas of the Sierra Nevada, compared to localized adverse effects on relatively small areas from individual projects.

Prairie falcon (Falco mexicanus)

Direct and Indirect Effects

Open areas such as meadows and grasslands are favored by prairie falcons for hunting, and cliff faces are used for nest sites. Actions that affect these habitats would therefore have the most effect on this species.

Restoration of meadow habitats in Yosemite Valley would benefit prairie falcons, but such benefit would be limited to minor, in light of the rarity of this species in the Valley (territorial peregrine falcons may be limiting use). The relocation of stables to McCauley Ranch could affect the quality of that habitat to prairie falcons, but the affected area would be relatively small, given the adjacent large meadow and the area opened by the A-Rock Fire. Minor expansion of facilities at Tioga Pass is expected to avoid meadows. Overall, impacts on prairie falcons under the Preferred Alternative would be minor and beneficial, primarily due to restoration of habitats in Yosemite Valley.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update(NPS), and the Merced River Wild and Scenic Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the prairie falcon. These actions could have long-term, moderate to major, beneficial effects on prairie falcon habitat, depending upon the alternatives chosen and the extent of their implementation over time.

Foreseeable projects that could have an adverse effect on prairie falcons include the Rio Mesa Area Plan; University of California, Merced campus; City of Merced General Plan; and Tioga Inn, Lee Vining. These cumulative projects would have a minor, adverse impact on prairie falcons, because of the limited area they would affect.

Overall, cumulative effects on prairie falcons would be minor and beneficial, due primarily to the protection of habitat provided by implementation of wide-ranging land management plans that would cover large areas of the Sierra Nevada; there would be a limited area of effect for those projects that have an adverse impact on prairie falcons.

Golden eagle (Aquila chrysaetos)

Direct Effects

Although golden eagles have been seen over most of the park, the areas of potential development under the Preferred Alternative that contain the most suitable habitat include El Portal, Yosemite Valley, Foresta, and Tioga Pass. The following are assessments of potential effects to golden eagles in these locations:

El Portal – Development of housing, parking, and operations in this location would primarily affect wooded areas near the bottom of the Merced River canyon, which is not preferred

golden eagle habitat. Most development would occur in or adjacent to areas with existing or previous development. These factors, coupled with the abundance of golden eagle habitat at higher elevations in the canyon, indicate that the impact on golden eagles under this alternative would be negligible.

Yosemite Valley – Restoration of meadow and riparian habitats would improve habitat quality for golden eagles under the Preferred Alternative. Even with this restoration, however, the terrain of Yosemite Valley would be marginal habitat for golden eagles, compared to other areas in the park (e.g., Merced River canyon, Foresta). Effects in Yosemite Valley would be minor and beneficial.

Foresta – Development of stables at McCauley Ranch, and, if decided, development of parking in Foresta would cause adverse effects to forest and meadow habitats. However, the area of such impact in relation to the range of a golden eagle is small. Such impact is also offset by the large area of open terrain suitable for golden eagles that was created by the 1990 A-Rock Fire. The combination of these factors indicates that actions under the Preferred Alternative would be negligible.

Tioga Pass – Development of expanded visitor facilities at the Tioga Pass Entrance Station could affect adjacent meadow and lodgepole pine habitats. The area of such impact, however, would be small relative to the range of a golden eagle, and abundant open terrain in the surrounding area would remain unaffected. These factors, combined with the seasonal use of this area by golden eagles, indicate that impact on this species would be negligible at Tioga Pass under this alternative.

Overall, effects of the Preferred Alternative on golden eagles would be minor and beneficial, due primarily to restoration of habitats in Yosemite Valley.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for golden eagles. These regional plans would have a long-term, moderate, beneficial effect on golden eagles.

Foreseeable projects that could have an adverse effect on golden eagles include the Rio Mesa Area Plan; University of California, Merced campus; City of Merced General Plan; and Tioga Inn, Lee Vining. These projects, in total, would have a minor, adverse effect on golden eagles, because of the limited area they would affect.

Overall, cumulative effects on golden eagles would be minor and beneficial, due primarily to the protection of habitat provided by implementation of wide-ranging land management plans that would cover large areas of the Sierra Nevada. There would be a limited area of effect for those projects that have an adverse impact on golden eagles.

Merlin (Falco columbarius)

Direct and Indirect Effects

Actions that would occur below 4,000 feet elevation — the primary range of merlins in California — would be most likely to affect the species. Under the Preferred Alternative, this includes the following locations:

Yosemite Valley – Restoration of meadow and riparian habitats and reduction of habitat fragmentation would improve the abundance and diversity of birds that merlin prey on in these open and edge habitats. This would be a moderate, beneficial effect on the merlin.

El Portal – Development of housing, parking, and operations to El Portal would likely have a detrimental effect on merlins by reducing habitat in this location. Most of the area likely to be affected, however, has either been affected by previous development or by its proximity to existing development. This, coupled with the abundance of suitable merlin habitat in the surrounding area, indicates that impact on merlins in this location would be minor and adverse.

Wawona – Development of housing in this location would likely affect a small area of wooded habitat that could be used by merlins, although such habitat is not optimal. The existing high level of development in this area, and its effect on adjacent habitats has already caused some degradation. Local impact on merlins from additional development under the Preferred Alternative would therefore be expected to be negligible.

Foresta – The development of stable facilities at McCauley Ranch could have a detrimental effect on meadow habitat that would be used for stock grazing, and meadow and forest habitat that would be removed to build the stable structures. Such actions would be expected to have a minor, adverse impact on merlin by affecting the diversity and abundance of prey. The stables could, however, also increase the abundance of certain opportunistic species of birds that feed on grain (i.e., brown-headed cowbird, brewer's blackbird, and European starling), which could in turn be preyed upon by merlins. While this situation may benefit a few merlins, such benefit is far outweighed by other resource effects created by unnatural concentrations of these bird species. If parking is developed at Foresta instead of Hazel Green, merlin habitat could be further affected at this location. The relatively open terrain of the burned forest, where parking would be developed, is suitable for merlins, but the best habitat — meadow edge — would not be affected by development. Therefore, impact from this development on merlins would be minor and adverse.

The overall impact on merlins under the Preferred Alternative would be minor and beneficial, due primarily to the large areas of habitat that would be restored in Yosemite Valley.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat

for the merlin. These regional plans would have a long-term, moderate, beneficial effect on the merlin.

Foreseeable projects that could have an adverse effect on merlins include Yosemite View Parcel Land Exchange; Rio Mesa Area Plan; Yosemite Motels Expansion; University of California, Merced campus; City of Merced General Plan. These projects would have a minor, adverse effect on merlins.

Overall, cumulative effects would be minor and beneficial, due primarily to the implementation of wide-ranging land management plans that could affect large areas of the Sierra Nevada.

Long-eared owl (Asio otus)

Direct and Indirect Effects

Given the rarity of observations in Yosemite Valley, and the age of the last confirmed nesting there, it is possible that increasing human disturbance has affected use of Valley habitats by long-eared owls, especially in meadow and riparian habitats. The Preferred Alternative in the *Final Yosemite Valley Plan/SEIS* would restore about 160 acres of previously developed meadow, riparian, and oak woodland habitat in Yosemite Valley. This could have a long-term, moderate, beneficial impact on long-eared owls.

Under the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS*, actions that would have adverse effects on potential long-eared owl habitat include:

- Construction of parking at Hazel Green and El Portal
- Construction of new housing in El Portal and Wawona
- Increased human use at the South Entrance and the Big Oak Flat Entrance

These actions would have a minor, adverse impact because of the limited area that would be involved, the existing human disturbance in the area, and the large area of suitable, unaffected habitat that would continue to exist in surrounding areas.

Overall, there would be a minor, beneficial impact on the long-eared owl as a result of a substantial amount of restored high-quality habitat in Yosemite Valley, and smaller reduction of lesser-quality habitat in other areas.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve size, integrity, and connectivity of suitable habitat for long-eared owls. These regional plans would have a long-term, moderate, beneficial effect on long-eared owls.

Foreseeable projects that could have adverse effects on suitable habitat for long-eared owls include the Yosemite View Parcel Land Exchange, Yosemite Motels Expansion, El Portal Road Improvement Project, and the Evergreen Lodge Expansion.

Overall, cumulative effects on long-eared owls would be minor and beneficial, due primarily to the protection of habitat provided by implementation of wide-ranging land management plans that would cover large areas of the Sierra Nevada. There would be a limited area of effect for those projects that have an adverse impacts on long-eared owls.

California spotted owl (see Federal Species of Concern)

Yellow warbler (Dendroica petechia)

Direct and Indirect Effects

The yellow warbler prefers riparian woodlands, but also breeds in chaparral, ponderosa pine, and mixed conifer habitats with substantial amounts of brush. The Preferred Alternative would restore a large tract of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. This would improve suitable habitat for the yellow warbler. Removal of stable operations from Yosemite Valley would benefit yellow warblers by reducing the number of brown-headed cowbirds.

New construction would take place at the Yosemite Village Visitor/Transit Center, the traffic check station near El Capitan crossover, and campsites east of Curry Village, at Camp 4 (Sunnyside Campground), Upper Pines Campground, and along Tenaya Creek. Roads would be moved out of meadows and into upland habitats, and Southside Drive would be widened from El Capitan crossover to Curry Village. These actions would directly displace wooded habitat in Yosemite Valley. In Yosemite Valley, there would be an overall moderate, beneficial impact on the yellow warbler because a relatively large area of highly suitable habitat (e.g., riparian) would be restored relative to the suitable habitat that would be removed (e.g., mixed conifer).

Mixed conifer habitat would be affected by the development of a transit center and parking at Hazel Green. If parking is developed in Foresta rather than Hazel Green, an area of brushy habitat would be removed, possibly having adverse effects on yellow warblers. Such habitat is not optimal and is available in abundance in the surrounding area burned in the A-Rock Fire. This would be a minor, adverse impact because the affected area is marginal habitat for yellow warblers, the affected area is limited, and large areas of suitable, unaffected habitat would continue to exist in surrounding areas.

In El Portal, effects on forest and riparian habitats from development of housing, work places, and parking would have a minor, adverse effect on yellow warblers because the affected area would be relatively small, and existing human effects to these habitats have already degraded their quality.

The moving of concession and National Park Service stables to McCauley Ranch in Foresta would increase the number of brown-headed cowbirds in the area and their parasitism on species such as the yellow warbler, resulting in minor, adverse impact. Development of housing in

Wawona and minor expansion of facilities at the South Entrance and Big Oak Flat Entrance would affect forest habitat. The limited size of the affected areas, the existing level of habitat disturbance, and the lack of highly suitable riparian habitat in these areas would limit the impact to minor and adverse. Increased use of Badger Pass in summer would have a negligible effect on yellow warblers because no additional degradation of habitat would occur.

The overall, long-term effect on yellow warblers under the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS* would be moderately beneficial, primarily due to the restoration of highly suitable riparian habitat and the reduction of stable operations in Yosemite Valley.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the yellow warbler. These regional plans would have a long-term, moderate, beneficial effect on the yellow warbler. The Hazel Green Ranch project (guest rooms, food services, University of California research station) would effect some yellow warbler habitat. This would be a minor adverse effect because the area affected is marginal habitat for yellow warblers, the affected area is limited, and large areas of suitable, unaffected habitat would continue to exist in surrounding areas.

Pallid bat (Antrozous pallidus)

Direct and Indirect Effects

The Preferred Alternative would restore a large tract of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. This would improve foraging habitat for the pallid bat, resulting in moderate, beneficial effects. If a transit center and parking is developed at Foresta instead of Hazel Green, an area of brushy upland habitat with snags would be affected. Because of the abundance of such habitat in this area, effects on pallid bats would be minor and adverse. This restoration would also reduce the need for hazard tree removal in the area, which would improve the availability of roosting sites.

In Yosemite Valley, new development would occur in pallid bat habitat through construction of the Yosemite Village Visitor/Transit Center and the traffic check station near El Capitan crossover, relocation of roads from meadow into forested habitats, widening of Southside Drive between El Capitan crossover and Curry Village, and construction of a bicycle/hiking path adjacent to Southside Drive. These actions would directly affect pallid bat habitat and increase the need for hazard tree reduction in those areas, slightly reducing the availability of trees for roosting and reproduction. In total, effects on forest habitats resulting from these actions would have a minor, adverse effect on pallid bats.

Outside of Yosemite Valley, projects that affect forest habitats could affect pallid bats. These include construction of a transit center and parking at El Portal and Hazel Green, development

of new housing at Wawona and El Portal, and minor expansion of facilities at the Big Oak Flat Entrance and South Entrance. Increased use of Badger Pass would have a negligible effect on pallid bats, because no habitat would be affected. In total, the effect of these actions would be limited to minor and adverse because of the development that currently exists in these areas, the relatively small areas that would be affected, and the abundance of suitable habitat that would remain unaffected in adjacent areas.

Bridge removal could have an adverse effect on night roosting habitat of pallid bats. There would, however, continue to be a variety of natural roosting sites for pallid bats (such as rock outcrops and hollow trees). The removal of bridges would have a minor, adverse effect on the pallid bat.

Overall, the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS* would have a moderate, beneficial impact on pallid bat by restoring large areas of potential bat foraging habitat in east Yosemite Valley, where an important colony of pallid bats is known to exist (at The Ahwahnee).

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could provide benefits to the size, integrity, and connectivity of suitable habitat for the pallid bat. These regional plans would have a long-term, moderate, beneficial effect on the pallid bat.

Foreseeable projects that could have adverse effects on suitable habitat for the pallid bat include the Hazel Green Ranch project (guest rooms, food services, University of California Research Station), Yosemite View Parcel Land Exchange, Yosemite Motels Expansion, El Portal Road Improvement Project, and the Evergreen Lodge Expansion.

Overall, there would be a minor, beneficial cumulative impact on the pallid bat. This conclusion is based on the potential protection of suitable habitat from wide-reaching regional plans. The projects with a possible adverse impact on the pallid bat would affect a relatively small area of habitat compared to projects with potential beneficial impacts.

Townsend's big-eared bat (Corynorhinus townsendii townsendii)

Direct and Indirect Effects

The Preferred Alternative would restore a large tract of previously disturbed meadow, riparian, and California black oak woodland habitat in the east end of Yosemite Valley, totaling about 160 acres. This would improve foraging habitat for the Townsend's big-eared bat, providing moderate beneficial effects on this species.

In Yosemite Valley, new development would occur in Townsend's big-eared bat habitat through construction of the Yosemite Village Visitor/Transit Center and the traffic check station near El Capitan crossover, relocation of roads from meadow into forested habitats, widening of Southside Drive between El Capitan crossover and Curry Village, and construction of a bicycle/hiking path

adjacent to Southside Drive. These actions would directly affect foraging habitat of Townsend's big-eared bat. In total, the effect on forest habitats resulting from these actions would have a minor, adverse impact on pallid bats.

Outside of Yosemite Valley, projects that affect forest habitats could affect Townsend's big-eared bats. These include construction of a transit center and parking at El Portal and Hazel Green, development of new housing at Wawona and El Portal, and minor expansion of facilities at the Big Oak Flat Entrance and South Entrance. Increased use of Badger Pass would have a negligible effect on Townsend's big-eared bats because no habitat would be affected. This species has been confirmed as using the mines in El Portal for roosting and reproduction. Although no actions under this plan would affect the mines, development in forest areas below them would likely affect foraging habitat. In total, the effect of these actions would be limited to minor and adverse because of the development that currently exists in these areas, the relatively small areas involved, and the abundance of suitable habitat that would remain unaffected in adjacent areas.

Because Townsend's big-eared bats are known to roost in buildings and are highly sensitive to disturbance, structures slated for demolition would be evaluated for bats. If bats are detected during periods of the year when reproduction or hibernation is occurring, demolition would be delayed until the bats could be removed from the structure without adversely affecting their survival or that of their young (generally April and October). With such mitigation, effect on Townsend's big-eared bats would be negligible.

Overall, the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS* would have a minor, beneficial impact on the Townsend's big-eared bat, primarily by restoring a diversity of foraging habitats in east Yosemite Valley.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the Townsend's big-eared bat. These regional plans would have a long-term, moderate, beneficial effect on the Townsend's big-eared bat.

Foreseeable projects that could have adverse effects on suitable habitat for Townsend's big-eared bats include the Hazel Green Ranch project (guest rooms, food services, University of California research station), Yosemite View Parcel Land Exchange, Yosemite Motels Expansion, El Portal Road Improvement Project, and the Evergreen Lodge Expansion.

Overall, there would be a minor, beneficial cumulative impact on Townsend's big-eared bat. This conclusion is based on the potential protection of suitable habitat through implementation of wide-reaching regional plans. The projects with a possible adverse impact on the Townsend's big-eared bat would affect a relatively small area of habitat compared to projects with potential beneficial impacts. .

