National Park Service
U.S. Department of the Interior

Lake Mead National Recreation Area | Arizona

Rehabilitate Katherine Landing Access Road

Environmental Assessment

March 2013

Rehabilitate Katherine Landing Access Road

Environmental Assessment

Summary

The National Park Service is proposing to rehabilitate, reconstruct, and resurface Katherine Landing Access Road at Lake Mead National Recreation Area, Mohave County, Arizona. The proposed project would begin at the intersection of Katherine Landing Access Road and Davis Dam Road (County Road 68) and extend to the Katherine Landing boat ramp. Rehabilitation of Katherine Landing Access Road is being proposed to correct a number of interrelated conditions that negatively affect public safety and visitor experience. The purpose of the action is to enhance public safety and support a high-quality visitor experience by correcting deficiencies in road design and conditions, including road and shoulder widths, horizontal and vertical curves, pavement condition, drainage structures, rockfall hazards, vehicle pullouts, vehicular circulation, traffic queueing, drainage problems, and flood damage threats to roadway embankment.

This Environmental Assessment has been prepared pursuant to the requirements of the National Environmental Policy Act of 1969 and National Park Service policies and procedures. The purpose of the Environmental Assessment is to provide the decision-making framework that (1) analyzes a reasonable range of alternatives to meet the project objectives, (2) addresses the potential impacts associated with the rehabilitation of Katherine Landing Access Road, and (3) identifies mitigation measures to lessen the degree or extent of impacts.

This Environmental Assessment examines three alternatives: the No Action alternative and two action alternatives (Typical Section One and Typical Section Two). Typical Section Two is the Preferred Alternative. The action alternatives would widen the 24-foot-wide road to 28 feet (two 12-foot-wide travel lanes and 2-foot-wide paved shoulders) or 32 feet (two 12-foot-wide travel lanes and 4-foot-wide paved shoulders), respectively. Typical Section One would result in nine vehicle pullout areas and Typical Section Two would result in eight vehicle pullout areas. All other improvements would be common to both action alternatives, including realignment of the Davis Dam Road and Katherine Landing Access Road intersection, other Katherine Landing Access Road improvements, parking area improvements, and drainage improvements.

External (public) scoping was conducted to inform the public and various agencies about the proposed rehabilitation of Katherine Landing Access Road. During the 30-day scoping period, three comments were received. All comments were in favor of the project.

Both of the action alternatives would have no or negligible impacts to the following resources: socioeconomics and environmental justice, wilderness areas, wetlands, riparian habitats, land use, Indian trust assets, geohazards and natural hazards, cultural landscapes, ethnographic resources, museum collections, archaeological resources, and historic structures.

Implementing either action alternative would contribute to long-term minor adverse impacts to geological resources and soils and vegetation while short-term minor adverse impacts would be expected to wildlife, species of special concern, floodplains, water quality, water quantity, and soundscapes. A long-term minor to moderate adverse impact to visual resources would be expected, depending on the action alternative selected. Intermittent to long-term minor beneficial impacts to water quality, streamflow characteristics, air quality, soundscapes, and park operations would be expected. For either action alternative, a long-term moderate beneficial impact to visitor use, experience, and safety would be expected.

Public Comment

This EA will be available for public review for 30 days. If you wish to comment on this Environmental Assessment (EA), comments may be mailed to the name and address provided below or posted at http://parkplanning.nps.gov/. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your personal identifying information, may be made publicly available at any time. Though you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Rehabilitate Katherine Landing Access Road EA
Lake Mead National Recreation Area
601 Nevada Way
Boulder City, NV 89005

Attention: Mike Boyles

TABLE OF CONTENTS

PURPOSE AND NEED 1
Introduction 1
Pavement 1
Road and Shoulder Widths/Horizontal and Vertical Curves 4
Rockfall Hazards 4
Pullouts 4
Vehicular Circulation/Traffic Queueing 4
Drainage Issues/Roadway Embankment Stability 5
Background 5
Relationship to Other Plans and Policies 6
Servicewide and Park-Specific Legislation and Planning Documents 6
Scoping 6
Internal Scoping 6
External Scoping 7
Value Analysis 7
Impact Topics 7
Introduction 7
Impact Topics Retained for Further Analysis 7
Impact Topics Dismissed from Further Analysis 9

ALTERNATIVES 13
Introduction 13
No Action Alternative 13
Typical Section One Alternative 13
Typical Section Two Alternative—Preferred Alternative 15
Components Common to Both Action Alternatives 15
Davis Dam Road and Katherine Landing Access Road Intersection Realignment 15
Katherine Landing Access Road Improvements 15
Parking Area Improvements 15
Drainage Improvements 15
Alternatives and Design Options Considered and Dismissed 16
Typical Section Three Alternative 16
Intersection Realignment Design Options 16
Mitigation Measures of the Action Alternatives 17
Wildlife and Habitat 17
Federally Listed Species and Species of Special Concern 17
Floodplains 18
Water Quality/Quantity and Streamflow Characteristics 18
Air Quality 18
Archeological Resources and Historic Structures 19

Comparison of Impacts 19
Alternatives Comparison 19
Summary of Environmental Consequences/Impact Comparison 20
Environmentally Preferred Alternative 23

AFFECTED ENVIRONMENT 25
Introduction 25
Location and General Description of Lake Mead National Recreation Area and the Project Area 25
Geological Resources and Soils 25
Vegetation 26
Wildlife 26
Federally Listed Species and Species of Special Concern 27
Threatened and Endangered Species 27
Other Sensitive Species 27
Floodplains 28
Water Quality/Quantity 28
Streamflow Characteristics 28
Air Quality 29
Archeological Resources and Historic Structures 29
Soundscapes 30
Park Management/Operations 30
Visitor Use/Experience, Visitor Safety, and Visual Resources 30

ENVIRONMENTAL CONSEQUENCES 33
Introduction 33
Methodology 33
Cumulative Impacts 34
Geographic Scope and Time Frame 34
Past, Present, and Reasonably Foreseeable Future Actions 34
Geological Resources and Soils 34
Intensity-Level Definitions 34
Impacts of No Action Alternative 35
Impacts Common to All Action Alternatives 35
Impacts of Typical Section One 36
Impacts of Typical Section Two 36
Vegetation 37
Intensity-Level Definitions 37
Impacts of No Action Alternative 37
Impacts Common to All Action Alternatives 38

Impacts of Typical Section One 38
Impacts of Typical Section Two 38

Wildlife 39
Intensity-Level Definitions 39
Impacts of No Action Alternative 39
Impacts Common to All Action Alternatives 40
Impacts of Typical Section One 40
Impacts of Typical Section Two 40

Federally Listed Species and Species of Special Concern 41
Intensity-Level Definitions 41
Impacts of No Action Alternative 41
Impacts Common to All Action Alternatives 41
Impacts of Typical Section One 42
Impacts of Typical Section Two 42

Floodplains 42
Intensity-Level Definitions 42
Impacts of No Action Alternative 43
Impacts Common to All Action Alternatives 43
Impacts of Typical Section One 43
Impacts of Typical Section Two 44

Water Quality/Quantity 44
Intensity-Level Definitions 44
Impacts of No Action Alternative 44
Impacts Common to All Action Alternatives 45
Impacts of Typical Section One 46
Impacts of Typical Section Two 46

Streamflow Characteristics 46
Intensity-Level Definitions 46
Impacts of No Action Alternative 47
Impacts Common to All Action Alternatives 47
Impacts of Typical Section One 48
Impacts of Typical Section Two 48

Air Quality 48
Intensity-Level Definitions 48
Impacts of No Action Alternative 49
Impacts Common to All Action Alternatives 49
Impacts of Typical Section One 50
Impacts of Typical Section Two 50

Archeological Resources and Historic Structures 50
Intensity-Level Definitions 51
Impacts of No Action Alternative 51
Impacts Common to All Action Alternatives 52
Impacts of Typical Section One 52
Impacts of Typical Section Two 52

Soundscape 52
Intensity-Level Definitions 52

Impacts of No Action Alternative 53
Impacts Common to All Action Alternatives 53
Impacts of Typical Section One 53
Impacts of Typical Section Two 53

Park Management/Operations 54
Intensity-Level Definitions 54
Impacts of No Action Alternative 54
Impacts Common to All Action Alternatives 55
Impacts of Typical Section One 55
Impacts of Typical Section Two 55

Visitor Use/Experience, Visitor Safety, and Visual Resources 56
Intensity-Level Definitions 56
Impacts of No Action Alternative 56
Impacts Common to the Action Alternatives 57
Impacts of Typical Section One 57
Impacts of Typical Section Two 57