White-tailed hare (Lepus townsendii)

Direct and Indirect Effects

The Tioga Road and existing development in this area likely has a minor adverse effect on the local population of white-tailed hares through habitat reduction, mortality caused by vehicle traffic, and the effects of human activity and associated foot traffic. Any additional development in the Tioga Pass area is likely to increase these effects, but the planned limited size of any such development is unlikely to increase the impact beyond minor and adverse, given that a large amount of suitable habitat in the area would remain unaffected.

Cumulative Effects

Regional and parkwide planning efforts such as the Sierra Nevada Framework for Conservation and Collaboration (USFS), U.S. Forest Service plans for adjacent wilderness, the Fire Management Plan Update (NPS), and the Merced Wild and Scenic River Comprehensive Management Plan (NPS) could improve the size, integrity, and connectivity of suitable habitat for the white-tailed hare. These regional plans would have a long-term, moderate, beneficial effect on the white-tailed hare.

Park Rare Species

PLANTS

El Portal

There are six park rare species that are found in the El Portal area: Indian paintbrush (*Castilleja foliolosa*), collinsia (*Collinsia linearis*), pitcher sage (*Lepechinia calycina*), Congdon's monkeyflower (*Mimulus congdonii*), Palmer's monkeyflower (*Mimulus palmeri*), and phacelia (*Phacelia platyloba*). These species would not be directly impacted by actions proposed in the *Final Yosemite Valley Plan/SEIS*.

There could be indirect effects on these species as a result of the increased human population in El Portal, which could promote additional foot traffic and possible trampling of these species. Non-native plant species would continue to invade undeveloped areas in El Portal. New construction can promote non-native species because it creates conditions that are favored by many non-native plants, such as disturbed soil. An increase in non-native plants could result in habitat loss and a competition for resources (i.e., light, water, and nutrients) for the rare plants in El Portal.

Overall, there would be a minor, adverse effect on these species as a result of an increased population in El Portal and an increase in non-native species as a result of new construction.

Yosemite Valley

Twelve park rare plant species are found in Yosemite Valley: sugar stick *(Allotropa virgata)*, broad-leaved sundew *(Drosera rotundifolia*), stream orchid *(Epipactus gigantea)*, fawn-lily *(Erythronium purpurascens)*, boreal bedstraw *(Galium boreale* spp. *septentrionale*), Sierra laurel

(Leucothoe davisiae), false pimpernel *(Lindernia dubia* var. *anagallidea*), azure penstemon *(Penstemon azureus* spp. *angustissimus*), phacelia *(Phacelia tanacetifolia*), wood saxifrage *(Saxifraga mertensiana)*, giant sequoia *(Sequoiadendron giganteum*), and ladies' tresses *(Spiranthes porrifolia)*. Restoration of riparian and meadow habitat would have a moderate, beneficial impact on boreal bedstraw, false pimpernel, and ladies' tresses.

Removal of tennis courts at The Ahwahnee and relocation of the Superintendent's House (Residence 1) and restoration of these sites to California black oak woodland would have a long-term, major, negative impact on several giant sequoia trees that were planted in the area. Redesign of The Ahwahnee's parking lot could have adverse effects to additional planted giant sequoia trees, depending on final alignment of parking lots and driveways. There would be a negligible impact on the overall sustainability of giant sequoias, as there are three naturally occurring groves elsewhere in the park that would not be affected by the plan.

The remaining species (sugar stick, azure penstemon, phacelia, and wood saxifrage) would not be affected by actions in the Preferred Alternative.

Foresta

Five park rare plant species occur in the Foresta area: snapdragon *(Antirrhinum leptaleum)*, Small's southern clarkia *(Clarkia australis)*, goldenaster *(Heterotheca sessiliflora* ssp. *echioides)*, inconspicuous monkeyflower *(Mimulus inconspicuous)*, pansy monkeyflower (*Mimulus pulchellus*). These plants would not be directly impacted by construction of 14 beds or establishment of a stables operation in Foresta, but individual plants could be permanently removed by development of a parking facility. Increased levels of human activity in the area due to increased residential, operational, and visitor use could have indirect, adverse effects on all of these species. There could also be adverse effects on rare plant habitat as a result of non-native species encroachment associated with ground disturbance and landscaping activities, and horse trailers and vehicles that could spread non-native seeds in feed and manure. Overall, there would be a long-term, moderate, adverse effect on rare plant species in Foresta.

Hazel Green

One park rare plant species occurs at Hazel Green, Small's southern clarkia *(Clarkia australis)*. This species, which occurs in open areas, could be directly affected by development of a transit and parking facility at Hazel Green. Plants could also be affected by picnicking, trampling, and random use of sites adjacent to parking and proposed lodging. This would result in a minor, adverse impact on this species.

Badger Pass

Two park rare species are found at Badger Pass: dwarf sandwort *(Minuartia pusilla)* and Yosemite ivesia *(Ivesia unguiculata)*. There would be no direct effects on these plants, but there could be long-term minor adverse effects from increased visitor use in areas surrounding Badger Pass.

Wawona

Eight park rare species occur within the Wawona basin: snapdragon *(Antirrhinum leptaleum)*, Child's blue-eyed Mary *(Collinsia childii)*, round-leaved sundew *(Drosera rotundifolia)*, Sierra sweet-bay *(Myrica hartwegii)*, Bolander's skullcap *(Scutellaria bolanderi)*, giant sequoia *(Sequoiadendron giganteum)*, trillium *(Trillium angustipetalum)*, and Hall's wyethia *(Wyethia elata)*. The construction of new housing would result in the direct loss of a portion of the trillium population in this area. This would be a moderate, adverse effect on the trillium population in the area. Increased human use in this area during the spring and summer would have minor, indirect effects on all of the Wawona park rare species.

Big Oak Flat Entrance

There are no rare species in the vicinity of the Big Oak Flat Entrance Station.

South Entrance

One park rare species, Sierra sweet-bay *(Myrica hartwegii)*, is located within the riparian areas adjacent to the current road alignment at the South Entrance. There would be no direct effects on this species as a result of proposed construction. There could be a long-term, minor, adverse effect on this species from increased visitor use in the area and associated foot traffic.

Tioga Pass Entrance

Thirteen park rare species occur within hiking distance of Tioga Pass: Sweetwater Mountains milkvetch *(Astragalus kentrophyta* var. *danaus)*, black and white sedge *(Carex albonigra)*, capitate sedge *(Carex capitata)*, Congdon's sedge *(Carex congdonii)*, alpine cerastium *(Cerastium beeringianum)*, Sierra claytonia *(Claytonia nevadensis)*, draba *(Draba praelta)*, desert fleabane *(Erigeron linearis)*, rambling fleabane *(Erigeron vagus)*, Dane's dwarf gentian *(Gentianella tenella* ssp. *tenella)*, common juniper *(Juniperus communis)*, snow willow *(Salix reticulata)*, and groundsel *(Senecio serra* var. *serra)*. One species, the common juniper, could be directly impacted by construction of a new or expanded entrance station at Tioga Pass. There could be indirect effects on all 13 park rare species from increased visitor use and associated foot traffic in the area. There could be increased hiking on Mt. Dana, which is within a day's hike from the Tioga Pass Entrance Station. The popular hike to the top of Mt. Dana is a cross-country path, without a formal route. Increased use on Mt. Dana could have a long-term, moderate, adverse impact on rare plant species on Mt. Dana.

CHAPTER VI. DETERMINATION OF EFFECTS ON FEDERALLY LISTED SPECIES

This determination of effects is based solely on the Preferred Alternative in the *Final Yosemite Valley Plan* as described in Chapter III of this document, and does not assume any potential mitigation measures. Mitigation measures are recommended in Chapter VII. The following criteria were used to develop determinations:

- No Effect – The project (or action) is located outside suitable habitat **and** there would be no disturbance or other direct or indirect impacts on the species.
- May Effect, Not Likely to Adversely Effect – The project (or action) occurs in suitable habitat or results in indirect impacts on the species, but the effect on the species is likely to be beneficial, discountable, or insignificant.
- May Effect, Likely to Adversely Effect – The project (or action) would have an adverse effect on a listed species as a result of direct, indirect, interrelated, or interdependent actions.

Determinations for Federally Listed Threatened or Endangered Species

SIERRA NEVADA BIGHORN SHEEP *(OVIS CANADENSIS SIERRAE)*

It is the determination of the National Park Service that actions that are proposed in the *Final Yosemite Valley Plan/SEIS* may affect, but are not likely to adversely affect, the Sierra Nevada bighorn sheep. The following conclusions have led to this determination:

- There would be no direct effects on habitat for the Sierra Nevada bighorn sheep.
- Indirect effects as a result of increased visitor use at Tioga Pass would be negligible, due to the steep and relatively inaccessible terrain used by the Sierra Nevada bighorn sheep.

VALLEY ELDERBERRY LONGHORN BEETLE *(DESMOCERUS CALIFORNICUS)*

It is the determination of the National Park Service that the actions proposed in the *Final Yosemite Valley Plan/SEIS* may affect, and are likely to adversely affect, the Valley elderberry longhorn beetle. The following conclusions have led to this determination:

- Elderberry plants grow within the project area. Based on the foregoing analysis, there is a likelihood that “take,” as defined in the Endangered Species Act, may occur.

Elderberry plants, the sole foodplant and habitat for the Valley elderberry longhorn beetle, are abundant in the Merced River canyon in the elevation range of the beetle. Elderberry plants would be avoided during construction wherever practicable.

CALIFORNIA RED-LEGGED FROG (*RANA AURORA DRAYTONII*)

It is the determination of the National Park Service that actions that are proposed in the *Final Yosemite Valley Plan/SEIS* would not affect the California red-legged frog. The following conclusions have led to this determination:

- No populations of the California red-legged frog were found in the park in recent surveys, and it is unlikely that red-legged frogs will be found within Yosemite Naitonal Park (Fellers 1999).
- There are two main areas in Yosemite that would be suitable places to reintroduce the California red-legged frog, provided the bullfrog population is removed: Yosemite Valley and the Swamp Lake area (Fellers 1999). The Preferred Alternative would restore at least 135 acres of suitable habitat for the California red-legged frog in Yosemite Valley.

BALD EAGLE (*HALIAEETUS LEUCOCEPHALUS*)

It is the determination of the National Park Service that actions that are proposed in the *Final Yosemite Valley Plan/SEIS* may affect, but are not likely to adversely affect, the bald eagle. The following conclusions have led to this determination:

- Bald eagles are rarely seen within Yosemite National Park and are not known to nest in the park; however, riparian and meadow areas of Yosemite Valley may provide foraging habitat for transient eagles.
- Actions proposed in the *Final Yosemite Valley Plan/SEIS* would restore at least 135 acres of meadow and riparian habitat that could provide foraging habitat for transient eagles.
- Development and fragmentation in upland habitats would have negligible effects on this species.

CHAPTER VII. MANAGEMENT RECOMMENDATIONS AND MITIGATION

Avoidance and Protection Measures

AVOIDANCE AND PROTECTION MEASURES COMMON TO ALL SPECIAL-STATUS SPECIES

The following hierarchy would be employed to avoid, minimize, or compensate for adverse effects to special-status species.

- Avoid adverse effects on special-status species
- Minimize adverse effects on special-status species
- Mitigate/compensate for adverse effects on special-status species

Additional documentation, studies, and consultation would be conducted as appropriate prior to implementation of specific actions.

- Prior to construction, conduct surveys as necessary for special-status species in the vicinity of all new construction in Yosemite Valley, El Portal, Wawona, Foresta, Hazel Green, South Entrance, Big Oak Flat Entrance, Tioga Pass Entrance, and Badger Pass. Bridges and other structures will be surveyed prior to deconstruction. This will take place well in advance of the project design phase to assure that avoidance and minimization requirements can be met. Should additional state or federally listed species be found that were not documented in this Biological Assessment, consultation with the USFWS would be initiated.
- To the extent practicable, site and design facilities/actions to avoid adverse effects to special-status species. If avoidance is infeasible, minimize and compensate adverse effects to special-status as appropriate and in consultation with the appropriate resource agencies.
- Develop and implement restoration and/or monitoring plans as warranted. Plans should include methods for implementation, performance standards, monitoring criteria, and adaptive management techniques.
- Implement measures to reduce adverse effects of non-native plants and wildlife on special-status species.
- Implement stormwater management measures to reduce non-point source pollution discharge from roads, parking lots, and other impervious surfaces. This could include oil/sediment separators, street sweeping, infiltration beds, and use of permeable surfaces and vegetated or natural filters to trap or filter stormwater runoff.
- Use only plants native to Yosemite National Park in landscaping.
- Prepare and implement a noxious weed abatement program. This could include restoration of degraded habitats, use of hand labor to remove weeds, and use of herbicides.

- Implement measures to reduce adverse effects of non-native wildlife. This could include use of processed feeds and hay at stables to reduce food for cowbirds, trapping programs for cowbirds, and measures to eradicate bullfrogs from wetland habitats.
- To the extent practicable, site and design facilities/actions to avoid adverse effects to sensitive wildlife habitats or habitat features, especially during breeding seasons. If avoidance is infeasible, minimize and compensate adverse effects as appropriate.
- Minimize night lighting where practicable. Where night lighting is necessary, design lighting to be minimal, directed downward, and shielded.
- Educate the public on the dangers of intentional or unintentional feeding of park wildlife, and on inadvertent harassment through observation or pursuit.
- Implement standard noise abatement measures during park operations. Standard noise abatement measures could include the following elements: a schedule that minimizes effects to adjacent noise-sensitive uses, use of the best available noise control techniques wherever feasible, use of hydraulically or electrically powered impact tools when feasible, and location of stationary noise sources as far from sensitive areas as possible.
- To the extent practicable, site and design facilities to minimize objectionable noise elements.
- Allow natural processes to maintain the presence of very large, old trees, snags, large-diameter logs, and decaying wood across the landscape.
- Maintain conditions suitable for spotted owl prey base, including decadence features such as mistletoe brooms, cavities, tree deformities, fungus growth, and large, decaying oaks.

CONSTRUCTION- AND DEMOLITION-RELATED BEST MANAGEMENT PRACTICES

The following best management practices would be implemented, as appropriate, prior to, during, and/or after specific construction or demolition actions. Specific tasks would include, but are not limited to, the following:

- Implement a compliance monitoring program when sensitive resources have potential to be affected. The compliance monitoring program would oversee/enforce the below-referenced measures and include compliance strategies and reporting protocols.
- Implement a fencing and flagging program to protect special-status or sensitive habitats. This could include the following types of measures: using of high-visibility snow fences around protected elderberry shrubs, marking trees to be retained, using signs (e.g., “no refueling” signs) in areas of high sensitivity.
- Implement a native vegetation salvage program. This could include minimizing land disturbance, salvage and storage of topsoil, treatment of non-native species, erosion control, and revegetation.

- Implement a dust abatement program. Standard dust abatement measures could include the following elements: water or otherwise stabilize soils, cover haul trucks, employ speed limits on unpaved roads, minimize vegetation clearing, and revegetate after construction.
- Implement standard noise abatement measures during construction. Standard noise abatement measures could include the following elements: a schedule that minimizes effects to adjacent noise-sensitive uses, use of the best-available noise control techniques wherever feasible, use of hydraulically or electrically powered impact tools when feasible, and location of stationary noise sources as far from sensitive uses as possible.
- Implement a noxious weed abatement program. Standard measures could include the following elements: ensure construction-related equipment arrives on site free of mud or seed-bearing material, use only certified weed-free seeds and straw material, identify areas of noxious weeds pre-construction, treat noxious weeds or noxious weed topsoil prior to construction (e.g., topsoil segregation, storage, herbicide treatment), and revegetate with appropriate native species propogated from local genetic stock.
- Implement a natural resource protection program. Standard measures could include construction scheduling, biological monitoring, erosion and sediment control, protection of sensitive habitats, removal of all food-related items or rubbish to bear-proof containers, topsoil salvage, and revegetation. This could include specific construction monitoring by resource specialists, treatment, and reporting procedures.
- To the extent practicable, schedule project activities that generate high levels of noise and other disturbance (e.g., light) to occur during periods of the year and times of day when effects on species sensitive to such disturbance would be minimized.
- Implement a spill prevention and pollution control program (hazardous materials). Standard measures could include hazardous materials storage and handling procedures; spill containment, cleanup, and reporting procedures; and limitation of refueling and other hazardous activities to upland/nonsensitive sites.
- Implement an interpretation and education program. Continue signage and education programs to promote understanding among park visitors.
- Implement a tree protection plan as warranted. This could include measures such as avoiding the root zone (typically 1.5 times the tree canopy), using hand equipment for trenching within the root zone, reducing compaction within root-zones, and maintaining a natural grade.

Species-Specific Avoidance and Protection Measures

The following avoidance and protection measures are included to guide future actions and planning in the project area. These measures are based on current scientific protocols and agency recommendations. These measures are intended to be fluid and to change with increased knowledge about a particular species or suite of species or as new technologies become available and practicable.

The Valley elderberry longhorn beetle

- Mitigation measures prescribed in the Biological Opinion for this plan (rendered by the USFWS) will be applied to all potential actions. The Biological Opinion will be based on conservation guidelines developed by the U.S. Fish and Wildlife Service (USFWS 1999).
- All National Park Service personnel that coordinate construction work should be familiar with the locations and avoidance requirements for all elderberry shrubs within the construction zone.
- The contractor and all of the contractor's on-site personnel should be briefed on the locations of elderberry, avoidance requirements, and penalties for noncompliance.
- Elderberry plants within the project area should be individually fenced 20 feet from the dripline. The area would be signed before clearing and grubbing begins and before any large equipment is allowed access to the site.
- A qualified National Park Service staff member should be present for the duration of the project to ensure no unnecessary take of elderberry occurs. The staff member would have the authority to stop all activities should the potential for unnecessary take become apparent. He or she should report any violations to the USFWS.
- Any construction-related disturbance to the buffer zone (100 feet from the dripline) should be minimized and restored following construction.
- All potential development zones below 3,000 feet (in the typical elevation range of the Valley elderberry longhorn beetle) have been surveyed for elderberry plants. All project sites above 3,000 feet will be surveyed prior to site design for the presence or absence of beetle exit holes. In the unlikely event that exit holes are discovered in areas outside the typical range of the Valley elderberry longhorn beetle, mitigation measures as described in the Biological Opinion from the USFWS will be applied.

Special-Status Birds

- To minimize adverse effects on nesting birds, limit construction activities in nesting habitat during breeding season, which is typically March to August.
- Trees or structures that contain unoccupied nests (stick nests or tree cavities), but must be removed, should be removed prior to March 1, or after nesting season is over.
- Alternatively, if activities take place during the breeding season, a qualified biologist would conduct a pre-construction survey for individuals no more than one week prior to construction in March through August. If any special-status species is observed nesting, a determination should be made as to whether or not the Preferred Alternative will impact the active nest or disrupt reproductive behavior.
- If it is determined that the action will not impact an active nest or disrupt breeding behavior, construction will proceed without any restriction or mitigation measure.

- If it is determined that construction will impact an active nest or disrupt reproductive behavior, then avoidance strategies should be implemented. Construction could be delayed within 500 feet of such a nest, until a qualified biologist determines that the subject birds are no longer nesting or until any juvenile birds are no longer using the nest as their primary day and night roost.

Special-Status Aquatic Species

Implementation of the following reasonable and prudent measures would reduce or eliminate potential taking of special-status amphibians. These measures were abstracted from the USFWS Programmatic Biological Opinion for projects that may affect California red-legged frog though the Biological Opinion does not specifically apply to this project because no take of California red-legged frog is anticipated. Provisions listed below are considered reasonable and prudent for actions located within 100 feet of aquatic habitats:

- Work activities within potential special-status aquatic species habitat should be completed between July 1 and November 1 or during low-flow conditions.
- A qualified biologist should survey the site two weeks before the onset of activities. If special-status aquatic species, tadpoles, or eggs are found, the biologist will contact the appropriate agency(ies) to determine if moving any of these life-stages is appropriate. Surveys will follow the "Guidance on Site Assessment and Field Surveys for California Red-legged Frogs" developed by the U.S. Fish and Wildlife Service (USFWS 1997).
- A qualified biologist should conduct training sessions for all construction personnel before activities begin.
- Construction adjacent to aquatic habitats should be fenced to prohibit the movement of frogs into the construction area, and to control siltation and disturbance in aquatic habitats.
- All construction adjacent to or within aquatic habitats should be regularly monitored.
- All trash that may attract predators should be contained and regularly removed. Following construction, all trash and construction debris will be removed from work areas.
- All fueling and maintenance of vehicles and equipment should occur at least 20 meters (65 feet) from any aquatic habitat.
- The spread or introduction of invasive, non-native plant species should be avoided. When practicable, invasive plants in the project areas will be removed.
- The number and size of access routes, staging areas, and total area of activity should be limited to the minimum necessary to achieve the project goal.
- Best management practices should be implemented to control erosion.
- During dewatering, intakes should be completely screened with wire mesh not larger than 5 millimeters to prevent aquatic species from entering the pump system. Water would be released or pumped downstream at an appropriate rate to maintain downstream flows

during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that allows flow to resume with the least disturbance to the substrate.

- Where practicable, qualified biologists would permanently remove, from within the project area, any individuals of non-native species, such as bullfrogs, crayfish, and centrachid fishes, to the maximum extent possible.
- The downstream construction boundary should be fenced to prohibit the movement of aquatic species into the construction area and to control creek siltation and disturbance to downstream riparian habitat. An exclosure fence should be installed in the creek channel both upstream and downstream of construction activities as appropriate. Fences should be installed at least six weeks prior to the commencement of any construction activities.
- Immediately after installation of the exclosure fence, a qualified biologist should inspect all areas within the fence for aquatic species.

Special-Status Bats

- A qualified biologist should conduct surveys to determine whether affected structures, mature trees, or other habitat (e.g., crevices) provide hibernacula, nursery colony, or roosting habitat.
- If surveys conducted during the fall do not reveal any bat species, then the action should occur within three days in order to prevent the destruction of any bats that move into the area after the survey.
- If the site is being used as a winter roost, then the action should occur either prior to hibernation (between September 1 and October 1) or after hibernation (January 15 to February 15).
- If spring surveys are conducted and reveal that the site is being used as a nursery colony, the action should not occur until after August 15, when the pups are weaned and are free-flying.

Other Special-Status Mammals

- Excavation sites (trenches or pits) would have suitable ramps for small mammals to exit these areas.
- A qualified biologist would be available to inspect all excavations before refilling occurs, ensuring that special-status species are passively relocated to avoid incidental take.
- Exclosure fencing could be erected prior to construction to ensure that no special-status species are within the construction area.
- To prevent mortality caused by motor vehicles, speed limits in primary fisher habitat should be low.

CHAPTER VIII. CONTRIBUTORS AND REFERENCES

Contributors

	TITLE	RESPONSIBILITY
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APPENDIX K-1 – U.S. FISH AND WILDLIFE SERVICE SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825

REPLY REFER

1-1-00-SP-1332

March 29, 2000

Memorandum

To: Lisa Acree, Resources Management, National Park Service, El Portal, California

From: Chief, Endangered Species Division, Sacramento Fish and Wildlife Office, Fish and Wildlife Service, Sacramento, California

Subject: Species List for the Draft Yosemite Valley Plan

We are sending the enclosed list in response to your March 29, 2000, request for information about endangered and threatened species (Attachment A). These lists fulfill the requirement of the Fish and Wildlife Service (Service) to provide species lists under section 7(c) of the Endangered Species Act of 1973, as amended (Act).

The Service used the information in your letter to locate the proposed project on a U.S. Geological Survey (U.S. Geological Survey) 7.5 minute quadrangle map. The animal species on the Attachment A quad list are those species we believe may occur within, *or be affected by projects within,* the U.S. Geological Survey quads where your project is planned.

Any plants on the quad list are ones *that have actually been observed* in that quad. Plants may occur in a quad without having been observed there. Therefore we have included a species list for the whole county in which your project occurs. We recommend that you survey for any relevant plants shown on this list.

Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them. Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you must*

contact the California Department of Fish and Game for official information about these species. Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Some of the species listed in Attachment A may not be affected by the proposed action. A trained biologist or botanist, familiar with the habitat requirements of the listed species, should determine whether these species or habitats suitable for them may be affected. For plants, we recommend using the enclosed Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species (Attachment C).

Some pertinent information concerning the distribution, life history, habitat requirements, and published references for the listed species is available upon request. This information may be helpful in preparing the biological assessment for this project, if one is required. Please see Attachment B for a discussion of the responsibilities Federal agencies have under section 7(c) of the Act and the conditions under which a biological assessment must be prepared by the lead Federal agency or its designated non-Federal representative.

Formal consultation, under 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. If you determine that a proposed species may be adversely affected, you should consider requesting a conference with our office under 50 CFR § 402.10. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of this list with our office.

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as *critical habitat*. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal. Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, this will be noted on the species list. Maps and boundary descriptions of the critical habitat may be found in the *Federal Register*. The information is also reprinted in the *Code of Federal Regulations (*50 CFR 17.95*)*.

Candidate species are being reviewed for possible listing. Contact our office if your biological assessment reveals any candidate species that might be adversely affected. Although they currently have no protection under the Endangered Species Act, one or more of them could be proposed and listed before your project is completed. By considering them from the beginning, you could avoid problems later.

Your list may contain a section called *Species of Concern*. This term includes former *category 2 candidate species* and other plants and animals of concern to the Service and other Federal, tate and private conservation agencies and organizations. Some of these species may become candidate species in the future.

If the proposed project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by the U.S. Army Corps of Engineers (Corps), a Corps permit will be required, under section 404 of the

Clean Water Act and/or section 10 of the Rivers and Harbors Act. Impacts to wetland habitats require site specific mitigation and monitoring. You may request a copy of the Service's General Mitigation and Monitoring Guidelines or submit a detailed description of the proposed impacts for specific comments and recommendations. If you have any questions regarding wetlands, contact Mark Littlefield at (916) 414-6580.

We appreciate your concern for endangered species. Please contact Harry Mossman, Biological Technician, at (916) 414-6650, if you have any questions about the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of Mr. Mossman at this address. You may fax requests to him at 414-6710.

Sincerely,

Karen J. Miller
Chief, Endangered Species Division

Attachments

ATTACHMENT A
Endangered and Threatened Species That May Occur in or be Affected by
Projects in the U.S.G.S. 7 ½ Minute Quads Listed at the End of This Report
Draft Yosemite Valley
Plan March 29, 2000

Listed Species

Mammals

Sierra Nevada (=California) bighorn sheep, *Ovis canadensis cailforniana* (E)

Birds

bald eagle, *Hailaeetus leucocephalus* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

Paiute cutthroat trout, *Oncorhynchus (=Salmo) clarki seleniris* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Species of Concern

Mammals

Mono Basin mountain beaver, *Aplodontia rufa californica* (SC)

pygmy rabbit, *Brachylagus idahoensis* (SC)

spotted bat, *Euderma maculatum* (SC)

greater western mastiff-bat, *Eumops perotis cailfornicus* (SC)

Califorma wolverine, *Gulo gulo luteus* (CA)

Sierra Nevada snowshoe hare, *Lepus americanus tahoensis* (SC)

American (=pine) marten, Martes *americana* (SC)

Pacific fisher, *Martes pennanti pacifica* (SC)

Small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

Mt. Lyell shrew, *Sorex lyelli* (SC)

Sierra Nevada red fox, *Vulpes vulpes necator* (CA)

Birds.

northern goshawk, *Accipiter gentilis* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco paregrinus anatum* (D)

Harlequin duck, *Histrionicus histrionicus* (SC)

California spotted owl, *Strix occidentalis occidentalis* (SC)

Reptiles

northwestern pond turtle. *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

northern sagebrush lizard, *Sceloporus graciosus graciosus* (SC)

Amphibians

Yosemite toad, *Bufo canorus* (SC)

limestone salamander, *Hydromantes brunus* (CA)

Mount Lyell salamander, *Hydromantes platycephalus* (SC)

foothill yellow-legged frog, *Rana boylii* (SC)

mountain yellow-legged frog, *Rana muscosa* (SC)

Fish

Red Hills roach, *Lavinia symmetricus* (SC)

longfin smelt, *Spirinchus thlieichthys* (SC)

Invertebrates

Wawona riffle beetle, *Atractelmis wawona* (SC)

Merced Canyon shoulderband snail, H*elminthoglypta allynsmithi* (SC)

keeled sideband snail, *Monadenia circumcarinata* (SC)

Yosemite mariposa sideband snail, *Monadenia hillebrandi yosemitensis* (SC)

Bohart's blue butterfly, *Philotiella speciosa bohartorum* (SC)

Sierra pygmy grasshopper, *Tetrix sierrana* (SC)

Plants

Tiehm's rock-cress, *Arabis tiehmii* (SC)

Yosemite woolly-sunflower, *Eriophyllum nubigenum* (SC)

Hetch Hetchy (slndr.stmmd.) monkeyflower, *Mimulus filicaulis* (SC)

parasol clover, *Trifolium bolanderi* (SC)

U.S.G.S. 7 ½ minute quads used	**Quad#**
HALF DOME	437A
EL CAPITAN	437B
EL PORTAL	438A
TIOGA PASS	454A
YOSEMITE FALLS	455D
ACKERSON MTN.	456D

KEY:

(E) *Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T) *Threatened*	Listed as likely to become endangered within the foreseeable future.
(P) *Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX) *Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C) *Candidate*	Candidate to become a *proposed* species.
(SC) *Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(D) *Delisted*	Delisted. Status to be monitored for 5 years.
(CA) *State-Listed*	Listed as threatened or endangered by the State of California.

Critical Habitat

Area essential to the conservation of a species.
Endangered and Threatened Species that May Occur in or be Affected by
PROJECTS IN MARIPOSA COUNTY
March 29,2000

Listed Species

Birds

Aleutian Canada goose, *Branta canadensis leucopareia* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

blunt-nosed leopard lizard, *Gambelia (=Crotaphytus) sila* (E)

Amphibians

California red-Iegged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T)

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

Valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

Plants

Mariposa pussy-paws, *Calyptridium pulchellum* (T)

fleshy owl's-clover, *Castilleja campestris ssp. succulenta* (T)

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

California wolverine, *Gulo gulo luteus* (CA)

Sierra Nevada red fox, *Vulpes vulpes necator* (CA)

pygmy rabbit, *Brachylagus idahoensis* (SC)

pale Townsend's big-eared bat, *Corynorhinus (=Plecotus) townsendii pallescens* (SC)

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

spotted bat, *Eudenna maculatum* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

Sierra Nevada snowshoe hare, *Lepus americanus tahoensis* (SC)

American (=pine) marten, *Martes americana* (SC)

Pacific fisher, *Martes pennanti pacifica* {SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-Iegged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Mt. Lyell shrew, *Sorex Iyelli* (SC)

Birds

Swainson's hawk, *Buteo Swainsoni* (CA)

little willow flycatcher, *Empidonax trailii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

northern goshawk, *Accipiter gentilis* (SC)

tricolored blackbird, *Agelaius tricolor* (SC)

grasshopper sparrow , *Ammodramus savannarum* (S C)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

short-eared owl, *Asio flammeus* (SC)

American bittern, *Botaurus lentiginosus* (SC)

ferruginous hawk, *Buteo regalis* (SC)

Lawrence's goldfinch, *Carduelis lawrencei* (SC)

Vaux's swift, *Chaetura vauxi* (SC)

olive-sided flycatcher, *Contopus cooperi* (SC)

black swift, *Cypseloides niger* (SC)

hermit warbler, *Dendroica occidentalis* (SC)

Pacific-slope flycatcher, *Empidonax difficilis* (SC)

Harlequin duck, *Histrionicus histrionicus* (SC)

least bittern, western, *Ixobrychus exilis hesperis* (SC)

loggerhead shrike, *Lanius ludovicianus* (SC)

Lewis' woodpecker, *Melanerpes lewis* (SC)

white-faced ibis, *Plegadis chihi* (SC)

rufous hummingbird, *Selasphorus rufus* (SC)

red-breasted sapsucker, *Sphyrapicus ruber* (SC)

Brewer's sparrow, *Spizella breweri* (SC)

California spotted owl, *Strix occidentalis occidentalis* (SC)

Bewick's wren, *Thryomanes bewickii* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

southwestern pond turtle, *Clemmys marmorata pallida* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

northern sagebrush lizard, *Sceloporus graciosus graciosus* (SC)

Amphibians

limestone salamander, *Hydromantes brunus* (CA)

Yosemite toad, *Bufo canorus* (SC)

Mount Lyell salamander, *Hydromantes platycephalus* (SC)

foothill yellow-legged frog, *Rana boylii* (SC)

mountain yellow-legged frog, *Rana muscosa* (SC)

western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)

river lamprey, *Lampetra ayresi* (SC)

Kern brook lamprey, *Lampetra hubbsi* (SC)

Pacific lamprey, *Lampetra tridentata* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Wawona riffle beetle, *Atractelmis wawona* SC)

Merced Canyon shoulderband snail, *Helminthoglyta allynsmithi* (SC)

Leech's skyline diving beetle, *Hydroporus leechi* (SC)

California linderiella fairy shrimp, Linderiella occidentalis (SC)

molestan blister beetle, *Lytta molesta* (SC)

Yosemite mariposa sideband snail, *Monadenia hillebrandi yosemitensis* (SC)

Bohart's blue butterfly, *Philotiella speciosa bohartorum* (SC)

Sierra pygmy grasshopper, *Tetrix sierrana* (SC)

Plants

Merced clarkia, Cl*arkia lingulata* (CA)

Mariposa lupine, *Lupinus citrinus var. deflexus* (CA)

Hoover's rosinweed, *Calycadenia hooveri* (SC)

Mono Hot Springs evening-primrose, *Camissonia sierrae ssp. alticola* (SC)

beaked clarkia, *Clarkia rostrata* (SC)

Rawson's flaming-trumpet, *Collomia rawsoniana* (SC)

Yosemite woolly-sunflower, *Eriophyllum nubigenum* (SC)

Parry's horkelia, *Horkelia parryi* (SC)

shaggy-hair lupine, *Lupinus spectabilis* (SC)

Hetch Hetchy (slndr.stmmd.) monkeyflower, *Mimulus filicaulis* (SC)

California beaked-rush, *Rhynchospora californica* (SC)

parasol clover, *Trifolium bolanderi* (SC)

Pleasant Valley mariposa, *Calochortus clavatus var. avius* (SC) *

Congdon's lomatium, *Lomatium congdonii* (SC) *

Mariposa daisy, *Erigeron mariposanus* (SC) **

KEY:

(E)	*Endangered*	Listed (i n the Federal Register) as being in danger of extinction .
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	Other species of concern to the Service.
(0)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.