CONSULTATION AND COORDINATION 59

Agency Consultation and Coordination 59

Environmental Assessment Review and List of Recipients 60

List of Preparers 60

REFERENCES 61

ACRONYMS 63

GLOSSARY 65

LIST OF TABLES

Table 1. Impact Topics Retained for Further Evaluation and Relevant Laws, Regulations, and Policies 8
Table 2. Alternatives Summary and Extent to Which Each Alternative Meets Project Objectives 19
Table 3. Environmental Impact Summary by Alternative 20
Table 4. Annual Visitor Use Data 1999–2009 31
Table 5. 2009 Monthly Visitor Use Data 31

LIST OF FIGURES

Figure 1. Project Location 2
Figure 2. Project Vicinity 3
Figure 3 Typical Sections for Action Alternatives 14

APPENDICES

Appendix A National Park Service Consultation with Arizona State Historic Preservation Office
Appendix B Potential Occurrences of U.S. Fish and Wildlife Service Listed Species in the Project Limits
Appendix C Potential Occurrences of Arizona Game and Fish Department Wildlife of Special Concern in Arizona Species in the Project Limits
Appendix D Floodplain Statement of Findings

PURPOSE AND NEED

Introduction

The National Park Service (NPS), in cooperation with the Federal Highway Administration Central Federal Lands Highway Division, is proposing to rehabilitate, reconstruct, and resurface Katherine Landing Access Road at Lake Mead National Recreation Area (NRA), Mohave County, Arizona (Figure 1). The proposed project would begin at the intersection of Katherine Landing Access Road and Davis Dam Road (County Road 68) and extend to the Katherine Landing boat ramp (Figure 2).

This Environmental Assessment (EA) was prepared to evaluate potential environmental, socioeconomic, and cultural resource effects from the action alternatives to improve Katherine Landing Access Road and a no action alternative that does not improve the road. The EA was prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 and implementing regulations, 40 Code of Federal Regulations (CFR) 1500–1508, and NPS Director's Order (DO)-12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making*. The EA will determine whether significant impacts would occur as a result of the proposed project and if an Environmental Impact Statement or a Finding of No Significant Impact would be required. The documents related to the National Historic Preservation Act, in accordance with Advisory Council on Historic Preservation regulations implementing Section 106 (36 CFR 800) have been completed as a separate submittal to the Arizona State Historic Preservation Office (SHPO). The NPS has found that the Preferred Alternative would have no adverse effect on historic properties, and SHPO has concurred with that determination in a letter dated June 29, 2012, and an email dated August 16, 2012 (Appendix A).

Reconstruction of Katherine Landing Access Road is being proposed to correct a number of interrelated conditions that negatively affect public safety and visitor experience. The purpose of the action is to enhance public safety and support a high-quality visitor experience by correcting deficiencies in existing road design and conditions, including road and shoulder widths, horizontal and vertical curves, pavement condition, drainage structures, rockfall hazards, pullouts, vehicular circulation, traffic queueing, drainage problems, and threats to roadway embankment. Improvements would be implemented in a way that minimizes impacts to the area's natural and cultural resources.

If the project is approved, construction is planned to begin in winter 2015–2016, dependent on availability of funding. It is estimated that construction activities would require approximately nine months for completion. All construction activities are anticipated to be completed between Labor Day (September) and Memorial Day (May) to avoid work during the summer, which is an annual period of peak visitor use.

The following paragraphs describe the project need.

Pavement

Pavement on the roadway and parking areas is deteriorating due to large volumes of traffic and normal wear. The deteriorating condition of the road may contribute to an elevated number of accidents along portions of the road. There is a need to reduce maintenance requirements and costs due to deficiencies in the road condition and prevent catastrophic failure that could lead to road closure.

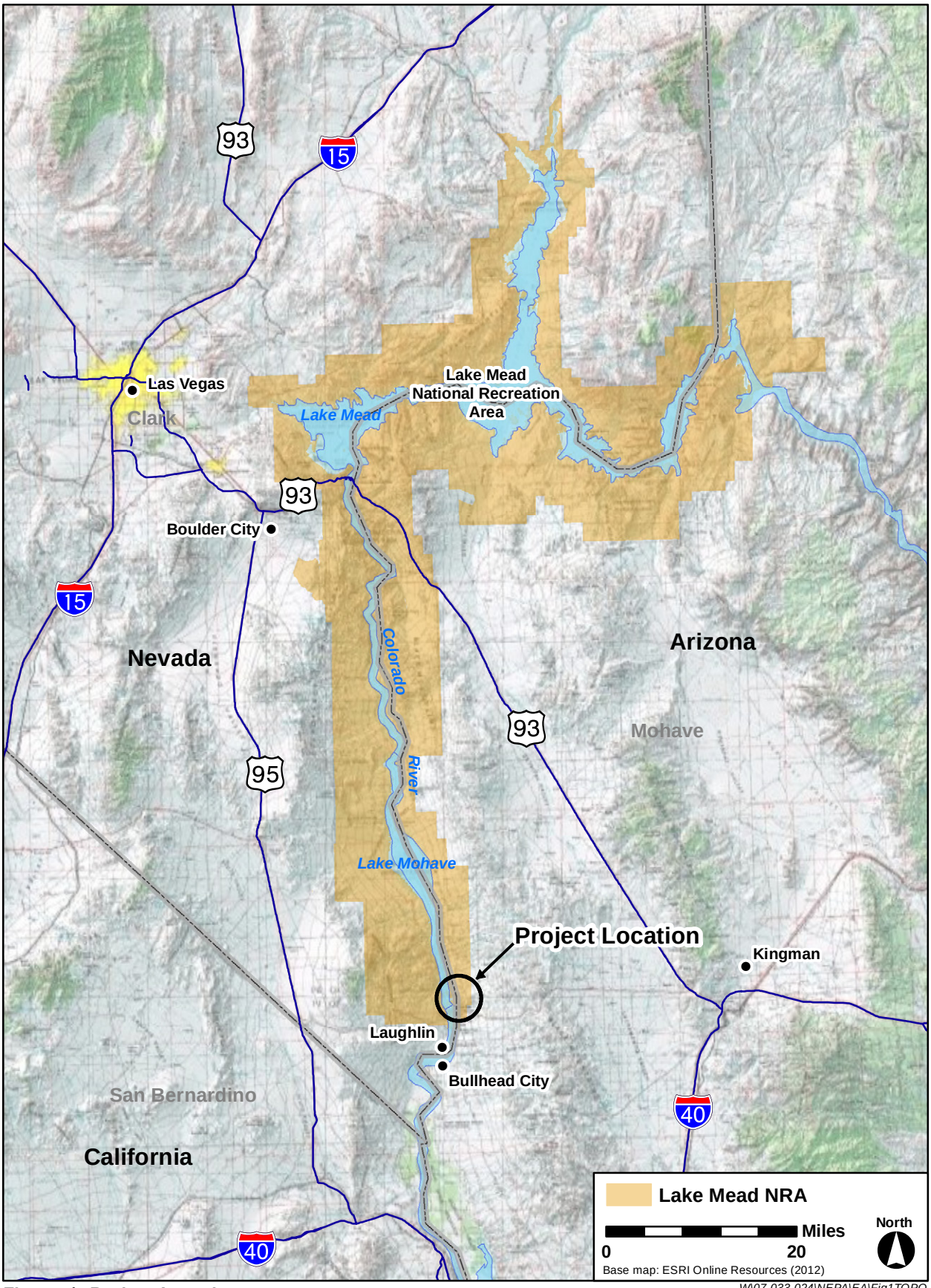
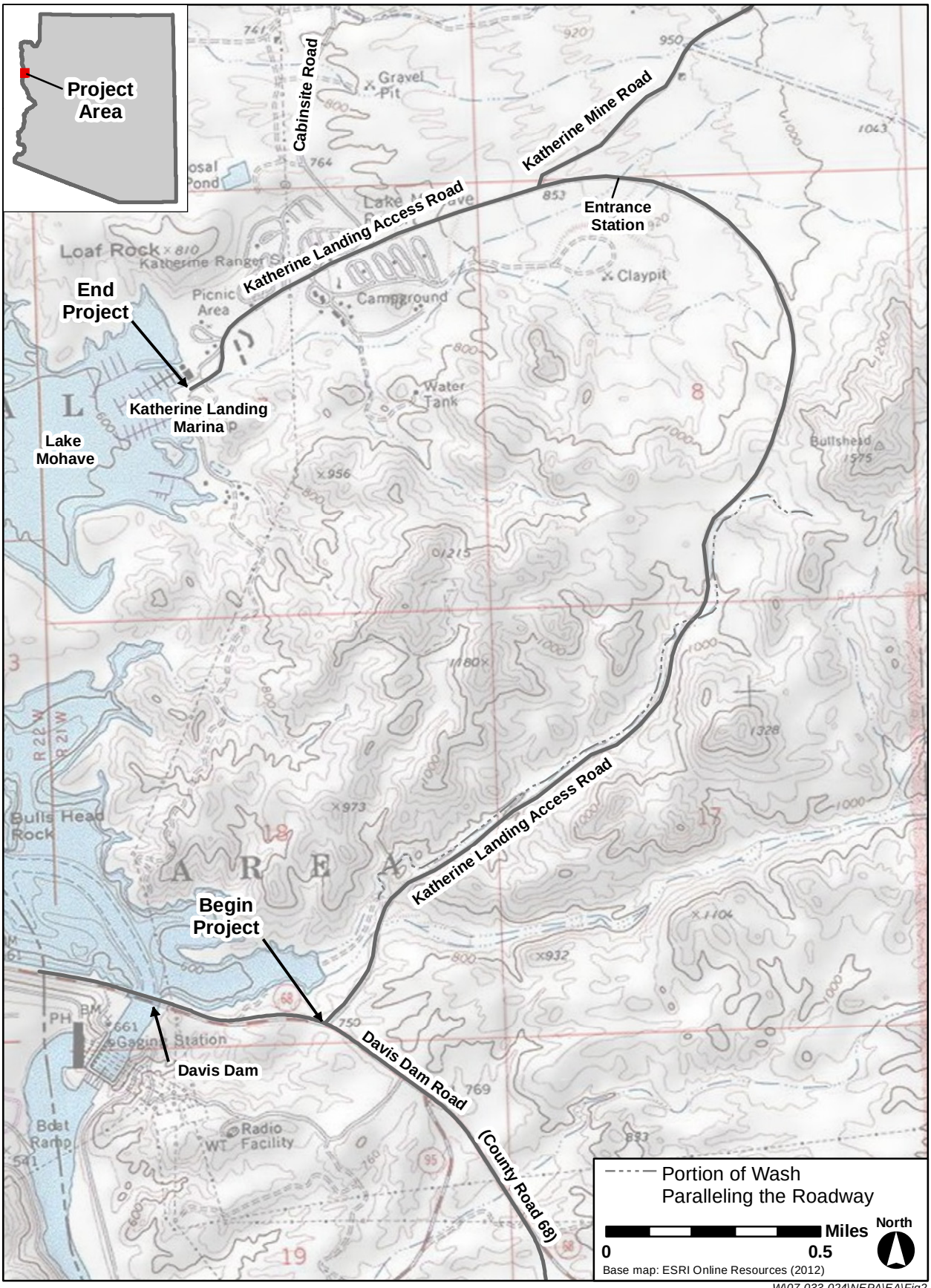


Figure 1. Project Location

W\07-033-024\NEPA\EA\Fig1TOPO



W\07-033-024\NEPA\EA\Fig2

Figure 2. Project Area

Road and Shoulder Widths/Horizontal and Vertical Curves

Roadway travel lanes are narrow (11 feet wide) for the type of vehicle and average speed of traffic on this road, and segments of the roadway have tight horizontal curves with substandard superelevations (banking or tilting of the roadway surface). The existing roadway geometry does not fit the typical vehicle type (passenger truck with boat trailer and motor homes). The combination of the narrow roadway, tight curves, and recreational traffic causes centerline crowding, centerline overruns, and tracking off the pavement, contributing to vehicular accidents. Furthermore, the existing roadway section does not accommodate an adequate clear zone beyond the edge of the pavement that allows drivers to stop safely or regain control of their vehicle if it tracks off the roadway pavement. Delineator posts are frequently struck by vehicles towing larger boat trailers. In mountainous areas, there is evidence that trailers have struck the adjacent cut slopes. Tight vertical curves through mountainous areas limit motorists' sight distance (the stretch of roadway visible to a motorist) and contribute to accidents, including rear-end collisions. The potential for collisions is exacerbated on Katherine Landing Access Road because vehicles hauling boat trailers have greater difficulty stopping unexpectedly.

Rockfall Hazards

Rocks and debris fall onto the roadway with regularity, creating a hazard and requiring removal by maintenance crews. Exposed granite in roadway cuts is relatively friable (easily crumbled), and cut slopes are relatively steep, with the base of the slopes terminating close to the edge of the roadway pavement. This combination creates a condition where the weathering process, particularly erosion of cut slopes, has the potential to dislodge a considerable volume of debris onto the shoulders and into the travel lanes of the roadway.

Pullouts

Pullouts are limited and are not situated at regular intervals along the route. Many of the existing unmarked pullouts are not paved or delineated. For vehicles traveling toward Katherine Landing, there are few pullouts, leaving some motorists no option but to use pullouts on the opposite side of the road. For more than 2 miles (from approximately 1.2 miles north of Davis Dam Road to 0.4 mile east of the boat ramp), the existing roadway bench is extremely narrow, limiting the opportunities for motorists to pull off the roadway. Limited opportunities to safely pull off the roadway can affect park staff working along the roadway (e.g., litter removal, roadside assistance, law enforcement) and visitors. Accidents and engine failure on the travel lanes can result in lane blockage and traffic backups, and can also block emergency vehicle access.

Vehicular Circulation/Traffic Queueing

Trailers with watercraft queue up on Katherine Landing Access Road awaiting their turn to launch. The number of watercraft allowed on Lake Mohave at a time is restricted; therefore, once this capacity is reached, launching is delayed until boats exit the lake. During the peak summer period, boat launch queues often extend beyond the entrance station, blocking other vehicle access, including traffic entering or exiting Cabinsite Road. On weekends in peak season, launch queues can extend back to Davis Dam Road.

Three inbound lanes are between the entrance station and the boat ramp—one is dedicated to vehicles launching watercraft, a second provides a dedicated right-turn lane for Cabinsite Road, and a third allows for regular through traffic. Vehicles hauling watercraft to be launched must line up in the designated launching lane. Some visitors mistakenly choose the wrong lane; others choose the wrong lane purposefully to move up in the queue. Long launch queues and associated

delays frustrate visitors. When boaters cut in line, visitor tempers can flare and, in some cases, altercations have resulted. Entrances to the overflow parking lot used regularly for the staging of large boats, including houseboats, have inadequate widths for larger vehicles. While entering or exiting this lot, larger trailers with boats routinely jump over the curbs, cracking curbs and knocking over NPS signs.

Drainage Issues/Roadway Embankment Stability

A major unnamed wash that parallels the road for approximately 1.4 miles (identified on Figure 2 as parallel wash; see legend) and other minor drainages threaten the road embankment and can cause overtopping of the roadway and sediment deposition. Some existing culverts are in need of replacement and inlet and outlet protection. All other existing culverts would require extending the overall length to accommodate greater road width. The box culvert approximately 1,500 feet north of the intersection of Davis Dam Road on Katherine Landing Access Road lacks capacity for a 50-year storm. This storm event is likely to overtop the roadway. Existing wire basket gabions installed to armor wash banks and protect the roadway embankment are deteriorating and failing in several locations. The parallel roadside wash has eroded a 15-foot to 20-foot vertical face approximately 10 feet from the edge of the pavement, threatening to undermine Katherine Landing Access Road approximately 1.3 miles north of the Davis Dam Road intersection.

Background

The project area (i.e., the larger, general area outside the specific location where project activities would occur) is at the southern end of Lake Mead NRA on the Arizona side of Lake Mohave. It begins approximately 1 mile north of Bullhead City, Arizona, at the intersection of Davis Dam Road and Katherine Landing Access Road and continues to the Katherine Landing boat ramp. The Colorado River flows generally north to south, with an impoundment at Hoover Dam creating Lake Mead and an impoundment at Davis Dam creating Lake Mohave. Ephemeral washes in the greater project area generally flow northeast to southwest toward the Colorado River.

Terrain in the project area varies. From the beginning of the project to a point where Katherine Landing Access Road begins to curve westward, the terrain is generally mountainous. Katherine Landing Access Road has frequent curves and short sight distances in this area. Following the westward curve, the terrain generally opens up, with gently rolling hills gradually descending west toward Lake Mohave. In this area, Katherine Landing Access Road is generally straighter, with longer sight distances.