*	*Extirpated*	Possibly extirpated from the area.
**	*Extinct*	Possibly extinct
Critical	*Habitat*	Area essential to the conservation of a species.

INDEX

Alpine cerastium, K-4, K-28, K-73
American (pine) marten, K-3, K-27
American peregrine falcon, K-3, K-24, K-112, K-113
Azure penstemon, K-5, K-30, K-78
Bald eagle, K-2, K-3, K-24, K-67, K-84
Bat
  fringed myotis, K-3
  Greater western mastiff, K-3, K-4
  long-eared myotis, K-3
  long-legged myotis, K-3
  pallid, K-4
  small-footed myotis, K-3
  spotted, K-3, K-4
  Townsend's big-eared, K-4
  Yuma myotis, K-3, K-4
Bell's sage sparrow, K-3, K-8
Black and white sedge, K-4, K-28
Bohart's blue butterfly, K-3, K-19, K-22, K-58, K-110, K-111
Bolander's clover, K-3, K-20, K-31, K-59, K-112
Bolander's skullcap, K-5, K-20, K-30, K-79, K-130
Boreal bedstraw, K-5, K-29
California red-legged frog, K-2, K-4, K-17, K-19, K-21, K-23, K-34, K-35, K-84, K-85, K-132, K-137, K-143
California spotted owl, K-3, K-4, K-18, K-19, K-21, K-25, K-39, K-69, K-88, K-89, K-124
California wolverine, K-3, K-4, K-27, K-63, K-101, K-115
Capitate sedge, K-4, K-28
Carex
  albonigra, *K-4*, K-28, K-73, K-116
Central Valley steelhead, K-2, K-8
Child's blue-eyed Mary, K-5, K-29, K-74, K-130
Clarkia
  Small's southern, K-4, K-74
Collinsia
  linearis, *K-5*, K-19, K-29, K-74, K-128
Congdon's lewisia, K-4, K-19, K-30, K-117
Congdon's lomatium, K-3, K-30, K-58, K-111
Congdon's monkeyflower, K-19, K-30, K-77, K-128
Congdon's woolly sunflower, K-29, K-116
Congdon's woolly-sunflower, K-4, K-19, K-116, K-117
Cooper's hawk, K-4, K-18, K-19, K-20, K-21, K-23, K-64, K-65, K-117, K-118
Dane's gentian, K-5, K-29
Delta smelt, K-2, K-8
Desert Fleabane, K-5, K-75
Draba, K-5, K-29, K-74
Dwarf sandwort, K-5, K-30, K-78
Endangered Species Act, K-1, K-2, K-9, K-11, K-131
Erigeron
  linearis, *K-5*, K-29, K-75
  vagus, *K-5*, K-29, K-75
False pimpernel, K-5, K-30, K-77
Fawn-lily, K-5, K-75
Foothill yellow-legged frog, K-3, K-4, K-23, K-106
Fringed myotis bat, K-26, K-94
Giant sequoia, K-5, K-31, K-80
Golden eagle, K-4, K-24, K-120
Goldenaster, *K-5*, K-29, K-76
Great gray owl, K-3, K-25, K-113
Greater western mastiff bat, K-27, K-97
Groundsel, K-5, K-31, K-79
Harlequin duck, K-2, K-4, K-23, K-87
Indian paintbrush, K-4, K-19, K-28, K-73, K-128
Juniper
  common, K-5, K-29, K-67, K-71, K-76
Keeled sideband snail, K-3, K-8
Ladies' tresses, K-5, K-31, K-80
Limestone salamander, K-3, K-4, K-22, K-104
Little willow flycatcher, K-3
Long-eared myotis bat, K-26, K-92
Long-eared owl, K-4, K-24, K-69, K-123
Longfin smelt, K-3, K-8
Long-legged myotis bat, K-26, K-95
Mariposa sideband snail, K-3, K-22, K-56, K-109
marten, K-3, K-20, K-49, K-50, K-102, K-104, K-156
Merced Canyon (Yosemite) shoulderband snail, K-3, K-22
Merlin, K-4, K-24, K-122
Monkeyflower
  Congdon's, K-5
  inconspicuous, K-5, K-30, K-77
  Palmer's, K-5, K-19
  pansy, K-5, K-30, K-78
Mount Lyell salamander, K-3, K-4, K-22, K-52, K-104, K-105
Mount Lyell shrew, K-3, K-25, K-41, K-90
Mountain yellow-legged frog, K-3, K-4, K-23, K-107
Northern bedstraw, K-5, K-75
Northern goshawk, K-3, K-4, K-24, K-65, K-88, K-119
Northern sagebrush lizard, K-3, K-8
Northwestern pond turtle, K-3, K-4, K-23, K-108
Pacific fisher, K-3, K-4, K-20, K-27, K-50, K-103
Paiute cutthroat trout, K-2, K-7
Pallid bat, K-25, K-125
peregrine falcon, K-3, K-17, K-59, K-60, K-112, K-113, K-157
Phacelia
  platyloba, K-5, K-19, K-30, K-78, K-128
  tanacetifolia, K-5, K-30, K-79, K-129
Pitcher sage, K-5, K-29, K-77
Prairie falcon, K-4, K-24, K-120
Rambling Fleabane, K-5, K-75
Red Hills roach, K-3, K-8

Sacramento spittail, K-2, K-8
Sedge
Congdon's, K-4, K-19, K-20, K-28, K-63, K-73, K-116
Sharp-shinned hawk, K-4, K-24, K-119
Sierra claytonia, K-4, K-74
Sierra laurel, K-5, K-29, K-77, K-128
Sierra Nevada bighorn sheep, K-2, K-28, K-32, K-83, K-131
Sierra Nevada mountain beaver, K-3, K-4
Sierra Nevada red fox, K-3, K-4, K-20, K-27, K-48, K-49, K-63, K-100, K-115
Sierra Nevada snowshoe hare, K-3, K-27, K-47, K-99
Sierra pygmy grasshopper, K-3, K-19, K-22, K-109, K-110
Sierra sweet-bay, K-5, K-20, K-21, K-30, K-78, K-130
Slender-stemmed (Hetch Hetchy) monkeyflower, K-3
Small's southern clarkia, K-28, K-129
Small-footed myotis bat, K-26, K-91
Snapdragon, K-4, K-28, K-72
Snow willow, K-5, K-30, K-79
Southwestern pond turtle, K-3, K-4, K-23, K-108
Spotted bat, K-26, K-90
Stream orchid, K-5, K-29, K-75
Sugar stick, K-4, K-28, K-72
Sundew
round-leaved, K-5, K-29, K-75
Sweetwater Mountains milkvetch, K-4, K-28
Tiehm's rock-cress, K-3, K-28
Tompkin's sedge, K-4, K-28, K-63, K-116
Townsend's big-eared bat, K-26, K-70, K-71, K-126, K-127
Trillium, K-5, K-31, K-80
Valley elderberry longhorn beetle (VELB), K-7, K-19, K-35, K-36, K-37, K-131, K-140
Wawona riffle beetle, K-3, K-19, K-22, K-57, K-110
White-tailed hare, K-4, K-27, K-128
Willow flycatcher, K-3, K-25, K-62, K-114
wolverine, K-3, K-4, K-27, K-49, K-156
Wood saxifrage, K-5, K-30, K-79
Wyethia
Hall's, K-5, K-31, K-80, K-130
Yellow warbler, K-4, K-25, K-124
Yosemite ivesia, K-5, K-29, K-76, K-129
Yosemite onion, K-4, K-19, K-28, K-63, K-116
Yosemite toad, K-3, K-4, K-20, K-23, K-52, K-53, K-105, K-106
Yosemite woolly-sunflower, K-3, K-9, K-158, K-163
Yuma myotis bat, K-26, K-45, K-46, K-96, K-97, K-118

appendix L

Biological Opinion

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX L – BIOLOGICAL OPINION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room West 2605
Sacramento, California 95825

IN REPLY REFER TO:
1-1-00-F-0196

September 7, 2000

Memorandum

To: Superintendent, Yosemite National Park, P.O. Box 577, Yosemite National Park, California

From: Acting Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Formal Endangered Species Consultation on the Yosemite Valley Plan Environmental Impact Statement

This is in response to your May 8, 2000, request for formal consultation, pursuant to section 7(a) of the Endangered Species Act of 1973, as amended (Act), on the Yosemite Valley Plan. At issue are project effects to the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (beetle), the Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*), the bald eagle (*Haliaeetus leucocephalus*), and the California red-legged frog *(Rana aurora draytonii*). This response is in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act). The Service received your request for formal consultation on
May 11, 2000.

Based on our review of the proposed action, we concur with your determination that the project is not likely to adversely affect the Sierra Nevada bighorn sheep or the bald eagle. However, we cannot concur with your no effect determination for the California red-legged frog. The *Draft California Red-legged Frog Recovery Plan* has identified portions of the Tuolumne River watershed that occur with the boundary of Yosemite National Park as a core area, an area where recovery actions will be focused (U.S. Fish and Wildlife Service 2000). We agree there is no evidence to indicate that California red-legged frogs currently occur within the boundaries of Yosemite National Park. However, recovery actions could be implemented in the near future to allow recolonization of the area through natural or artificial means. The Service commends the National Park Service (NPS) for your willingness to remove exotic species including bullfrog

(*Rana catesbeiana*), crayfish, and centrachid fish to the maximum extent possible in potential future habitat for the red-legged frog. We also agree that the measures outlined under the Species-Specific Avoidance and Protection Measure of the biological assessment go a long way toward minimizing any negative affects to the California red-legged frog and other amphibian species from the implementation of the Yosemite Valley Plan. Therefore, the Service believes the project may affect but is not likely to adversely affect the California red-legged frog. Unless presented with new information, no further action would be necessary to comply with the Act for the California red-legged frog, Sierra Nevada bighorn sheep or bald eagle. The proposed action may adversely affect the valley elderberry longhorn beetle. This consultation will address potential impacts to the beetle.

As you know, the Service delisted the American peregrine falcon (*Falco peregrinus anatum*) on August 25, 1999. The continued recovery of the peregrine falcon is dependent upon Federal agencies continuing to carry out actions that benefit the species. In the Conservation Recommendations section below, the Service will provide recommendations to minimize disturbance to nesting peregrine falcons.

The Service has recently received petitions to list the California spotted owl *(Strix occidentalis occidentalis*), mountain yellow-legged frog (*Rana muscosa*), and Yosemite toad (*Bufo canorus*) as threatened and endangered species. The Service will make a determination within the next month whether or not these three petitions provide sufficient information to warrant a one-year status review that could lead to their eventual listing. We believe that it is in the best interest of the NPS to incorporate all practical actions that would minimize any impacts to these three species resulting from the implementation of the Yosemite Valley Plan. We are providing recommendations for reducing impacts to these three species in the Conservation Recommendations section of this biological opinion.

This biological opinion is based on information provided in: (1) the *Draft Yosemite Valley Plan Supplemental Environmental Impact Statement*, dated April 2000; (2) the *Biological Assessment Draft Yosemite Valley Plan Supplemental Environmental Impact Statement*, dated April 2000; (3) the *Revised Biological Assessment Draft Yosemite Valley Plan Supplemental Environmental Impact Statement*, dated June 2000; (4) the *Merced Wild and Scenic River Comprehensive Management Plan Biological Assessment*, dated June 2000; (5) additional information regarding the quantity, condition and location of elderberry plants that may be affected by the project received on July 6, 2000; and (6) additional information located in Service files. A complete administrative record is on file at the Sacramento Fish and Wildlife Office (SFWO).

CONSULTATION HISTORY

April 17, 2000. The Service received a letter from the NPS, requesting concurrence that the Merced River Wild and Scenic Comprehensive Management Plan would not likely adversely affect any federally-listed threatened or endangered species.

May 11, 2000. The Service received a request for the NPS for formal consultation on the *Yosemite Valley Plan Supplemental Environmental Impact Statement*.

July 6, 2000. The Service received additional information from the NPS including a revised biological assessment and information on the number, condition and location of elderberry plants that may be affected by the implementation of the Yosemite Valley Plan.

July 11, 2000. The Service sent a memo to the NPS concurring with the determination that the formalization of the Merced River Plan will not adversely affect threatened and endangered species. In addition, the memo stated that since the Merced River Plan was incorporated within the Yosemite Valley Plan, formal consultation for the Yosemite Valley Plan would address project related affects to threatened, endangered and sensitive species that could occur under the Merced River Plan.

August 15, 2000. The Service received the biological assessment for the Final Yosemite Valley Plan Supplemental Environmental Impact Statement.

BIOLOGICAL OPINION

GEOGRAPHIC LOCATION OF PROPOSED ACTION

A majority of the proposed project occurs within the Yosemite Valley area of Yosemite National Park. Additional features of the Yosemite Valley Plan would take place outside Yosemite Valley in El Portal, Foresta, Hazel Green, and Badger Pass.

DESCRIPTION OF THE PROPOSED ACTION

The preferred alternative proposes a number of actions to meet the goals of the 1980 *Yosemite National Park General Management Plan*. The preferred alternative aims to restore degraded areas and reduce development within the Merced River ecosystem and other highly valued natural and cultural resource environments. In addition, the preferred alternative would reduce traffic congestion, limit crowding, and expand orientation and interpretation services. The plan would move non-essential housing, administrative headquarters, offices, and other functions out of Yosemite Valley to areas within the park boundary including the El Portal Administrative Site.

A thorough description of the proposed project can be found in the Final Yosemite Valley Plan Supplemental Environmental Impact Statement. The following list summarizes most of the actions proposed under the preferred alternative:

1) Approximately 175 acres of disturbed or degraded land in Yosemite Valley would be restored to natural conditions;

2) Day use parking for Yosemite Valley would be consolidated through the construction of a 550 vehicle parking lot at Yosemite Village and the construction of Out-of-Valley day-visitor parking areas at Badger Pass, El Portal and Hazel Green or (Foresta);

3) Removal of one or two historic bridges affecting Merced River flow;

4) Reduction in the number of camp sites and lodging units in Yosemite Valley;

5) Relocation of employee housing from Yosemite Valley to El Portal and Wawona; and

6) Relocation of NPS and concessioner stables to McCauley Ranch in Foresta;

The revised biological assessment states that there are 213 elderberry plants in the project area, 124 which have stems over one inch in diameter at ground level. Elderberry plants are distributed in the following areas throughout the project site:

1) Hillside East/Hillside West - 17 elderberry plants, all stems less than one inch in diameter;

2) Village Center - 14 elderberry plants, all with stems greater than one inch in diameter. One plant with beetle exit holes;

3) Old El Portal - Six elderberry plants, five plants have stems greater than one inch in diameter. None of the plants have beetle exit holes;

4) Rancheria - 136 elderberry plants, 74 have stems greater than one inch in diameter. Two plants with beetle exit holes;

5) Middle Road - 22 elderberry plants, 14 have stems greater than one inch in diameter. Four plants have beetle exit holes;

6) Hennessey's Ranch - 10 elderberry plants, nine have stems greater than one inch in diameter. Four plants have beetle exit holes;

7) Sand Pit - Two elderberry plants, both with stems greater than one inch in diameter. No beetle exit holes; and

8) Railroad Flat - Six elderberry plants, all have stems greater than one inch in diameter.