Soils range from well-drained, shallow soils and rock outcrops on the hills and mountains to well-drained and excessively drained soils formed in sandy to clay mixed alluvium deposited by the Colorado River. The project area is in the Mohave Desertscrub biotic community and supports vegetation that varies with terrain conditions. Sparse creosote bush *(Larrea tridentata)* is the dominant vegetation in the flat or gently rolling hills, and the rockier and steeper terrain supports dense growth of brittlebush *(Encelia farinosa),* particularly along ephemeral washes.

The area surrounding the roadway is undeveloped for much of the project area. Development (e.g., campgrounds, parking areas, and lodging and retail facilities) begins near Katherine Mine Road and increases in density near the boat ramp west of Cabinsite Road.

Relationship to Other Plans and Policies

Servicewide and Park-Specific Legislation and Planning Documents

Current plans and policies that pertain to this proposal include the NPS Organic Act of 1916 (U.S. Congress 1916), the Lake Mead NRA Enabling Legislation of 1964 (U.S. Congress 1964), the *Lake Mead NRA General Management Plan* (NPS 1986), the *Lake Mead NRA 2001–2005 Strategic Plan* (NPS 2000a), and the NPS *Management Policies* (2006). The project's consistency with these plans and policies is described as follows:

- The NPS Organic Act of 1916 (U.S. Congress 1916) identifies the purpose of the NPS to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The project is consistent with the NPS Organic Act because it would improve visitor access for enjoyment of park resources.

- The enabling legislation for Lake Mead NRA (U.S. Congress 1964) identified the purpose of the park for "general purposes of public recreation, benefit, and use, and in a manner that will preserve, develop, and enhance, so far as practicable, the recreation potential." The project is consistent with Lake Mead NRA enabling legislation by supporting a high-quality visitor experience at Katherine Landing.

- The project is in the Katherine zone identified in the *Lake Mead NRA General Management Plan* (NPS 1986). Katherine Landing, noted as the only developed access point in the Katherine zone, is a large and popular resort area. The *Lake Mead NRA General Management Plan* goals for the Katherine zone include flood mitigation, redesigning parking/circulation, expanding commercial facilities, and relocating and expanding NPS facilities. This project is consistent with the *Lake Mead NRA General Management Plan* in that it would improve traffic circulation and movement.

- The *Lake Mead NRA 2001–2005 Strategic Plan* (NPS 2000a) identifies the park infrastructure as deteriorating and in need of upgrades to meet visitor expectations of quality. A goal in the strategic plan is to reduce the visitor safety incident rate by, among others, assuring that appropriate response times are met. This project is consistent with the strategic plan because the project's purpose is to enhance public safety by correcting deficiencies in existing road design and conditions, and to improve emergency response times by improving traffic circulation and movement.

- The proposal is consistent with the goals and objectives of the NPS *Management Policies* (2006) in that it meets the park purposes and legislatively authorized uses. It also addresses the stated requirement that the park "must exercise good judgment . . . and that safeguarding of human life must not be compromised." The proposed project was developed to improve traffic conditions, decrease accident rates, and improve emergency response times along Katherine Landing Access Road.

Scoping

Internal Scoping

Internal scoping was conducted with NPS Denver Service Center and Lake Mead NRA personnel. A meeting was held with internal interdisciplinary team members on October 7, 2010, to identify

team member roles and to discuss purpose and need, existing conditions, and environmental topics for analysis. An Environmental Screening Form was completed by internal NPS personnel, and the results were discussed at this meeting.

External Scoping

Lake Mead NRA conducted external scoping with the public, and interested and affected groups and agencies, to inform them about the project, to identify the resources that may be affected by a project proposal, and to explore possible alternative methods of meeting the project purpose and need while minimizing adverse impacts.

Lake Mead NRA issued a press release on October 28, 2010, to initiate the scoping process. At that same time, a notice was posted on the NPS website and the Planning Environment and Public Comment project home page. During the 30-day scoping period, three comments were received. All comments were in favor of the project, and one included roadway improvement and traffic management suggestions for consideration during alternative development.

Value Analysis

A value analysis was prepared and approved by the NPS in February 2012. The purpose of the value study was to (1) identify improvements to the alternatives, (2) recommend a preferred alternative for further analysis, and (3) evaluate cost estimates and maximize the benefit of a project relative to its cost. The Typical Section One alternative, which consists of a 12-foot-wide travel lane and a 2-foot-wide paved shoulder, had the highest benefit-cost ratio but scored lower than the Typical Section Two alternative in the value analysis. The Typical Section Two alternative, which consists of a 12-foot-wide travel lane and a 4-foot-wide paved shoulder, achieved the highest score in the value analysis but did not have the highest benefit-cost ratio. The Typical Section One and Typical Section Two alternatives will be included for analysis in this EA. The National Park Service chose Typical Section Two as the Preferred Alternative.

Impact Topics

Introduction

Impact topics for this project have been identified on the basis of federal laws, regulations, and orders; NPS *Management Policies* (2006) and NPS general knowledge of the resources in the project area; and public comments and concerns received during the initial public scoping period.

Impact Topics Retained for Further Analysis

Table 1 identifies the impact topics that could be affected by the improvements to Katherine Landing Access Road and, therefore, are retained for further evaluation in the *Environmental Consequences* chapter of this EA. Relevant laws, regulations, and policies are also noted.

Table 1. Impact Topics Retained for Further Evaluation and Relevant Laws, Regulations, and Policies

Impact Topic	Reasons for Retaining Impact Topic	Relevant Laws, Regulations, and Policies
Geological resources and soils	Ground disturbance would extend to previously undisturbed terrain.	NPS *Management Policies* (2006); NPS Reference Manual 77: *Natural Resource Management* (2004)
Vegetation	Construction would remove vegetation and require revegetation efforts, and could potentially lead to the spread of invasive species.	Executive Order 13112, Invasive Species; NPS Management Policies (2006)
Wildlife	Ground-disturbing and vegetation-removal activities have the potential to impact wildlife and wildlife habitat in the project limits. Suitable habitat for species covered by the Migratory Bird Treaty Act is found in the project vicinity but not in the project limits.[1]	Migratory Bird Treaty Act of 1918
Federally listed species and species of special concern	Though no Sonoran Desert tortoises (a candidate for listing under the Endangered Species Act) or Gila monsters (a species of concern) were observed in the project area during the biologist's site visit, there is the potential for individual Sonoran Desert tortoises or Gila monsters and their habitat to be disturbed by project activities.	Endangered Species Act of 1973, as amended
Floodplains	Project activities would occur in the 100-year floodplain.	Executive Order 11988, "Floodplain Management"; NPS DO-77-2, *Floodplain Management* (2003)
Water quality and quantity	Thirty-six ephemeral washes and numerous erosional gullies are in the project limits. Any of the washes have the potential to be impacted by roadway widening and drainage improvement activities.	Clean Water Act of 1977
Streamflow characteristics	Drainage improvements would directly impact ephemeral washes in the project limits and could alter channel alignments or road crossing locations.	Clean Water Act of 1977
Air quality	Construction activities could temporarily contribute to air pollutant emissions in the project vicinity. Following construction, the project would have the potential to benefit air quality in the immediate project vicinity by improving the flow of traffic, thereby reducing congestion and idling times.	Clean Air Act of 1963; 1916 Organic Act; NPS *Management Policies* 2006; Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance"; NPS Climate Change Response Strategy 2010

[1] The "project limits" is the physical area in which project activities would occur, including the footprint of potential disturbance and the limits of effect.

Table 1. Impact Topics Retained for Further Evaluation and Relevant Laws, Regulations, and Policies

Impact Topic	Reasons for Retaining Impact Topic	Relevant Laws, Regulations, and Policies
Archeological resources and historic structures	Two in-use structures and one archeological site have been identified in the project limits and have the potential to be affected by the project.	National Historic Preservation Act of 1966, Section 106, as amended (1992); NPS DO 28, *Cultural Resource Management Guideline* (1998); NPS *Management Policies* (2006)
Soundscapes	Motor vehicle traffic along the length of Katherine Landing Access Road and watercraft use near the Katherine Landing boat ramp in Lake Mohave are the primary sources of background noise in the project limits. Noise from the operation of construction equipment would temporarily impact noise levels. Once construction is complete, the project would no longer impact background noise levels.	NPS *Management Policies* (2006); NPS DO 47, *Soundscape Preservation and Noise Management* (2000b)
Park management/ operations	Construction operations could temporarily disrupt maintenance operations and emergency vehicle access and temporarily limit parking along the roadway. After construction, the project could benefit maintenance operations and emergency vehicle access, and would improve pullouts and parking facilities.	NPS *Management Policies* (2006)
Visitor use/experience, visitor safety, visual resources	Visitor use, experience, and safety are a major component of the purpose and need for this project. The project would be expected to improve visitor use/experience and visitor safety. The project would also be expected to have a minor to moderate effect on visual resources, which are addressed in this EA under this topic.	NPS *Management Policies* (2006); *Lake Mead NRA 2001–2005 Strategic Plan*

Impact Topics Dismissed from Further Analysis

Socioeconomics/Environmental Justice

Title VI of the Civil Rights Act of 1964 and related statutes assure that individuals are not excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, and disability. Executive Order 12898 on environmental justice, signed by President Clinton on February 11, 1994, directs that programs, policies, and activities not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations. The No Action alternative and the action alternatives would not have a disproportionate impact on populations protected under Title VI because there are no resident populations in the project area. In addition to Title VI and environmental justice, the socioeconomic environment includes factors such as park revenue and concessions. The project alternatives would have only a negligible effect

on socioeconomics. For the action alternatives, this effect would be beneficial. Because any potential impacts would be negligible, this topic was dismissed from further analysis.