STATUS OF THE SPECIES

On August 8, 1980, the valley elderberry longhorn beetle was listed as a threatened species (45 **FR** 52803). Two areas along the American River in the Sacramento metropolitan area have been designated as critical habitat for the beetle. In addition, an area along Putah Creek, Solano County, and the area west of Nimbus Dam along the American River Parkway, Sacramento County, are considered essential habitat, according to the Recovery Plan for the beetle (USFWS 1984). These areas support large numbers of mature elderberry shrubs with extensive evidence of use by the beetle.

The beetle is dependent on its host plant, elderberry (*Sambucus* sp.), which is a common component of the remaining riparian forests of the Central Valley. Use of the plants by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just prior to the pupal stage. Recent field work along the Consumnes River and in the Folsom Lake area indicates that larval galleries can be

found in elderberry stems with no evidence of exit holes; the larvae either succumb prior to construction of an exit hole or are not far enough along in the developmental process to construct an exit hole. Larvae appear to be distributed in stems which are 1.0 inch or greater in diameter at ground level. The *Valley Elderberry Longhorn Beetle Recovery Plan* (USFWS 1984) and Barr (1991) contain further details on the beetle's life history.

Population densities of the beetle are probably naturally low (USFWS 1984), and it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991), that the beetle is a poor disperser. Low density and limited dispersal capability may cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

ENVIRONMENTAL BASELINE

Extensive destruction of California's Central Valley riparian forests has occurred during the last 150 years due to agricultural and urban development (Katibah 1984, Katibah et al. 1984, Smith 1977, Thompson 1961). Based on a 1979 aerial survey, only about 102,000 acres out of an estimated 922,000 acres of Central Valley riparian forest remain (Katibah et al. 1981). More extreme figures were given by Frayer et al. (1989), who reported that approximately 85 percent of all wetland acreage in the Central Valley was lost before 1939, and that from 1939 to the mid-1980s, the acreage of wetlands dominated by forests and other woody vegetation declined from 65,400 acres to 34,600 acres. Differences in methodology may explain the differences between the studies. In any case, the historical loss of riparian habitat in the Central Valley strongly suggests that the range of the beetle has been reduced and its distribution greatly fragmented. Loss of non-riparian habitat where elderberry occurs (e.g., savanna and grassland adjacent to riparian habitat, oak woodland, mixed chaparral-woodland), and where the beetle has been recorded (Barr 1991), suggests further reduction of the beetle's range and increased fragmentation of its upland habitat.

The beetle's current distribution is patchy throughout the remaining habitat of the Central Valley from Redding to Bakersfield. Surveys conducted in 1991 (Barr 1991) found evidence of beetle activity at 28 percent of 230 sites with elderberry plants present. The beetle appears to be only locally common, found in population clusters which are not evenly distributed across available elderberry shrubs. Frequently only particular clumps or trees in the study areas were found to harbor the beetle. Plants used by the beetle usually show evidence of repeated use over a period of several years, but sometimes only one or two exit holes are present. Similar observations on the clustered distribution of exit holes were made by Jones and Stokes (1987). Barr (1991) noted that elderberry shrubs and trees with many exit holes were most often large, mature plants; young stands were seldom occupied.

As stated above, two areas are designated as critical habitat for the beetle. The American River Parkway (Parkway), extending from Nimbus Dam to the confluence with the Sacramento River, represents a 22-mile long corridor of mixed riparian forest and grassland confined by flood-control levees and urban development along its entire length. Elderberry shrubs occur throughout this corridor. With the exception of levee maintenance, the Parkway is managed primarily for recreation, including a bike path. Evidence of use by the beetle can be found throughout the Parkway.

Within the project area, elderberry plants are commonly found in areas below 3,000 feet in elevation, especially the El Portal area. Elderberry plants represent a subdominant species within interior live oak forests, interior live oak woodlands, blue oak woodlands, canyon live oak forests, mixed north slope forests, foothill pine/live oak/chaparral woodlands, northern mixed chaparral, interior live oak chaparral, and westside ponderosa pine forests in the project area.

To summarize, the Service believes that the beetle, though wide-ranging, is in long-term decline due to human activities which have resulted in widespread alteration and fragmentation of riparian habitats, and to a lesser extent, upland habitats, which support the beetle.

EFFECTS OF THE PROPOSED ACTION

Direct Effects

Up to 124 elderberry shrubs with stems measuring greater than one inch in diameter could be directly affected by the proposed project. A total of 651 stems large enough to harbor beetle larvae could be directly impacted. All beetle larvae inhabiting these shrubs/stems could be killed during the removal process.

Indirect Effects

Indirect effects to the beetle could result from habitat fragmentation through the removal of 124 shrubs in the proposed project area. Habitat fragmentation can inhibit dispersal and colonization of beetles between remaining habitat areas. Fragmentation may lead to population declines and localized extinctions by dividing a population into smaller, isolated subpopulations in restricted areas. These smaller populations may then be adversely affected by inbreeding depression, genetic drift, and other problems associated with small population size (Primack 1998).

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the Yosemite Valley Plan are not considered in this section, because they require separate consultation pursuant to section 7 of the Act.

The Service is not aware of specific projects that might affect the beetle or its habitat that are currently under review by State, county, or local authorities. Nevertheless, continued human population growth in the Central Valley, in general, is expected to drive further development of agriculture, cities, industry, transportation, and water resources in the foreseeable future. Some of these future activities will not be subject to Federal jurisdiction (and thus are considered to enter into cumulative effects), and are likely to result in loss of riparian and other habitats where elderberry shrubs and the beetle occur.

CONCLUSION

After reviewing the current status of the beetle, the environmental baseline for the action area, the effects of the proposed Yosemite Valley Plan, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the beetle. Critical habitat has been designated for the beetle. However, this action does not affect areas designated as critical habitat for the beetle, therefore, no destruction or adverse modification of critical habitat is anticipated .

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the NPS in order for the exemption in section 7(o)(2) to apply. The NPS has a continuing duty to ensure that the covered activity complies with the terms and conditions of this incidental take statement. If the NPS fails to adhere to the terms and conditions of the incidental take statement, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

The Service expects that incidental take of the valley elderberry longhorn beetle will be difficult to detect or quantify. The cryptic nature of these species and their relatively small body size make the finding of a dead specimen unlikely. The species occurs in habitats that make them difficult to detect. Due to the difficulty in quantifying the number beetles that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of elderberry stems one inch or greater in diameter at ground level (beetle habitat) that could become unsuitable for beetles due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 651 elderberry stems could become unsuitable for use by the beetle as a result of the proposed action.

Upon implementation of the following reasonable and prudent measures, incidental take associated with the Yosemite Valley Plan on the beetle in the form of harm, harassment, or mortality from habitat loss or direct mortality will become exempt from the prohibitions

described under section 9 of the Act for direct impacts; in addition, incidental take in the form of harm, harassment, or mortality associated with the Yosemite Valley Plan will be exempt from the prohibitions described under section 9 of the Act for indirect impacts as a result of the management activities described. The incidental take associated with the proposed action is hereby exempted from prohibitions of take under section 9 of the Act.

EFFECT OF THE TAKE

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the beetle or result in destruction or adverse modification of critical habitat for the beetle.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the beetle:

1. Minimize the effects of project impacts to the beetle and to elderberry shrubs (habitat) throughout the proposed project area.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the NPS must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are non-discretionary.

1. The following terms and conditions implement reasonable and prudent measure one (1):

2. Confine clearing to the minimal area necessary to facilitate project activities.

3. All elderberry shrubs to be avoided within the vicinity of the proposed project would be flagged and surrounded with high-visibility fencing for the duration of construction activities.

4. Movement of heavy equipment to and from the project site shall be restricted to established roadways to minimize habitat disturbance.

5. Restore any damage occurring within 100 feet of elderberry shrubs that are not removed by the project.

6. Prevent the application of all pesticides within 100 feet of all retained elderberry shrubs with stems measuring 1 inch or greater in diameter at ground level.

7. Work crews shall be briefed on the status of the beetle, the need to protect its host plant (elderberries), requirements to avoid damaging elderberry shrubs, and possible penalties for not complying with identified avoidance and minimization measures.

8. To further compensate for impacts to beetles inhabiting 651 elderberry stems that would be lost or otherwise adversely affected due to activities associated with the Yosemite

Valley Plan, the NPS shall establish a 22.55 acre valley elderberry conservation area (conservation area), complete with a 100-foot buffer, within the park boundary in close proximity to one of the impact sites. Within the conservation area, the NPS would be required to establish 2,728 elderberry seedlings or cuttings and 1,096 associated native species plantings according to the Service's Conservation Guidelines for the Valley Elderberry Longhorn Beetle (enclosure). For the purposes of this consultation, the Service has assumed a worst case scenario where 651 stems measuring greater than one inch in diameter would be taken during the construction of the Yosemite Valley Plan (See **Appendix A** for a discussion and calculation of the worst case scenario).

9. The conservation area should be incorporated into the General Management Plan for Yosemite National Park as an area that will be managed specifically for the long-term protection of the valley elderberry longhorn beetle.

10. Transplant all elderberry shrubs with stems measuring one inch in diameter or greater at ground level, following the Service's July 9, 1999, Conservation Guidelines for the Valley Elderberry Longhorn Beetle, from all impacted sites to the conservation area.

11. Develop and implement a Service approved management plan for the conservation area. This plan should provide measures for insuring long-term protection and survival of all elderberry shrubs that are transplanted, planted or naturally occurring within the conservation area. In addition, the plan should include a monitoring program that conforms to the Service's July 9, 1999, Conservation Guidelines for the Valley Elderberry Longhorn Beetle.

Reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take on a species that might result from the proposed action. The Service believes that no more than the number of beetles inhabiting 651 elderberry stems will be incidentally taken. If, during the course of the action, this level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

REPORTING REQUIREMENTS

The Sacramento Fish and Wildlife Office is to be notified within three working days of the finding of any listed species or any unanticipated take of species addressed in this biological opinion. The Service contact person for this is the Division Chief for Endangered Species at (916) 414-6620.

Any dead or severely injured beetles found (adults, pupae, or larvae) shall be deposited in the Entomology Department of the California Academy of Sciences. The Academy's contact is the Senior Curator of Coleoptera at (415) 750-7239. All observations of valley elderberry longhorn beetles - live, injured, or dead - or fresh beetle exit holes shall be recorded on California Natural Diversity Data Base (NDDB) field sheets and sent to California Department of Fish and Game, Wildlife Habitat Data Analysis Branch, 1416 Ninth Street, Sacramento, California 95814.

A post-construction compliance report prepared by a Service approved monitoring biologist(s) shall be forwarded to the Chief, Endangered Species Division, at the Sacramento Fish and Wildlife Office within 60 calendar days of the completion of each project. This report shall detail: (I) dates that construction occurred; (ii) pertinent information concerning the applicant's success in meeting project compensation measures; (iii) an explanation of failure to meet such measures, if any, and recommendations for remedial actions and request for approval from the Service, if necessary; (iv) known project effects on federally listed species, if any; (v) occurrences of incidental take of federally listed species, if any; and (vi) other pertinent information.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

1. The NPS should assist the Service in the implementation of the Recovery Plan for the Valley Elderberry Longhorn Beetle (U.S. Fish and Wildlife Service 1984).

2. To minimize disturbance to the peregrine falcon, the NPS should avoid any construction related or recreation related activity (i.e. rock climbing) within one mile of an eyrie during the peregrine falcon breeding season.

3. To minimize adverse impacts to the California spotted owl, the following measures should be incorporated into your project description:

4. For all project related activities, including building, road, and parking lot construction, recreation, and watershed restoration, with the potential for disturbance of reproductive behavior in or near suitable California spotted owl habitat, spotted owl surveys should be conducted to identify spotted owl use areas.

    b. All project related activities that may disturb California spotted owl breeding activity should not occur within one quarter mile of spotted owl nest stands during the breeding season (February 15 to August 15).

    c. Efforts should be made to retain all live conifers greater than 20 inches diameter at breast height.

    d. Efforts should be made to retain all hardwoods greater than 10 inches diameter at breast height.

    e. Efforts should be made to retain all snags with the project area.

4. To minimize potential impacts to and enhance essential habitat for the mountain yellow-legged frog and the Yosemite toad, the NPS should incorporate the following measures into the Yosemite Valley Plan and any future projects within the park that may affect these species:

   a. Locate all project related recreation and construction activities including building, road, and parking lot construction, out of potential habitat for these species. Special consideration should be given when siting facilities within the Badger and Tioga Pass areas of Yosemite National Park.

   b. Ensure that runoff from existing and future infrastructure, especially parking lots, does not enter aquatic habitats that may be occupied by these species.

   c. Remove nonnative trout species from high mountain lakes and streams to allow the recolonization of historic habitat by these species.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION–CLOSING STATEMENT

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please contact Jason Davis or Maria Boroja of this office at (916) 414-6640 if you have any questions.

Sincerely,

Cay C. Goude
Acting Field Supervisor

Enclosures

cc: ARD (ES), Portland, OR
CDFG, Region 2, Rancho Cordova, CA (Attn: Larry Eng)

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appendix M

Sequencing

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX M – SEQUENCING

Introduction

The implementation of the *Yosemite Valley Plan* will occur over many years and will be accomplished sequentially. Each action related to developing replacement facilities outside Yosemite Valley, relocating functions, rehabilitating and/or removing structures, and redeveloping and restoring areas to natural conditions, is linked to other actions. The purpose of this appendix is to identify the general sequence of the implementation of elements in Alternative 2, the Preferred Alternative. As funding is secured and projects progress through site planning, compliance, and design, more specific implementation information will be available.

Summary of Major Actions

Alternative 2 of the *Final Yosemite Valley Plan/SEIS* includes over 250 actions. These actions have been sorted into nine series of projects, each of which leads to a target that supports the overall goals of the *Yosemite Valley Plan*. These series were developed through analyzing the relationships and links between the individual actions created by physical or operational constraints. As a result of these links, restoration, administration, and transportation actions occur in each of the nine series. These series of projects are not independent; they are often interlinked. The nine series are as follows:

RESOURCE STEWARDSHIP

The goal of this series is to restore former campgrounds, administrative, and lodging areas to natural conditions and to restore or maintain cultural areas. Natural and cultural restoration projects that are directly linked with other geographical or functional groupings can be found in another series.

INTERPRETATION, EDUCATION, AND ORIENTATION

The goal of this series is to expand Yosemite's interpretive services and education services. Project examples include converting the west end of the Yosemite Village area into museum and education space, and installing interpretive exhibits Valleywide. Visitor centers would also be provided near each of the park entrances.

CAMPGROUNDS

The goal of this series is to provide camping outside of the River Protection Overlay through rehabilitation of existing campgrounds and construction of new campgrounds, and to restore former campground areas to natural conditions. Camp 4 (Sunnyside Campground) is not included in this series, but is found in the Yosemite Lodge and Camp 4 series. Project examples include removing the concessioner stable and housing, and constructing a campground check station, amphitheater, campgrounds, and associated restoration to natural conditions.

Yosemite Falls

The goal of this series is to improve visitor experience through redevelopment and redesign of parking areas, bridges, trails, and exhibits and to restore areas to natural conditions in the vicinity of Lower Yosemite Fall.

Yosemite Lodge and Camp 4 (Sunnyside Campground)

The goal of this series is to enhance the visitor experience and improve resource conditions through reconstruction of Yosemite Lodge, redesign and expansion of Camp 4 (Sunnyside Campground), and restoration of areas to natural conditions.

Curry Village

The goal of this series is to enhance the visitor experience through rehabilitation of existing lodging and the construction of new lodging at Curry Village, and to restore former housing and lodging areas to natural conditions. The new dormitories west of Curry Village are in the employee housing series. Project examples include relocating recreation facilities (ice rink, sports rentals, etc.), constructing new cabins, and rehabilitating the Pavilion and Meadow Deck areas (i.e., expanded grocery).

Yosemite Village (Visitor/Transit Center and Maintenance Areas)

The goal of this series is to improve visitor services and transit through the construction of a new visitor and transit center, and consolidated parking in Yosemite Village. Project areas, which are specifically interconnected, are the new visitor/transit center and the redevelopment of the NPS Operations Building (Fort Yosemite) area as a light maintenance area for shuttles, including relocating existing functions and facilities from both areas. While this series covers a majority of the Yosemite Village area, the interpretation and education services at the west end of the Yosemite Village area are included in another series.

Circulation

The goal of this series is to reduce motor vehicle traffic in the Valley, restore former circulation routes to natural conditions, and improve non-vehicle circulation options. Project examples include expanding and improving the in-Valley shuttle system, developing an out-of-Valley shuttle system, constructing multi-use paved trails, converting Southside Drive to two-way traffic, and developing new picnic areas.

Employee Housing

The goal of this series is to relocate some employee housing out of the Valley, relocate some housing within the Valley, and to restore some former housing areas to natural conditions. The park would first strive to locate housing outside the park and administrative areas. If needed, project examples include constructing new housing and employee support facilities, and upgrading utility, roads, and pathway systems in new housing locations.

Determining Sequencing: Links Between Actions

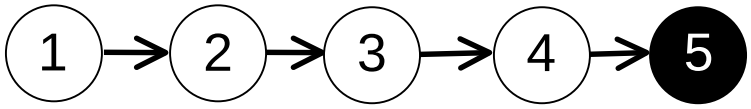
To determine the sequencing of projects, it is important to first establish the links that exist between the various individual actions. These links place requirements or limitations on the order in which projects can occur, and therefore guide the sequencing of actions. Some links are caused by physical constraints, such as the need to first remove structures in areas designated for reuse, prior to constructing new facilities in the same location or prior to designated restorations. Some links are caused by operational goals, such as the desire to minimize disruption to the visitor experience. For example, the existing visitor center would not be removed until a new one is built. Collectively, these links form ordered categories of actions that must be taken for each series to be completed. While there are some variations in the order of actions for specific projects, generally, they fall into the following sequence:

- **One:** Site planning, design work, and possibly regulatory compliance (e.g., wetland delineation) must be completed (see Introduction for Chapter 2 for more information on compliance)
- **Two:** Constructing new, replacement facilities prior to removing old facilities; relocating functions to the new facilities in a method designed to minimize impacts on the visitor experience
- **Three:** Removing or rehabilitating structures in the area
- **Four:** Providing any additional support facilities and functions that are required for the project to be fully operational
- **Five:** The major actions to complete the series can be accomplished to achieve the stated goal

The evolution of a series of projects is best seen through the example on the following page. Following the example, there are nine charts showing the general sequencing for the series of projects in Alternative 2.

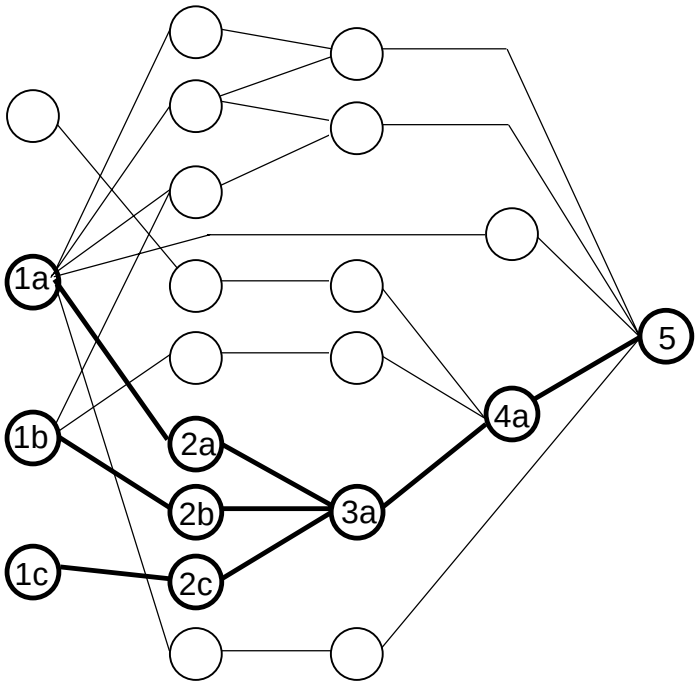
Example: Yosemite Village (Visitor/Transit Center and Maintenance Area)

What is an example of the categories leading to the completion of major actions?



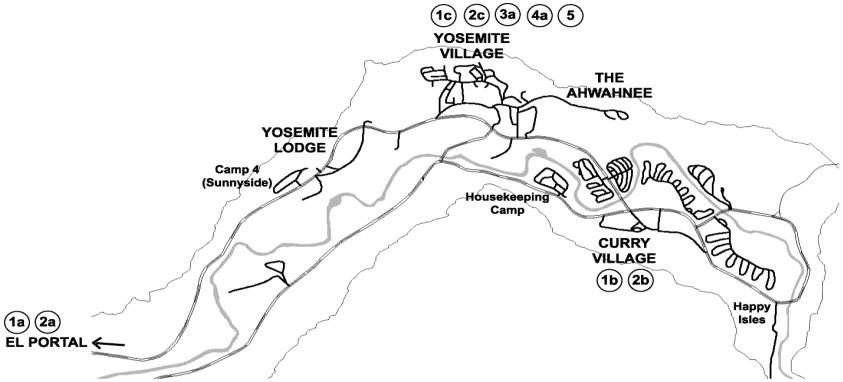
1 Conduct necessary site planning, design work, and regulatory compliance
2 Construct replacement facilities for displaced functions
3 Remove or rehabilitate current facilities in the location of new site
4 Construct support facilities for new visitor center and transit operations
5 Construct new visitor/transit center in Yosemite Village

The diagram below displays the individual actions within the five categories as a series of projects leading to the end goal. Example links are highlighted and explained to the right.



1a El Portal site planning
1b Curry Village site planning
1c Yosemite Village site planing
2a Construct replacement administrative offices
2b Construct replacement campground maintenance shops
2c Construct replacement firehouse
3a Rehabilitate or remove NPS maintenance facilities, firehouse, and offices
4a Construct new light maintenance shuttle facilities in NPS maintenance area
5 Construct new visitor/transit center

What areas of the park are affected by the sample shown? The graphic below shows how sequenced actions impact several areas in El Portal and the Valley.



Resource Stewardship (Natural and Cultural)

1 →	2 →	3 →	4 →	5
Conduct necessary site planning/design work/ regulatory compliance for locations of new structures and circulation routes	Construct replacement facilities or realign infrastructure to allow for removals prior to restoration projects	Remove specified functions and facilities to allow for the restoration of areas	Create facilities and plans to support Valley restoration efforts	Restore former campgrounds, administrative, and lodging areas to natural conditions and restore or maintain cultural areas
Conduct site planning for the Curry Village and campground areas	▪ Create replacements for the utilities which are currently in meadows and River Protection Overlay areas ▪ Realign Curry Village Road to allow removal of secondary roads through meadows	Remove the following functions and facilities: ▪ Utilities from Upper and Lower River Campgrounds and southern Ahwahnee Meadow ▪ Ahwahnee and Stoneman Meadow roads ▪ Curry Orchard access road ▪ Housekeeping lodging (164 units) ▪ Relocate Superintendent's House (Residence 1) ▪ Old sewer plant, bulk fuel storage, and sand pit areas in El Portal ▪ The Ahwahnee tennis courts and administrative area east of The Ahwahnee ▪ Temporary Happy Isles snack stand	▪ Build bridge crossings to re-establish cut-off river channels south of Ahwahnee Bridge ▪ Construct multi-use paved trail segments to reroute circulation around restoration areas ▪ Evaluate additional roads for possible realignment to restore natural water flows ▪ Conduct a Visitor Experience Resource Protection study	Restore the following areas to natural conditions: ▪ Upper and Lower River Campgrounds, North Pines, and a portion of Lower Pines Campgrounds ▪ Former Housekeeping lodging area ▪ Tennis courts and administrative area at The Ahwahnee ▪ Bulk fuel, old sewer plant, and sand pit areas in El Portal ▪ Ahwahnee and Stoneman Meadows Restore or maintain the following cultural areas: ▪ Historic landscapes in Yosemite Village area ▪ Lamon and Hutchings Orchards, without further cultivation

Note: In some cases, actions in Category 4 may actually need to be accomplished before removals in Category 3 to ensure that services and operations are not interrupted. It is not always necessary to complete every action in one category prior to beginning actions in later categories, and actions in different categories may occur simultaneously.

Interpretation, Education and Orientation

1	2	3	4	5
Conduct necessary site planning, design work, and regulatory compliance for locations of new structures and circulation routes	Create replacement facilities for functions being displaced by the rehabilitation of the Visitor Center, auditoriums and administrative buildings	Remove functions formerly located in the Valley Visitor Center and administrative buildings to allow for rehabilitation into an museum and Interpretation and Education services	Create facilities and plans to support the new Interpretation and Education Complex and expanded interpretive services	Expand Yosemite's interpretive services through the development of west end of mall for new Interpretation and Education services and creation of visitor centers near all park entrances
Conduct site planning for the following: ▪ El Portal ▪ Yosemite Village ▪ Areas for new visitor centers near entrance stations	Construct space in El Portal for the following: ▪ National Park Service headquarters ▪ Interpretive administrative support ▪ Administration and supervision Construct space in Yosemite Village for the following: ▪ New Visitor/Transit Center ▪ Valley district operations (to be located in both the new district office building and the new firehouse building) ▪ Museum collections	Remove the following functions from the Visitor Center and administrative buildings: ▪ National Park Service headquarters ▪ Interpretive administrative support ▪ Valley district operations and administration (including law enforcement, wilderness, etc.) ▪ Some museum collections	To support expanded interpretive services: ▪ Develop and install valleywide interpretive exhibits and new interpretive trails ▪ Rehabilitate Yosemite Village gathering and program area ▪ Prepare accessibility plan to outline improvement to visitor facilities	▪ Expand interpretive services in the Valley ▪ Create a new interpretive and education services through rehabilitation of current visitor center, National Park Service headquarters, and Museum/Valley District buildings (including museum) ▪ Construct new visitor centers near Arch Rock, South, Tioga, and Big Oak Flat Entrance Stations

Note: In some cases, actions in Category 4 may actually need to be accomplished before removals in Category 3 to ensure that services and operations are not interrupted. It is not always necessary to complete every action in one category prior to beginning actions in later categories, and actions in different categories may occur simultaneously.

Campgrounds

1	2	3	4	5
Conduct necessary site planning, design work, and regulatory compliance for locations of new structures and circulation routes	Construct replacement facilities for functions being removed or realigned to allow for restoration and rehabilitation of campgrounds	Remove functions and facilities in the campgrounds area to allow for redevelopment or restoration	Construct support facilities for rehabilitated and new campgrounds	Provide camping outside of the River Protection Overlay through the rehabilitation of existing and construction of new campgrounds, and restore former campground areas to natural conditions
Conduct site planning for the Curry Village, campgrounds, and Foresta areas	Create replacements for the following: ▪ Backpackers and Group Campgrounds ▪ Campground utilities ▪ Campground amphitheater ▪ Stock staging areas and corrals ▪ Realign Curry Village Road from Southside Drive to campgrounds ▪ Employee housing Create replacement in Foresta or other area for the following: ▪ Volunteer group campgrounds ▪ Concessioner administrative stable (possibly through relocation of historic structures)	Remove the following functions and facilities: ▪ Concessioner stable and kennels ▪ Employee housing at Boys Town and stable area ▪ Current campground check-in kiosk ▪ Backpackers, Group and Yellow Pine Campgrounds ▪ Current RV dump station	▪ Construct a new campground check station and maintenance/ administrative office, including an RV dump station, to support rehabilitated and new campgrounds ▪ Reconstruct wilderness parking area to support backcountry camping	▪ Construct new campgrounds at Tenaya Creek and new sites at Upper Pines ▪ Rehabilitate Upper and Lower Pines Campgrounds ▪ Restore to natural conditions former Backpackers, Group and Yellow Pine Campgrounds and former concessioner stable and housing area

Note: In some cases, actions in Category 4 may actually need to be accomplished before removals in Category 3 to ensure that services and operations are not interrupted. It is not always necessary to complete every action in one category prior to beginning actions in later categories, and actions in different categories may occur simultaneously.

Yosemite Falls

1	2	3	4	5
Conduct necessary site planning, design work, and regulatory compliance for locations of new structures and circulation routes	Create replacement facilities for functions being displaced by realigned circulation and restoration/redevelopment of parking areas	Remove functions and facilities in the Yosemite Falls area to allow for restoration and redevelopment of parking areas	Construct support facilities for redesigned Yosemite Falls area	Improve visitor experience through redevelopment and redesign of parking areas, bridges, trails, and exhibits, and restore areas to natural conditions in the vicinity of Lower Yosemite Falls
Finish site planning for Yosemite Falls area in the vicinity of Lower Yosemite Fall	Create replacements for the following: ▪ Tour bus parking (goes to the new light maintenance area) ▪ Visitor parking (goes to the consolidated parking area for the new transit center)	Remove the following functions and facilities: ▪ Current bus and visitor parking areas ▪ Existing restroom facilities ▪ Pedestrian bridge over Yosemite Creek	▪ Construct a new restroom facility and shuttle bus stop to support the visitor experience at the redesigned Yosemite Falls area ▪ Construct new vehicle bridge over Yosemite Creek and realign Northside Drive	▪ Partially redevelop and partially restore to natural conditions the former Yosemite Falls parking area (including the protection of a prehistoric village) ▪ Redesign the Lower Yosemite Fall trails, bridges, and interpretive exhibits

Note: In some cases, actions in Category 4 may actually need to be accomplished before removals in Category 3 to ensure that services and operations are not interrupted. It is not always necessary to complete every action in one category prior to beginning actions in later categories, and actions in different categories may occur simultaneously.

Yosemite Lodge and Camp 4 (Sunnyside Campground)

1	2	3	4	5
Conduct necessary site planning, design work, and regulatory compliance for locations of new structures and circulation routes	Create replacement facilities for functions being removed to allow for Yosemite Lodge reconstruction or circulation realignment	Remove functions and facilities in Yosemite Lodge area to allow for Lodge reconstruction	Construct new or rehabilitate facilities to support guest lodging at Yosemite Lodge and Camp 4	Enhance visitor experience and improve resources through reconstruction of Yosemite Lodge, redesign and expansion of Camp 4 and restore areas to natural conditions
Conduct revised site planning for Yosemite Lodge and Camp 4	Create replacements for the following: ▪ Employee housing	Remove the following facilities: ▪ Employee housing ▪ Maple, Juniper, Laurel, and Alder motel units for redevelopment ▪ Birch motel unit when it reaches obsolesce ▪ Hemlock motel unit for restoration ▪ Parking and utilities associated with building removals	▪ Construct parking and utilities to support reconstructed lodging and expanded camping ▪ Redesign or rehabilitate the Cliff Room, Mountain Bar, gift store, existing registration building, and amphitheater at Yosemite Lodge to support guest lodging ▪ Construct new vehicular bridge over Yosemite Creek and realign Northside Drive	▪ Reconstruct Yosemite Lodge ▪ Redesign and expand Camp 4 ▪ Restore areas south of realigned Northside Drive and between proposed Indian Cultural Center and Camp 4 to natural conditions

Note: In some cases, actions in Category 4 may actually need to be accomplished before removals in Category 3 to ensure that services and operations are not interrupted. It is not always necessary to complete every action in one category prior to beginning actions in later categories, and actions in different categories may occur simultaneously.

Curry Village

1	2	3	4	5
Conduct necessary site planning, design work, regulatory compliance for locations of new structures and circulation routes	Create replacement facilities for functions being removed to allow for lodging redevelopment and restoration, or realign circulation	Remove functions and facilities in Curry Village to allow for the redevelopment and restoration of the area	Construct new or rehabilitate existing facilities in Curry Village to support guest lodging	Enhance visitor experience through the rehabilitation of existing and construction of new lodging at Curry Village, and restore former housing and lodging areas to natural conditions
Conduct site planning for the Curry Village and campground areas	Create replacements for the following: ▪ Ice rink/recreational facility ▪ Employee housing ▪ Curry Village utilities	Remove the following functions and facilities: ▪ Existing ice rink ▪ Employee housing at Huff House, the Terrace, and Cooks' Cabins ▪ Selected visitor tent cabins	▪ Redesign and/or rehabilitate Curry Pavilion, the pool, and the amphitheater to support guest lodging ▪ Construct a satellite fire house to support Curry Village area ▪ Realign Curry Village Road from Southside Drive to campgrounds	Rehabilitate existing or construct new lodging at Curry Village: ▪ Rehabilitate cabins without baths and cabins with baths; construct new cabins with baths ▪ Rehabilitate historic studios into lodging Restore former housing and lodging areas to natural conditions: ▪ Terrace housing area ▪ Visitor tent cabin area

Note: In some cases, actions in Category 4 may actually need to be accomplished before removals in Category 3 to ensure that services and operations are not interrupted. It is not always necessary to complete every action in one category prior to beginning actions in later categories, and actions in different categories may occur simultaneously.