Wilderness

The Wilderness Act of 1964 established the National Wilderness Preservation System to "secure for the American people of current and future generations the benefits of an enduring resource of wilderness" and is applied to all designated wilderness areas. Currently, there are nine wilderness areas partially or entirely in the Lake Mead NRA. There are no wilderness areas in or adjacent to the project limits; therefore, there is no potential for the No Action or action alternatives to impact wilderness. For this reason, the topic was dismissed from further analysis.

Wetlands and Riparian Habitats

The potential presence of wetlands in the project limits was investigated following the procedures outlined in NPS Manual 77-1: Wetland Protection. The manual instructs the use of U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps/digital data and field inventories based on the classification system developed by Cowardin et al. (1979) to determine the presence of wetlands. The latter defines wetlands as *"lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year."* This classification system includes riverine wetlands associated with intermittent streams, which are defined as a channel that *"contains flowing water for only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent."*

NWI mapping and digital data were reviewed and did not identify any wetlands in the project area. A field investigation of the project limits was conducted on October 7 and 8, 2010, to investigate the potential presence of wetlands. During this field investigation, only ephemeral drainages (i.e., desert washes) were observed in the project limits, and no evidence was found of hydrophytic vegetation, indicators of the presence of such vegetation in the recent past, hydric soils, or hydrological conditions conducive to wetlands formation. A Lake Mead NRA staff member (Mr. Michael Boyles) confirmed that the washes in the project limits flow during localized storm events without any regularity or predictability. The NPS Water Resources Division (Mr. Joel Wagner) concurred. For wetlands to be present in these types of ephemeral drainages, surface water would have to be present for a sufficient duration of the growing season to support hydrophytic vegetation and allow the development of hydric soils. This could occur in cases of prolonged supplemental flows from other sources (e.g., nuisance flows from urban development) or ponding of storm water. These circumstances do not occur in the project limits. The soils in ephemeral drainages in the project limits are generally well-drained and do not support surface water for a sufficient period during the growing season to allow the formation of hydric soils or the presence of hydrophytic vegetation. It was concluded, therefore, that there are no wetlands in the project limits.

The washes in the project limits are ephemeral desert washes that do not maintain riparian habitat. Because no wetlands or riparian habitats are in the project limits, there is no potential for the No Action or action alternatives to affect these resources. This topic was dismissed from further analysis.

Land Use

In 1964, Congress created the Lake Mead NRA for "general purposes of public recreation, benefit, and use, and in a manner that will preserve, develop, and enhance, so far as practicable, the recreation potential, and in a manner that will preserve the scenic, historic, scientific, and other important features of the area" (U.S. Congress 1964). This topic was dismissed from further analysis because there would be no change in existing land uses or land use classifications from the No Action alternative or from implementation of either of the action alternatives.

Indian Trust Assets

Indian trust assets are defined as resources reserved by or for Indian tribes through treaties, statutes, judicial decisions, and executive orders, and are held in trust by the United States (NPS 2006). The NPS *Management Policies* (2006) require that projects identify and evaluate potential impacts to Indian trust assets and consult with concerned tribes and the Bureau of Indian Affairs, as necessary. Because there are no Indian trust assets in the project area, there is no potential for the No Action or action alternatives to affect these resources. This topic was dismissed from further analysis.

Geohazards/Natural Hazards

There are no significant fault zones, seismic activity concerns, volcanoes, or other geohazards or natural hazards in the project area; therefore, there is no potential for the No Action or action alternatives to affect geohazards/natural hazards, and there is no potential for geohazards/natural hazards to affect the existing roadway or project. These topics have been dismissed from further analysis.

Cultural Landscapes

A cultural resource survey and a records search were undertaken as part of this project in an effort to locate any cultural resources, including cultural landscapes and historic districts. No cultural landscapes or historic districts were identified in the area of potential effects, and consultation with SHPO confirmed this conclusion. The project would not be expected to impact historic districts distanced from the immediate project area. Therefore, the No Action or action alternatives have no potential to impact these resources, and this topic was dismissed from further analysis.

Ethnographic Resources

Ethnographic resources are defined as cultural and natural features significant to an ethnic heritage and cultural viability (NPS 1998). Executive Order 13007, Indian Sacred Sites, signed by President Clinton on May 24, 1996, requires that federal agencies must "(1) accommodate access to and ceremonial use of Indian sacred sits by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites." No ethnographic resources, including sacred sites, were identified in or near the project area. Therefore, the No Action or action alternatives have no potential to impact these resources, and this topic was dismissed from further analysis.

Museum Collections

NPS management policies (NPS 2006) state that NPS will "collect, protect, preserve, provide access to, and use objects, specimens, and archival and manuscript collection . . . in the disciplines of archeology, ethnography, history, biology, geology, and paleontology to aid understanding among park visitors and to advance knowledge in the humanities and sciences" and to consider impacts of a project on museum collections. There are no cultural resource repositories in the area of potential effects; therefore, there are no museum collections. Because there are no museum collections in

the area of potential effects, no impact to museum collections would occur as a result of the No Action or action alternatives. Therefore, this topic was dismissed from further analysis.

Natural Lightscape/Night Sky

According to NPS *Management Policies* (2006), the NPS will preserve the natural lightscape in a park to protect the natural processes of species and provide for the enjoyment of a natural night sky by recreationists. By definition, a natural lightscape is what exists in the "absence of human-caused light." Under this policy, the NPS is required to minimize light from park facilities and work with adjacent landowners to reduce light pollution from nearby sources. Park superintendents are charged with determining where artificial lighting is appropriate but to restrict and minimize the use of artificial lighting as much as safety and security will allow.

Bullhead City, Arizona, and Laughlin, Nevada, less than 1 mile due south of Lake Mead NRA, are sources of light pollution; however, the mountainous terrain blocks this light pollution from much of the project area. Near Katherine Landing, overhead lights illuminate parking facilities and pedestrian lights line sidewalks. In addition, overhead lighting is at Davis Dam, southwest of the project area. No overhead lights are along Katherine Landing Access Road.

No lighting would be introduced into Lake Mead NRA with any of the alternatives: the No Action alternative or the action alternatives. Because there is no potential to affect night skies, this topic has been dismissed from further analysis.

ALTERNATIVES

Introduction

This chapter describes the No Action alternative and two action alternatives (Typical Section One and Typical Section Two) for the rehabilitation of Katherine Landing Access Road. The No Action alternative would not repair the road and would continue the present level of management, operations, and maintenance. Typical Section One and Typical Section Two were developed to address the purpose and need for the project to enhance public safety and support a high-quality visitor experience by correcting deficiencies in existing road design and conditions, including road and shoulder widths, horizontal and vertical curves, pavement condition, drainage structures, rockfall hazards, pullouts, vehicular circulation, traffic queueing, drainage problems, and flood damage threats to roadway embankment. Improvement would be implemented in a way that minimizes impacts to the area's natural and cultural resources. Typical Section Two is the Preferred Alternative.

The Preferred Alternative presents the NPS preferred management action in consideration of resource protection and management, visitor and operational use, cost, and other applicable factors. Other alternatives that were considered but eliminated from detailed analysis are discussed in this chapter. Also included in this chapter is a comparison of how well the alternatives meet project objectives and a summary comparison of the environmental effects of each of the alternatives.

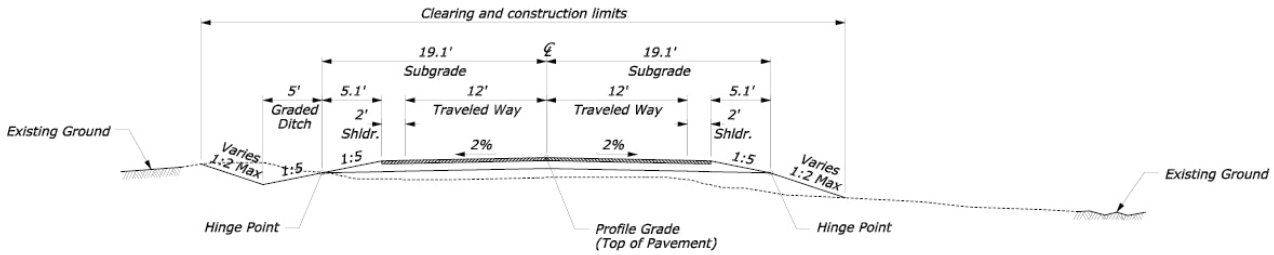
No Action Alternative

A No Action alternative represents a projection of current conditions. Under the No Action alternative, routine maintenance activities and other normal daily park operations would continue, and any previously approved plans would be implemented. Katherine Landing Access Road would continue to be available for use by local residents, park employees, and visitors. The roadway would continue to deteriorate, and existing concerns such as narrow travel lanes and shoulders, rockfall hazards, excessive traffic queueing, and drainage issues would remain.

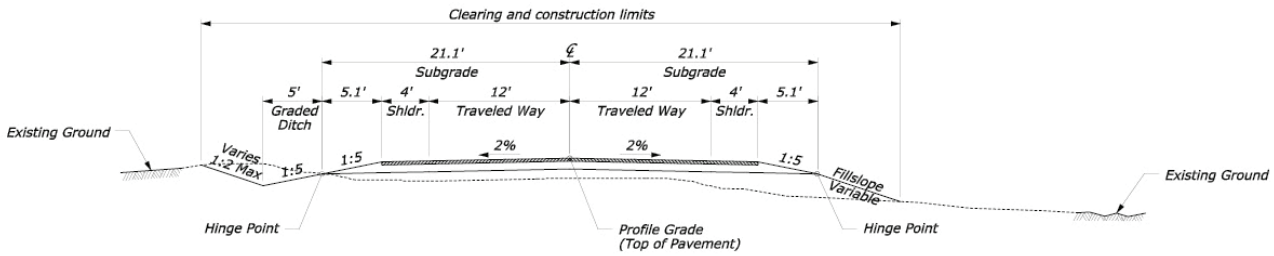
The No Action alternative provides a basis for comparison of the action alternatives and their respective environmental consequences. Should the No Action alternative be selected, the NPS would respond to future needs and conditions without major actions or changes in the present course.

Typical Section One Alternative

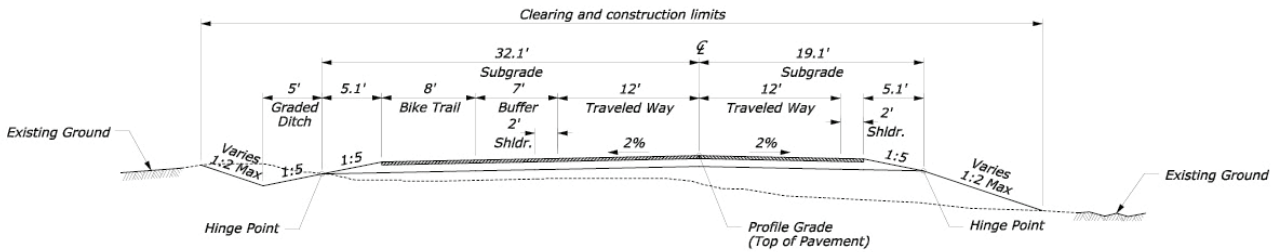
Under Typical Section One, the new paved shoulders would be 2 feet wide. The total width of roadway pavement, including the shoulders, would be 28 feet (two 12-foot-wide travel lanes plus 2-foot-wide paved shoulders) (Figure 3). Typical Section One would provide nine pullouts (six formal [paved] and three informal [unpaved]).



Typical Section One–2' Shoulder



Typical Section Two–4' Shoulder



Typical Section Three–2' Shoulder/15' Bike Path

Figure 3. Typical Sections for Action Alternatives

W\07-033024\NEPA\EA\Fig3

Typical Section Two Alternative—Preferred Alternative

Under Typical Section Two, the new paved shoulders would be 4 feet wide. The total width of roadway pavement, including the shoulders, would be 32 feet (two 12-foot-wide travel lanes plus 4-foot-wide shoulders) (Figure 3). Typical Section Two would provide eight pullouts. Six of these would be formal (paved) and two would be informal (unpaved). The NPS selected Typical Section Two as the agency's Preferred Alternative.

Components Common to Both Action Alternatives

The improvements common to Typical Section One and Typical Section Two, as described in the following sections, are the intersection realignment, roadway improvements, parking area improvements, and drainage improvements.

Davis Dam Road and Katherine Landing Access Road Intersection Realignment

For each of the action alternatives considered, the intersection of Davis Dam Road and Katherine Landing Access Road would be reconfigured. A "T" intersection would be constructed to provide unimpeded traffic flow on Katherine Landing Access Road. The abandoned portions of the Davis Dam and Katherine Landing Access roadways would be obliterated and revegetated.

Katherine Landing Access Road Improvements

The action alternatives would rehabilitate, reconstruct, and resurface Katherine Landing Access Road from Davis Dam Road to the Katherine Landing boat ramp. Existing travel lanes would be widened to 12 feet. Shoulders would be paved on both sides of the highway. The width of the shoulders would depend on the action alternative implemented. A graded ditch would also be established along portions of the highway. Existing guardrail would be replaced and new guardrail installed at various locations. Existing gravel pullouts would be paved, and others would be removed.

Pavement rehabilitation, roadway widening, and other improvements would be undertaken at the fee station, and a dedicated turn lane would be constructed at Katherine Mine Road and Cabinsite Road. New concrete curb and gutter would replace asphalt curbing.

Parking Area Improvements

Parking improvements would include the rehabilitation of existing parking areas and the paving of informal (unpaved) parking areas. An informal parking area would be formalized (paved) on the northeast corner of the reconfigured Katherine Landing Access Road and Davis Dam Road intersection. New curb and gutter and an accessible sidewalk would be installed along the eastern edge of the parking lot. Existing parking areas would be rehabilitated along the east and west sides of Katherine Landing Access Road at the fishing pier.

Drainage Improvements

All drainage improvements would occur along Katherine Landing Access Road. Riprap would be placed on both sides of the roadway for scour protection, as needed. Due to lane widening, approximately 19 existing culverts in the project limits (i.e., the physical area in which project activities would occur, including the footprint of potential disturbance and limits of effect) would be extended, and structure components, such as headwalls, wingwalls, elbows, end sections, and riprap inlet and outlet protection, would be incorporated, as needed.

At an existing box culvert, 1,500 feet north of the Davis Dam Road intersection, the wingwalls and cap would be extended and higher overflow culverts added. Approximately 1.1 miles north of this intersection, on the west side of the road, a row of gabion baskets would be removed and replaced with riprap, and a new mechanically stabilized earth-retaining wall (approximately 270 feet long) would be constructed on the roadway edge. A new culvert would be installed under the Katherine Mine Road intersection parallel to Katherine Landing Access Road. Existing surface drainage features would be rehabilitated.

Alternatives and Design Options Considered and Dismissed

One alternative was considered for project implementation but was ultimately dismissed from further analysis. In addition, one design option was considered for project implementation but was ultimately dismissed from further analysis.

Typical Section Three Alternative

Typical Section Three would reconstruct Katherine Landing Access Road to two 12-foot-wide travel lanes with a 2-foot-wide shoulder and a 15-foot-wide bike path zone (Figure 3). The bike path zone would consist of a 2-foot-wide shoulder, a 5-foot-wide buffer, and an 8-foot-wide dedicated and paved bike lane. Four formal (paved) pullouts and one informal (unpaved) pullout would be provided. The remaining improvements would be the same as Typical Sections One and Two.

Typical Section Three would satisfy the overall project purpose and need and was considered in the Value Analysis to be the safest of the action alternatives due to the inclusion of the bicycle zone. The bicycle zone would separate bicycles from motor vehicles and would improve access for emergency vehicles, which could drive on this buffer and bike lane, if needed. It would also enhance connectivity to bicycle lanes/paths outside the project limits.