Yosemite Village (Visitor/Transit Center and Maintenance Area)

1 →	2 →	3 →	4 →	5
Conduct necessary site planning, design work, regulatory compliance for locations of new structures and circulation routes	Create replacement facilities for functions being displaced from the Yosemite Village area	Remove functions and facilities in the location of the new Visitor/Transit Center and maintenance area	Construct functions and facilities to support the new visitor center and transit operations	Improve visitor services and transit through construction of a new Visitor Center, consolidated parking and Transit Facility in Yosemite Village
Conduct site planning for the following areas: ▪ Yosemite Village ▪ Curry Village ▪ El Portal ▪ Foresta	In Yosemite Village create space for relocation of: ▪ Valley district operations ▪ Fire station/emergency medical services ▪ Some concessioner functions in rehabilitated concessioner's warehouse ▪ Art Activity Center In Curry Village create space for relocation of: ▪ Campground maintenance ▪ Fire station ▪ Main grocery (through remodeling of Curry Pavilion) In El Portal or other location create space for relocation of: ▪ Parkwide administration, supervision, and storage ▪ Jail and public garage ▪ Concessioner's headquarters and short-term warehousing ▪ Employee housing In Foresta create space for relocation of: ▪ NPS administrative stable (if viable) ▪ Parkwide Trails Operations	Remove the following functions and facilities from the Yosemite Village area: ▪ Concessioner's headquarters and associated out buildings ▪ Village Store ▪ Village Garage and fire station ▪ Art Activity Center (former bank building) ▪ Employee housing Remove the following functions and facilities from the maintenance area: ▪ NPS Operations Building, firehouse, and associated outbuildings ▪ NPS administrative stable ▪ Employee housing	Construct the following facilities to support visitor experience in the Visitor/ Transit Center area: ▪ Food service ▪ Retail ▪ Recycling center Construct the following facilities to support transit operations: ▪ Shuttle light maintenance in Valley NPS maintenance area ▪ Shuttle heavy maintenance in El Portal ▪ Shuttle fueling and charging stations ▪ Bus day and night parking areas	Construct the following new facilities at Yosemite Village: ▪ Visitor Center ▪ Transit Center ▪ Consolidated parking with a picnic area, including restoration of some existing parking areas

Note: In some cases, actions in Category 4 may actually need to be accomplished before removals in Category 3 to ensure that services and operations are not interrupted. It is not always necessary to complete every action in one category prior to beginning actions in later categories, and actions in different categories may occur simultaneously.

Circulation

1	2	3	4	5
Conduct necessary site planning, design work, regulatory compliance for locations of new structures and circulation routes	Construct facilities or acquire equipment necessary for the replacement or expansion of current circulation methods in the valley	Remove circulation components to allow those locations to be restored to natural conditions	Create systems and facilities to support the reduction of vehicle traffic and changes in circulation options	Reduce vehicle traffic in the Valley, restore former circulation routes to natural conditions, and improve non vehicle circulation options
Conduct site planning for the following areas: ▪ El Portal ▪ Foresta ▪ Yosemite Village ▪ Valleywide transportation	Construct or acquire the following shuttle system facilities to replace or expand current visitor circulation methods: ▪ Out-of-Valley parking at El Portal, Badger Pass, and Hazel Green (or Foresta) ▪ New shuttle buses ▪ New Transit Center ▪ Employee housing for shuttle operators Construct multi-use paved trail segments to replace circulation routes at bridge removal sites	Remove the following circulation components: ▪ Curry Orchard parking ▪ Selected turnouts and parking lanes throughout the Valley ▪ Scattered parking areas ▪ Sugar Pine Bridge ▪ Stoneman Bridge (pending further evaluation) ▪ Ahwahnee Meadow Road	Create the following systems to support the reduction of vehicle traffic: ▪ New shuttle stops and upgrades on existing shuttle stops, including lockers, bike racks, and new signs ▪ Employee transit system ▪ Traffic information and transportation management system Remove and restore some existing picnic areas and create new picnic areas to better align picnicking options with multi-use paved paths and new shuttle routes	Reduce vehicle traffic in the Valley through: ▪ Implementation of the out-of-Valley shuttle system ▪ Implementation of the improved and expanded in-Valley shuttle system ▪ Active management of traffic flow into the Valley Restore former circulation routes to natural conditions at the former Curry Orchard parking, Sugar Pine Bridge, Stoneman Bridge (pending further evaluation), and Ahwahnee Meadow Road locations Improve nonvehicle circulation routes through: ▪ Completion of the Valley loop multi-use paved trail ▪ Conversion of Southside Drive into a 2-way road to allow for conversion of Northside Drive into a multi-use paved trail

Note: In some cases, actions in Category 4 may actually need to be accomplished before removals in Category 3 to ensure that services and operations are not interrupted. It is not always necessary to complete every action in one category prior to beginning actions in later categories, and actions in different categories may occur simultaneously.

Employee Housing

1	2	3	4	5
Conduct necessary site planning, design work, and regulatory compliance for locations of new structures and circulation routes	Create replacement facilities for functions being removed for housing projects	Remove functions and facilities in employee housing areas to allow for adaptive reuse, new construction, or restoration of existing locations	Construct functions and facilities to support housing development in El Portal, Wawona, and the Valley	Relocate employee housing out-of-Valley, relocate some within the Valley and restore some former housing areas to natural conditions
For in-Valley housing, conduct site planning for the Curry Village and Village areas For out-of-Valley housing, first, strive to find housing outside the park and administrative areas. If no private housing is found, conduct site planning for the following areas: ▪ El Portal ▪ Wawona ▪ Foresta	▪ Create replacement offices for Yosemite Institute ▪ Some current housing locations will be replaced with the final housing projects ▪ Once site plans are developed, additional replacement needs may be identified	Remove the following facilities: ▪ Henessey's Ranch Trailer Village and modular housing ▪ Yosemite Institute office from El Portal Hotel ▪ El Portal Motor Inn cabins ▪ Ahwahnee tent cabins ▪ Cascades housing ▪ Lost Arrow housing ▪ House behind Visitor's Center ▪ Hospital Row apartments ▪ Remove housing from Arch Rock but adaptively reuse historic structures	▪ Upgrade utilities and water sources in El Portal and Wawona to support increased usage ▪ Construct employee transit system, commuter lots, and circulation routes at new housing locations ▪ Construct housing support facilities such as wellness centers, cafeterias, and support offices at new housing developments	Construct new housing complexes in the following locations ▪ El Portal ▪ Wawona ▪ Curry Village ▪ Hospital Row dorms ▪ Foresta homes Restore to natural conditions former housing areas at: ▪ Ahwahnee tent area ▪ Cascades Rehabilitate: ▪ Ahwahnee dorm ▪ Arch Rock

Note: In some cases, actions in Category 4 may actually need to be accomplished before removals in Category 3 to ensure that services and operations are not interrupted. It is not always necessary to complete every action in one category prior to beginning actions in later categories, and actions in different categories may occur simultaneously.

Implementation

As the implementation of the *Final Yosemite Valley Plan/SEIS* moves forward, the following principles will apply:

- Disruption to the visitor experience will be minimized
- Implementation plans will recognize that additional regulatory compliance may be necessary
- Temporary solutions will be placed only in previously disturbed areas
- Sequencing will take into consideration fiscal responsibility
- The final implementation plan will strive for a mix between site planning, restoration, demolition, and construction activities.

Funding

The following funding table provides an indication of possible funding sources to complete the actions in the *Final Yosemite Valley Plan/SEIS*. As indicated in the plan, opportunities will be sought to develop facilities outside the park if possible (e.g., housing, visitor centers near park entrances, etc.) and thus funding may not be required as indicated below.

Description	Flood Recovery Appropriation	Concession Related & Capital Improvement Fund	Private Fundraising	Anticipated Fee Demo Program through 2004	Line Item or Other Sources	Alt 2 Costs
Resource Stewardship	3.4		12.0	1.3	11.8	**28.5**
Visitor Experience/ Facilities	54.5				59.1	**113.6**
Transportation and Circulation	11.6		3.0	27.5	31.3	**73.4**
Administration/ Infrastructure	0.6	10.0		20.0	20.5	**51.1**
Employee Housing	36.5				138.6	**175.1**
Fund Source Total	**106.6**	**10.0**	**15.0**	**48.8**	**261.3**	**441.7**

(Figures are in millions of dollars)

appendix N

Floodplain Statement of Findings

Final Yosemite Valley Plan

Supplemental EIS

APPENDIX N – FLOODPLAIN STATEMENT OF FINDINGS FOR THE *FINAL YOSEMITE VALLEY PLAN/SEIS*

This Floodplain Statement of Findings is included in this document for public review to meet the obligations of Executive Order 11988 (*Floodplain Management*) and the NPS Floodplain Management Guideline 1993.

Introduction

The National Park Service has prepared the *Final Yosemite Valley Plan/Supplemental Environmental Impact Statement* (*SEIS*) to provide direction and propose specific actions to preserve Yosemite Valley's natural, cultural, and scenic resources, and to provide opportunities for high-quality, resource-based experiences for visitors. It is based on the broad goals of the 1980 *General Management Plan* for Yosemite National Park. The purpose of this Floodplain Statement of Findings is to review the *Final Yosemite Valley Plan/SEIS* in sufficient detail to:

- Provide an accurate and complete description of the flood hazard assumed by implementation of the proposed action (without mitigation)
- Provide an analysis of the comparative flood risk among alternative sites
- Describe the effects on floodplain values associated with the proposed action
- Provide a thorough description and evaluation of mitigation measures developed to achieve compliance with Executive Order 11988 *(Floodplain Management)* and the NPS Floodplain Management Guideline 1993

Floodplain Extent

The best available data were used to determine the extent of existing floodplain boundaries and water surface characteristics of the Merced River. The Stantec (2000) and Cella Barr Associates (1998) model was used to analyze the extent of the 2-, 10-, 25-, and 100-year floodplains in the east end of Yosemite Valley between Happy Isles and the west end of Yosemite Lodge. The line that delineates the January 1997 flood extent was used to determine the 100-year floodplain in the west end of Yosemite Valley from the west end of Yosemite Lodge to Pohono Bridge. The U.S. Army Corps of Engineers Merced River study (1998) was used to determine the 100-year and 500-year floodplain in El Portal. The U.S. Army Corps of Engineers floodplain map (1981b) was used to determine the 100-year and 500-year floodplains in Wawona.

The Proposed Action

The *Final Yosemite Valley Plan/SEIS* aims to restore degraded areas and reduce development within the Merced River ecosystem and other highly valued natural and cultural resource environments. It strives to reduce traffic congestion and supports the use of alternative fuels to reduce mobile sources of air pollution. It presents alternatives to expand orientation and interpretation services. It proposes to move nonessential housing, administrative headquarters, offices, and other functions out of Yosemite Valley. Many of these functions would move to the

El Portal Administrative Site on the western boundary of the park. The plan proposes options for the size and placement of parking areas, both within and outside of Yosemite Valley. Attachment A of this Statement of Findings lists the nonexempted actions in the floodplain that are proposed in the *Final Yosemite Valley Plan/SEIS*.

Existing Structures in the Floodplain

The NPS Floodplain Management Guideline 1993 divides actions into the following three groups:

- Class I Actions – include administrative, residential, warehouse and maintenance buildings, and nonexempted (overnight) parking lots
- Class II Actions – those that would create "an added disastrous dimension to the flood event." Class II actions include schools, clinics, emergency services, fuel storage facilities, large sewage treatment plants, and structures such as museums that store irreplaceable records and artifacts.
- Class III Actions – Class I or Class II Actions that are located in high hazard areas such as those subject to flash flooding.

The regulatory floodplain for Class I actions is the 100-year floodplain. The regulatory floodplain for Class II Actions is the 500-year floodplain. There are no Class III actions in the project area.

Most existing structures in the regulatory floodplain in Yosemite Valley are Class I actions. These structures include five motel units at Yosemite Lodge, the Concessioner Headquarters Building at Yosemite Village, Indian Creek employee housing, 248 units at Housekeeping Camp, the Superintendent's House (Residence 1), and the concessioner stable. The regulatory floodplain for the museum collection, a Class II action, is the 500-year floodplain. The museum collection is currently housed outside of the 100-year floodplain in Yosemite Village in Yosemite Valley. It may be in the 500-year floodplain, though current data are not available.

The Cascades Diversion Dam is located west of Pohono Bridge in Yosemite Valley. This dam was constructed as part of a small hydroelectric plant. Though the plant is no longer functional, the dam remains in place. Safety engineers have classified the dam as a "high hazard potential structure."

Most existing structures that are found in the regulatory floodplain in El Portal are Class I actions. These structures include the El Portal Market, the Motor Inn (employee housing), the warehouse complex, and the ranger station. There are two existing Class II actions in the regulatory floodplain in El Portal: the gas station (currently not in use) and the bulk fuel storage facility.

In Wawona, parts of the Pioneer Yosemite History Center are in the regulatory floodplain.

Proposed Actions

Under the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS*, all existing nonexempted facilities in Yosemite Valley would be removed from the floodplain except for the following:

- New overnight parking at Yosemite Lodge

- Three Ahwahnee Row houses (all of the Ahwahnee Row houses would remain, but only three are within the regulatory floodplain)
- New visitor services and a transit center at Yosemite Village in the vicinity of the Concessioner Headquarters Building
- 84 units at Housekeeping Camp
- The Yosemite Museum collection

Under the Preferred Alternative in the Final Yosemite Valley Plan/SEIS, the following facilities would remain or could be placed in the floodplain in El Portal:

- Hennessey's Ranch – Mobile homes would be removed from the site and replaced with high-density housing.
- Village Center – This area has been designated for necessary support facilities and commercial services and could also support parking. Parts of this area are in the regulatory floodplain. The exact placement of new and replacement facilities will be determined in subsequent site design. New development could include a community center, post office, enlarged grocery store/deli, laundry, recreation facilities, hair salon, medical clinic, and office spaces.
- The NPS warehouse at Railroad Flat
- The gas station

In Wawona, parts of the Pioneer Yosemite History Center would remain in the regulatory floodplain.

General Characteristics of Flooding in the Area

Floods on the Merced River are of two general types: those that occur during the late fall and winter (November through March) primarily as the result of intense rainfall, and those that occur during the spring and early summer resulting from snowmelt. At the beginning of the wet season the ground is extremely dry, and about 3 to 5 inches of precipitation is required to satisfy the retention storage capacity of the soil before any significant runoff occurs. Later in the season, when the ground may be very wet and there may be a moderate snow cover at the higher elevations, heavy rainfall over the basin causes large flood runoff. An intense storm with a high freezing level may result in flood runoff from almost the entire basin, with as much as 2 inches of snowmelt augmenting the rainfall. Most of the runoff from the Merced River basin occurs from November through July.

Yosemite Valley has a well-developed, relatively wide floodplain that is confined by steep valley walls. The Merced River in Yosemite Valley has a relatively mild slope, with an average of 0.1%. In the middle reach of the Merced River in Yosemite Valley, downstream of Clark's Bridge to the El Capitan moraine, the river flows through a shallow channel approximately 100 to 300 feet wide. Typically, the main channel in this reach has the capacity to convey between 2- and 5-year flow events within the existing channel banks (Stantec 2000). Historic discharge in the river, measured at the Pohono Bridge gauging station, has ranged from a high of about 25,000 cubic

feet per second to a low of less than 10 cubic feet per second. The mean daily discharge rate is about 600 cubic feet per second.

The low flow channel in the middle reach of Yosemite Valley meanders across a broad floodplain and through a series of bends and divides. During 25- and 100-year floods, waters substantially overflow the meandering low-flow channel path and flow straight down the Valley (Stantec 2000). Near Yosemite Lodge and downstream to the El Capitan moraine, flood waters back up against the moraine and tend to be deep and slow. This backwater influence, which reduces flow velocities and increases flow depths, extends about 4.5 miles upstream of the El Capitan moraine past Sentinel Bridge (Stantec 2000). Flow velocities in this backwater area for 2- and 10-year events are actually higher than for 25- and 100-year events in both channel and overbank areas due to the backwater influence (Stantec 2000).

The river channel in El Portal is steep and flow velocities are high. Some lateral shifting can occur during large floods. Flow volumes are not available but should be slightly larger than those of the Pohono Bridge gauging station. The levee at the east edge of Hennessey's Ranch (Trailer Village and Abbieville) prevents water from entering the site and is effective for containing floods that have less than a 100-year recurrence interval.

The floodplain in Wawona along the South Fork is an elongated alluvial valley. The river channel can shift laterally during large floods. In Wawona, upstream of the Big Creek confluence, the average annual flow was 174 cubic feet per second between 1958 and 1968, as measured at the Wawona gauging station, with an estimated maximum flow of 15,000 cubic feet per second in December 1955.

Justification for Use of the Floodplain

NEW DEVELOPMENT

Overnight Parking at Yosemite Lodge. During site design planning, should no reasonable alternative be identified for overnight parking outside of flood limits for the Yosemite Lodge, overnight parking would be placed within the 100-year floodplain. The Yosemite Lodge area is constrained by natural boundaries as well as by development boundaries. If necessary, overnight parking would be placed in a previously developed area that once served as the site of concessioner employee dormitories. The dormitories were removed after the January 1997 flood because of extensive flood damage.