The Value Analysis process recommended that Typical Section Three be eliminated from consideration for several reasons:

- It would result in the greatest acreage of ground disturbance (43 acres—19 more than Typical Section One and 13 more than Typical Section Two).
- It would result in the widest pavement surface (41 feet—12 more than Typical Section One and 9 more than Typical Section Two).
- It would accommodate only five pullouts, compared with nine pullouts for Typical Section One and eight pullouts for Typical Section Two.
- It would require the most long-term maintenance.
- It would consume the most raw materials and would require the most hauling for its construction.
- It would be the most costly to construct ($22.8 million) of the action alternatives—$12.7 million more than Typical Section One and $9.1 million more than Typical Section Two.

Intersection Realignment Design Options

Currently, Davis Dam Road extends from Bullhead City north and west to Davis Dam, which is west of the intersection with Katherine Landing Access Road. Katherine Landing Access Road forms a

"T" intersection with Davis Dam Road (Figure 2). In its current configuration, Davis Dam Road is referred to as the "through road." Today, nearly all Davis Dam traffic approaching the intersection from the south turns right (north) onto Katherine Landing Access Road rather than continuing on Davis Dam Road toward Davis Dam. Likewise, nearly all traffic traveling south on Katherine Landing Access Road turns left onto Davis Dam Road at the intersection. These right and left turning movements slow the flow of traffic through the intersection.

Two options were considered for the realignment of the intersection of Davis Dam Road and Katherine Landing Access Road. The first intersection realignment option would generally maintain the existing configuration of the intersection, with Davis Dam Road as the "through road." The second intersection realignment option would reconfigure the intersection to align with the primary direction of travel—establishing Katherine Landing Access Road as the "through movement" with unimpeded traffic flow. With this second option, the segment of Davis Dam Road west of the intersection would "T" into Davis Dam Road/Katherine Landing Access Road.

The Value Analysis recommended the second option, Katherine Landing Access Road as the through movement, because it would minimize the turning movements at the intersection and result in better traffic flow compared with the Davis Dam through-road option. The Davis Dam through-road option, which would not improve traffic flow through the intersection, would not fully meet the purpose of, and need for, the project; therefore, it was dismissed from further consideration.

Mitigation Measures of the Action Alternatives

The following mitigation measures have been developed to minimize the degree and/or severity of adverse effects and would be implemented during construction of the action alternatives.

Wildlife and Habitat

To minimize impacts to wildlife and wildlife habitat, the following mitigation measures will be implemented with the selected alternative:

- All construction equipment will be pressure-washed to remove foreign soil and plant matter before entering Lake Mead NRA. An NPS representative will inspect the equipment to ensure its cleanliness.
- Removal of native vegetation will be minimized to the extent practicable.
- All disturbed areas that would not be permanently incorporated into the transportation facility will be restored by seeding with native species, topsoil salvage and replacement, or a combination of both methods.
- Design of culvert inlet and outlet riprap scour protection will include wildlife ramps to allow continued wildlife movement through culverts.

Federally Listed Species and Species of Special Concern

- To protect any unknown or undiscovered threatened, endangered, or special status species, the construction contract will include provisions for the discovery of such. These provisions will require the cessation of construction activities until NPS staff evaluates the project

impact on the discovery and will allow modification of the contract for any protection measures determined necessary to protect the discovery.

- A desert tortoise education program shall be presented to all personnel on-site during construction. This program will contain information concerning the biology and distribution of the desert tortoise, its legal status, its potential occurrence near the proposed project limits, the definition of "take" and associated penalties, measures designed to minimize the effects of construction activities, the means by which workers can facilitate this process, and reporting requirements if desert tortoises are encountered.

Floodplains

- Following construction, any temporary roads across the 100-year floodplain will be obliterated and the floodplain graded to match the surrounding terrain.

Water Quality/Quantity and Streamflow Characteristics

- Prior to construction, a Clean Water Act Section 404 permit and Section 401 Certification will be acquired from the U.S. Army Corps of Engineers and the Arizona Department of Environmental Quality for all work occurring in Waters of the United States. The contractor shall adhere to all conditions, including any special conditions, of the permit and certification during and following construction activities.

- Prior to construction, a Clean Water Act Section 402 National Pollutant Discharge Elimination System Permit will be acquired. The contractor shall adhere to all conditions of this permit during and following construction activities.

- Construction will occur when no flow is present in the ephemeral drainages crossing the project limits.

Air Quality

- Any project-related vehicle or equipment operating on unpaved roads will not exceed a speed limit of 25 miles per hour.

- All active construction areas, including on-site haul roads, staging areas, and storage piles, will be effectively stabilized against dust emissions by applying water, and/or other reasonable measures. Land disturbances will be limited to areas needed for construction.

- Trucks hauling soil or sediment will be covered.

- The contractor will not operate equipment and vehicles that show excessive emissions of exhaust gases until corrective repairs or adjustments are made to reduce such emissions to acceptable levels.

- Unnecessary idling of diesel-powered construction equipment will be minimized.

- The contractor will immediately clean up any track-out onto a paved public roadway that exceeds 25 feet in length or exhibits a track-out pack-depth greater than 0.25 inch. All visible track-out will be removed at the end of each work day.

- The contractor will not be permitted to dispose of construction materials by burning.

Archeological Resources and Historic Structures

To minimize impacts to unknown cultural resources, the following mitigation measure will be implemented with the selected alternative:

- If previously unidentified cultural resources are discovered during construction-related activities, construction activities will be halted. The NPS would be notified immediately and arrangements made for the appropriate assessment and treatment of those resources.

Comparison of Impacts

This section summarizes the alternatives considered and the impacts of each alternative carried forward in this document.

Alternatives Comparison

Table 2 provides a brief summary of the No Action alternative and the action alternatives carried forward for analysis, and explains how well each of the alternatives meets the project objectives.

Table 2. Alternatives Summary and Extent to Which Each Alternative Meets Project Objectives

Alternative	Alternative Summary	Meets Project Objectives?
No Action	Katherine Landing Access Road and its intersections, pullouts, parking spaces, and drainage features would not be expanded or rehabilitated under this alternative. The existing road would continue to be used to access Katherine Landing, and regularly scheduled maintenance activities would continue to occur.	No. This alternative would not correct deficiencies in existing road design and conditions. Excessive traffic queue times would continue, and emergency vehicle access would be hampered by traffic congestion. Rockfall hazards and drainage issues would remain unaddressed. This alternative meets the objective for minimizing impacts to park resources because no construction would occur.
Typical Section One	Katherine Landing Access Road would be widened to two 12-foot-wide travel lanes with 2-foot-wide shoulders for a total pavement width of 28 feet. The Davis Dam Road/Katherine Landing Access Road "T" intersection would be reconfigured to allow unimpeded traffic flow on Katherine Landing Access Road and drainage structures would be improved. Six formal (paved) and three informal (unpaved) would be constructed or improved. The total area of new ground disturbance would be 24 acres. Typical Section One is the Environmentally Preferred Alternative.	Yes. This alternative would meet project objectives. Of the action alternatives, this alternative would have the smallest footprint of disturbance.

Table 2. Alternatives Summary and Extent to Which Each Alternative Meets Project Objectives

Alternative	Alternative Summary	Meets Project Objectives?
Typical Section Two	Katherine Landing Access Road would be widened to two 12-foot-wide travel lanes with 4-foot-wide shoulders, for a total pavement width of 32 feet. The Davis Dam Road/Katherine Landing Access Road intersection would be reconfigured to allow unimpeded traffic flow on Katherine Landing Access Road, and drainage structures would be improved. Six formal (paved) and two informal (unpaved) would be constructed or improved. The total area of new ground disturbance would be 30 acres. The NPS selected Typical Section Two as the agency's Preferred Alternative.	Yes. This alternative would meet project objectives. It could accommodate Class A (i.e., advanced) bicyclists on its wider, 4-foot shoulder and would provide more space along the side of the roadway for emergency vehicle access. This alternative would result in approximately 6 more acres of new ground disturbance than Typical Section One.

Summary of Environmental Consequences/Impact Comparison

Table 3 summarizes the level of impact for each analysis area covered in this EA for the No Action alternative and the action alternatives carried forward for analysis. Action alternatives considered but dismissed are not included in this table. The Environmental Consequences chapter provides a more detailed explanation of these impacts.

Table 3. Environmental Impact Summary by Alternative

Impact Topic	No Action	Typical Section One	Typical Section Two
Geological resources and soils	Continuing erosion due to scour would result in direct, localized, short-term, negligible, and adverse impacts to soils.	Construction would impact 24 acres of previously undisturbed soils, and cut and fill slopes would be required for roadway widening, resulting in direct, localized, long-term, minor, and mainly adverse impacts by incorporating previously undisturbed soils into permanent, man-made structures.	Construction would impact 30 acres of previously undisturbed soils and cut and fill slopes would be required for roadway widening, resulting in direct, localized, long-term, minor, and mainly adverse impacts by incorporating previously undisturbed soils into permanent, man-made structures.