In high flood conditions similar to those of the January 1997 flood, there would be slow water movement in the potential parking area. The new parking would have a minimal effect on flood characteristics during high water levels in relation to previous dormitory structures. The new parking area would prevent the establishment of floodplain-related natural communities such as riparian areas, wetlands, and meadows.

Hennessey's Ranch (Trailer Village and Abbieville). The National Park Service has determined that the El Portal Administrative Site will serve as the principal location for National Park Service employee housing in the *Final Yosemite Valley Plan/SEIS.* This decision was based on a thorough evaluation of potential environmental impacts, and on clear and overwhelming public comment and endorsement. The El Portal Administrative Site lies at the bottom of a steep river

canyon. Available building space is at a premium due limits imposed by the steep terrain, flood dangers, and natural and cultural resources.

The National Park Service evaluated all potential building sites in El Portal and identified seven potential sites for employee housing: Hennessey's Ranch, Hillside West, Hillside East, Village Center, Rancheria Flat, Old El Portal, and Riverside. In the Preferred Alternative of the *Final Yosemite Valley Plan/SEIS*, employee housing would be built at all of these sites except for Riverside. Riverside was removed from consideration for housing for the following reasons: the site contains significant cultural resources; a bridge would need to be constructed to access the site; evacuation would be difficult if the bridge failed during a flood; the site is subject to river erosion; potential impacts to threatened and endangered species could occur; and the site contains high-quality wildlife habitat. All of the remaining potential housing sites are necessary to support the large number of employee housing proposed in El Portal. There are no reasonable alternatives to these six remaining sites, including Hennessey's Ranch.

Village Center. This area has been designated for necessary support facilities and commercial services and could also support parking. Parts of this area are in the floodplain. New development could include a community center, post office, enlarged grocery store/deli, laundry, recreation facilities, hair salon, medical clinic, office spaces, and a gas station. If day-visitor parking were to be developed, this action would be exempted from the NPS *Floodplain Management Guideline* (1993c). Should other facilities be developed in the regulatory floodplain, a subsequent Floodplain Statement of Findings would be developed as a part of future compliance.

EXISTING DEVELOPMENT

Ahwahnee Row Houses (Three Houses in Floodplain). These houses would not be removed because they are important contributing elements to the Yosemite Valley cultural landscape.

Housekeeping Camp. Currently, 248 units at Housekeeping Camp are within the 100-year floodplain. These units are available seasonally, and the area is closed for overnight use in the winter. In the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS*, 84 units at Housekeeping Camp would remain in the floodplain along with six miscellaneous structures (such as bathrooms and the store). The 164 units that are closest to the Merced River would be removed from the floodplain.

Housekeeping Camp has had a long history of traditional use. Housekeeping Camp provides a unique opportunity in Yosemite Valley for a rustic camping experience with "developed camping shelters" that eliminate the need to purchase large amount of camping equipment. Housekeeping Camp is the only place in Yosemite Valley where overnight visitors can cook their own food, other than the campgrounds.

Housekeeping Camp is closed during the winter, when most high-flow events have occurred. There would be sufficient time to evacuate visitors in the unlikely event that evacuation would be necessary. To preserve the floodplain values in areas close to the river while still preserving the unique visitor experience, the 164 units that are closest to the Merced River would be removed and 84 units would remain within the floodplain. The remaining units would have little effect on flood attributes.

The Yosemite Museum Collection. The museum collection would remain in Yosemite Village in proximity to museum exhibit space. This would allow staff to easily move collection objects to and from exhibit space, allow users of the research library to easily access the collection, and protect the collection from risks involved with transfer to another location.

Some parts of the museum collection, in particular the Native American collection, were collected, made, or are strongly associated with the Valley. These articles have more intrinsic value to American Indian and other groups when stored in the Valley.

The NPS Warehouse Complex at Railroad Flat in El Portal. When the first phases of this extensive warehouse/office complex were planned and constructed in 1994 and 1995, U.S. Army Corps of Engineers map data determined that most of the complex would be out of the floodplain. New information based on data from the January 1997 flood (USCOE 1998) has revised this determination to indicate that most of the complex is in the 100-year floodplain. A Statement of Findings would be developed as part of the El Portal design concept process to provide an accurate description of flood hazards at the site and identify necessary mitigation.

The Gas Station in El Portal. There is an immediate need for a gas station in El Portal to serve local residents (numbering about 1,000) and National Park Service and park partner employees who work in El Portal. The closest gas stations to El Portal are located in Midpines and Crane Flat, both of which are about a 30-minute drive from El Portal under good driving conditions. The location of the gas station would be re-evaluated during specific site design process for El Portal.

The Pioneer Yosemite History Center in Wawona. Parts of this interpretive site are located in the regulatory floodplain. Four buildings in the Pioneer Yosemite History Center are listed on the National Register of Historic Places (Jorgensen Studio, Hodgdon Homestead Cabin, Superintendent's House (Residence 1), and Yosemite Transportation Company Office). Whether a historic building retains its original location is an important consideration when assessing its eligibiity for the National Register. The buildings would be left in their current locations because moving them would affect their historic integrity and possibly their National Register status.

REDEVELOPMENT

Visitor Services and Transit Center at Yosemite Village. Several areas in Yosemite Valley have been zoned to concentrate intensive visitor use in order to protect the renowned qualities of Yosemite Valley, while still providing services for the public. In the Preferred Alternative in the *Final Yosemite Valley Plan/SEIS*, Yosemite Village would be a major parking area and transportation hub as well as the site for the visitor center. The placement of the visitor center near the transportation hub would ensure that visitors have easy access to orientation tools to help them understand the park, as well as transportation connections to other areas.

Parts of the Yosemite Village area fall within floodplain boundaries, particularly in the vicinity of the existing Concessioner Headquarters Building. Visitor services and a transit center are proposed for redevelopment in this area. Site-specific design has not been completed, and the specific nonexempted actions that would fall within floodplain boundaries are not known. If day-visitor parking were developed, this action would be exempted from the NPS *Floodplain*

Management Guideline (1993c). Should structures to support visitor services be proposed within the floodplain, a subsequent Floodplain Statement of Findings would be developed as a part of future compliance.

Description of Site-Specific Flood Risk

YOSEMITE VALLEY

Floods of consequence in Yosemite Valley always occur with some warning. It takes a prolonged period of intense rain for at least 24 hours to create flood conditions. Risks to humans can typically be mitigated by warning and evacuation.

In Yosemite Valley, the character of flooding varies in different locations because of local hydraulic controls. From Clark's Bridge to Housekeeping Camp in the east Valley, the Merced River floods areas outside the main river channel with shallow, swift flows that cut across meander bends. Near Yosemite Lodge and downstream to the El Capitan moraine, flood waters back up against the moraine and dense vegetation. Flood waters in this area are of low velocity and significant depths. At Housekeeping Camp, velocities are relatively higher with lower depths.

The historic discharge in the river, measured at the Pohono Bridge gauging station, has ranged from a high of about 25,000 cubic feet per second to a low of less than 10 cubic feet per second. The mean daily discharge rate is about 600 cubic feet per second.

EL PORTAL

The El Portal area is located in an extremely high energy, bedrock-controlled reach with little high floodplain suitable for development. Due to high flood velocities, infrastructure and developments must be located above flood levels or be massively armored. Evacuation of flood-prone areas should be mandatory during flood events of any appreciable size (National Park Service 1997g).

WAWONA

Floods of consequence in Wawona always occur with some warning. It takes a prolonged period of intense rain for at least 24 hours to create flood conditions. Risks to humans can typically be mitigated by warning and evacuation.

Design Or Modifications To Minimize Harm To Floodplain Values Or Risks To Life And Property

GENERAL MITIGATION

The design of all new structures would incorporate methods for minimizing flood damage, as contained in the National Flood Insurance Program "Floodplain Management Criteria for Flood-Prone Areas" (CFR 44, 60.3) and in accordance with any local, county, or state requirements for flood-prone areas. Furthermore, the park staff would maintain an active flood evacuation plan. The plan details responsibilities of individual park employees for advanced

preparedness measures; removing or securing park property; records and utility systems; monitoring communication; and conducting rescue and salvage operations.

Impacts on the site's resources would be minimized and mitigated. The design for impermeable areas would provide for appropriate drainage to ensure that natural resources are not further degraded by associated runoff following hydrologic events.

SITE-SPECIFIC MITIGATION – NO SUBSEQUENT STATEMENT OF FINDINGS NECESSARY

Housekeeping Camp, Ahwahnee Row Houses, and Ahwahnee Cottage

- Plans would be made for timely and safe evacuation of Housekeeping Camp and the Ahwahnee Row houses in times of rising water.

SITE-SPECIFIC MITIGATION – SUBSEQUENT STATEMENT OF FINDINGS NECESSARY

Overnight Parking at Yosemite Lodge

- Site-specific design has not been completed for this area, and specific overnight parking needs have not been determined. If overnight parking were developed, a subsequent Floodplain Statement of Findings would be developed as a part of future compliance.
- Design of overnight parking would allow minimal resistance to flood waters to minimize impacts on natural flood processes.
- Plans would be made for timely evaluation of the lodge area in times of rising water. Evacuation routes would be outside the flood levels, along surfaced pedestrian/bicycle routes that are wide enough for vehicles.

Parking and Visitor Services at Yosemite Village

- Site-specific design has not been completed for this area, and it is not possible to determine the specific nonexempted actions that would fall within floodplain boundaries. If day-visitor parking were developed, this action would be exempted from the NPS *Floodplain Management Guideline* (1993c). Should structures to support visitor services be proposed within the floodplain, a subsequent Floodplain Statement of Findings would be developed as a part of future compliance.
- Plans would be made for timely and safe evaluation of the Yosemite Village area in times of rising water.

Yosemite Museum Collection

- The site-specific location and plans for the museum collection have not been determined. A subsequent Floodplain Statement of Findings would be developed as a part of future compliance.

- All museum storage facilities would have permanent foundations and finished floor elevations above the current 500-year flood high-water line and be engineered to withstand inundation.

The Village Center in El Portal

- Site-specific locations for necessary support facilities and commercial services have not been determined. A Floodplain Statement of Findings would be developed as part of future site design and compliance.

The Gas Station in El Portal

- The site-specific location for the gas station in El Portal has not been determined. A subsequent Floodplain Statement of Findings would be developed as a part of future site design and compliance.
- Facilities would be built to avoid or withstand the 500-year flood.

Hennessey's Ranch

- The site-specific design for employee housing at Hennessey's Ranch has not been developed. A subsequent Floodplain Statement of Findings would be developed as a part of future site design and compliance.
- As many structures as possible would be built on the high island in the center of the area outside of the 100-year floodplain.
- All dwellings would have permanent foundations and finished floor elevations above the current 100-year flood high-water line and be engineered to withstand inundation.
- The existing levee would be rebuilt to withstand the 100-year flood.
- A "community open space" or riparian buffer zone would be left adjacent to the river. This would retain more space for the Merced River to spread out horizontally, and the levee would not need to be as high.
- Along with raising the levee, appropriate measures would be taken to prevent flood waters from entering the area via the Highway 140 corridor below the highway bridge.
- An emergency evacuation plan would be developed. The plan would designate a specific river stage at which evacuation of people would begin.

The NPS Warehouse Complex at Railroad Flat

- New information developed after the complex was constructed shows that a large part of the complex is within the 100-year floodplain. A Statement of Findings would be developed as part of the El Portal design process to provide an accurate description of flood hazards at the site and identify necessary mitigation. Mitigation measures would be evaluated for this area, including raising the elevation of the building and constructing a floodwall.
- An emergency evacuation plan would be developed. The plan would designate a specific river stage at which evacuation of people would begin.

Conclusion

The Preferred Alternative would substantially reduce potentially hazardous conditions associated with flooding by relocating facilities out of the floodplain in Yosemite Valley. Facilities that would be removed from the floodplain include five motel units at Yosemite Lodge, Indian Creek employee housing, 164 units at Housekeeping Camp, the Superintendent's House (Residence 1), three Ahwahnee Row houses, and the concessioner stable. The Preferred Alternative would have beneficial impacts on floodplain values by linking river-associated wetlands and meadows that have been degraded or fragmented into one large and dynamic, river-governed ecosystem. However, the National Park Service has determined that there is no practicable alternative to maintaining the following within the regulatory floodplain: overnight parking at Yosemite Lodge, three Ahwahnee Row houses, new visitor services and a transit center at Yosemite Village, and 84 units at Housekeeping Camp. In El Portal, there is no practicable alternative to high-density employee housing at Hennessey's Ranch; support facilities, commercial services, and parking at Village Center; the National Park Service warehouse at Railroad Flat; and the gas station in the regulatory floodplain. These facilities are not within areas subject to frequent flooding, and with the early warning system and evacuation plan in use, the risk to human safety would be minimized.

The National Park Service concludes that the Preferred Alternative would reduce the impacts of potentially hazardous conditions associated with flooding in Yosemite Valley. Mitigation and compliance with regulations and policies to prevent impacts to water quality, floodplain values, and loss of property or human life would be strictly adhered to during and after the construction. Individual permits with other federal and cooperating state and local agencies would be obtained prior to construction activities. No long-term adverse impacts would occur from the proposed actions. Therefore, the National Park Service finds the Preferred Alternative to be acceptable under Executive Order 11988 for the protection of floodplains.

ATTACHMENT A – Current and Proposed Nonexempted Actions in the Regulatory Floodplain

Final Yosemite Valley Plan/SEIS

Alternative 1 – Existing structures in the floodplain	Alternative 2	Alternative 3	Alternative 4	Alternative 5
YOSEMITE VALLEY				
Cascades Diversion Dam	Remove	Remove	Remove	Remove
Yosemite Lodge Motel Units (5)	Remove motel units Develop new overnight parking	Remove motel units Develop new overnight parking	Remove motel units Develop new overnight parking	Remove motel units Develop new overnight parking
Yosemite Lodge Wellness Center and custodial units	Remove from floodplain	Remove from floodplain	Remove from floodplain	Remove from floodplain
Human-constructed rock rubble pile in Yosemite Creek drainage near base of Yosemite Falls	Remove rock-rubble pile	Remove rock-rubble pile	Remove rock-rubble pile	Remove rock-rubble pile
Yosemite Village				
Concessioner Headquarters	Redevelop as visitor services and transit center	Remove building and restore area to natural conditions	Remove building and restore area to natural conditions	Redevelop as visitor services and transit center
Indian Creek employee housing	Redevelop as visitor services and transit center	Remove buildings and restore area to natural conditions	Remove buildings and restore area to natural conditions	Redevelop as visitor services and transit center
Ahwahnee Row houses (3)	Retain and mitigate	Remove	Remove	Remove
Housekeeping Camp (248 units in the floodplain)	Remove 164 units out of the floodplain. Retain 84 units in the floodplain.	Remove 212 units out of the floodplain. Retain 36 units in the floodplain.	Remove 212 units out of the floodplain. Retain 36 units in the floodplain.	Remove 164 units out of the floodplain. Retain 84 units in the floodplain.
Superintendent's House (Residence 1)	Remove from floodplain	Remove from floodplain	Remove from floodplain	Remove from floodplain
Concessioner Stable and associated housing	Remove and restore area	Remove and restore area	Remove and restore area	Redevelop as campground

Alternative 1 – Existing structures in the floodplain	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Kennel at Lamon Orchard	Remove kennel (orchard remains)	Remove kennel and restore area	Remove kennel (orchard remains)	Remove kennel (orchard remains)
EL PORTAL				
68 beds at Hennessey's Ranch (Trailer Village)	Replace mobile homes with high-density employee housing and recreation center	Replace mobile homes with high-density employee housing and recreation center	Replace mobile homes with high-density employee housing and recreation center	Replace mobile homes with high-density employee housing and recreation center
Abbieville: 4 houses	Retain	Remove/redevelop	Remove/redevelop	Retain
El Portal Hotel (employee housing and Yosemite Institute office)	Remove or adaptively reuse	Remove or adaptively reuse	Remove or adaptively reuse	Remove or adaptively reuse
Bulk fuel storage facility	Remove	This action would only occur in Alternative 2	This action would only occur in Alternative 2	This action would only occur in Alternative 2
El Portal Market, Motor Inn (12 employee housing cabins), ranger station/NPS offices	Redevelop	Redevelop	Redevelop	Redevelop
Gas station	Retain	Retain	Retain	Retain
El Portal NPS Warehouse complex	Retain and redevelop	Retain and redevelop	Retain and redevelop	Retain and redevelop
WAWONA				
Portions of the Pioneer Yosemite History Center	Retain	Retain	Retain	Retain