Table 3. Environmental Impact Summary by Alternative

Impact Topic	No Action	Typical Section One	Typical Section Two
Vegetation	Impacts to individual plants could occur with maintenance vehicles that pull off onto the roadway shoulder and other vehicles that track off the roadway pavement. This would have direct, localized, short-term, negligible, and adverse impacts on vegetation.	Construction activities would result in a short-term impact on individual plants. A long-term impact on vegetation would occur in those areas permanently incorporated into the roadway infrastructure. This would have direct, localized, long-term, negligible to minor, and adverse impacts on vegetation.	Impacts of Typical Section Two would be similar to those of Typical Section One but would have a slightly greater area of impact (6 acres) due to the wider shoulder with this alternative. This would have direct, localized, long-term, negligible to minor, and adverse impacts on vegetation.
Wildlife	Impacts on wildlife would be negligible and would have no discernable effects on wildlife because no construction activities would occur.	The noise and activity of construction, including temporary blockages of potential movement corridors, would have direct, localized, short-term and long-term, negligible to minor, and adverse impacts on wildlife.	Typical Section Two would have similar impacts to Typical Section One but over a slightly wider area, resulting in direct, localized, short-term and long-term, negligible to minor, and adverse impacts on wildlife.
Federally listed species and species of special concern	No impact because no construction activities would occur.	During construction, individuals of a species may be impacted, but this alternative would not impact an overall species population. Any impacts, therefore, would be direct, localized, short-term, minor, and adverse.	Impacts of this alternative would be similar to those of Typical Section One but over a slightly wider area. Any impacts would be direct, localized, short-term, minor, and adverse.
Floodplains	No impact because no construction would occur.	No substantial changes to floodplain topography would result. Impacts due to temporary access roads would be direct, localized, short-term, negligible to minor, and adverse.	Impacts to floodplains would be the same as those of Typical Section One.
Water quality/ quantity	Ongoing maintenance activities would have the potential to increase sedimentation and would result in direct, localized, short-term, negligible, and adverse impacts on water quality. There would be no impact on water quantity.	Construction activities would result in direct, localized, short-term, minor, and adverse impacts on water quality. Scour protection would reduce bank erosion, reducing suspended sediment during flow events, resulting in direct, localized, long-term, negligible, and beneficial impacts.	Short-term and long-term impacts would be the same as those of Typical Section One.

Table 3. Environmental Impact Summary by Alternative

Impact Topic	No Action	Typical Section One	Typical Section Two
Streamflow characteristics	Continuing undercutting of roadway due to stream processes would result in indirect, localized, long-term, minor, and adverse impacts.	Inlet and outlet protection and scour protection structures would reduce erosion and localized flow velocity, resulting in direct, localized, long-term, minor, beneficial impacts.	Long-term impacts to streamflow characteristics would be the same as those of Typical Section One.
Air quality	Continuing traffic congestion would result in indirect, localized, long-term, negligible to minor, and adverse impacts.	Construction activities would result in direct, localized, short-term, negligible, and adverse impacts. Reductions in traffic congestion and idling times due to improvements would result in direct, localized, long-term, negligible, and beneficial impacts.	This alternative would have the same impacts as those of Typical Section One.
Archeological resources and historic structures	There would be no impact because there are no historic properties in the project limits.	There would be no impact because there are no historic properties in the project limits.	There would be no impact because there are no historic properties in the project limits.
Soundscape	No impact because no construction would occur.	Construction activities would temporarily increase noise, resulting in direct, localized, short-term, minor to moderate, and adverse impacts. Decreases in vehicle congestion and idling during peak visitation would result in indirect, localized, long-term, negligible, and beneficial impacts.	Impacts for this alternative would be the same as those of Typical Section One.
Park management/ operations	Would not correct existing road deficiencies or improve safety or maintenance, resulting in indirect, parkwide, long-term, minor, and adverse impacts.	Construction activities would result in direct, localized, short-term, negligible, and adverse impacts on park operations. Improvements would reduce burden on NPS maintenance, law enforcement, and emergency response personnel, resulting in direct, parkwide, long-term, minor, and beneficial impacts.	Impacts for this alternative would be the same as those of Typical Section One.

Table 3. Environmental Impact Summary by Alternative

Impact Topic	No Action	Typical Section One	Typical Section Two
Visitor use/ experience, visitor safety, Visual resources	No impact to visitor safety, use, or visual resources because no construction would occur.	Construction would result in temporary delays and adverse impacts for the duration of construction. Following construction, reduction of traffic delays, increased safety due to widened road, shoulders, and pullouts, and an expected reduction in traffic incidents would result in indirect, localized, long-term, moderate, and beneficial impacts. Impacts to visual resources as a result of road widening would be direct, localized, long-term, minor, and adverse.	Wider shoulders provide a larger safety area for vehicles to avoid collisions and more space for emergency vehicles and for disabled vehicles to vacate the travel lane. Its 4-foot-wide paved shoulder could be used by advanced bicyclists. This alternative would result in indirect, localized, long-term, moderate, and beneficial impacts. The wider roadway would have direct, localized, long-term, moderate, and adverse impacts on visual resources.

Environmentally Preferred Alternative

According to the Council of Environmental Quality regulations implementing NEPA (43 CFR 46.30), the Environmentally Preferred Alternative is the alternative "that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighing by the Responsible Official of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources. In some situations, such as when different alternatives impact different resources to different degrees, there may be more than one environmentally preferable alternative."

No Action alternative. This alternative would not result in new surface disruption to the area around Katherine Landing Access Road. However, this alternative would not address roadway design deficiencies or deteriorating pavement and would not reduce traffic congestion; therefore, it would not resolve concerns related to visitor safety and experience. This alternative does not meet the criteria identified previously for the Environmentally Preferred Alternative.

Typical Section One. This alternative, including all mitigation measures identified in this EA, is the Environmentally Preferred Alternative. Of the two action alternatives carried forward for analysis, Typical Section One, with it smaller footprint of disturbance, would have the least potential of the action alternatives to affect biological, physical, natural , and cultural resources of the project area and, therefore, best meets the evaluation criteria identified previously.

Typical Section Two. Typical Section Two would result in approximately 6 more acres of new ground disturbance than Typical Section One and, therefore, would have more potential to affect the previously referenced resources. Though not the Environmentally Preferred Alternative, Typical Section Two was selected as the agency's Preferred Alternative for several reasons:

- It could accommodate advanced bicyclists on its wider, 4-foot shoulder.

- It would provide more space along the side of the roadway for emergency and maintenance access and response, and for the temporary parking of disabled vehicles.

- It would reduce the potential for motorists to inadvertently track off the pavement and lose control of their vehicles, or cross the roadway centerline in an effort to avoid tracking off the roadway pavement.

AFFECTED ENVIRONMENT

Introduction

This chapter describes the existing conditions of the natural and human environment that may be affected by the alternatives under consideration. The information is organized by impact topic or resource.

Location and General Description of Lake Mead National Recreation Area and the Project Area

In the Mohave Desert of northwestern Arizona and southeastern Nevada, Lake Mead NRA encompasses the Colorado River from the western edge of Grand Canyon National Park southwest to Bullhead City, Arizona, and Laughlin, Nevada. Encompassing the Colorado River, Lake Mead NRA contains Lake Mead and Lake Mohave and provides many recreational opportunities for millions who visit the area for boating, fishing, swimming, and water-skiing.

Lake Mead NRA is within easy driving distance of major tourist destinations such as Las Vegas and Laughlin, Nevada, and the NRA itself is a tourist destination containing the Hoover Dam in addition to other desirable natural and man-made recreation opportunities.

At the south end of Lake Mead NRA in the project area, the terrain varies from nearly flat, gently sloping floodplains to extremely steep and rocky hillsides. The Black Mountains lie in a north–south orientation approximately 4 miles to the east of the roadway. Katherine Landing Access Road passes through the western edge of the Black Mountains.

The project limits follow Katherine Landing Access Road from Davis Dam Road near the southernmost limits of the Lake Mead NRA to the Katherine Landing boat ramp on Lake Mohave (Figure 2).

Geological Resources and Soils

Soils throughout the project area are hyperthermic arid soils (annual soil temperatures of 72 degrees Fahrenheit or higher). From Davis Dam Road to approximately 1.5 miles along Katherine landing Access Road, soils are of the Lithic Camborthids–Rock Outcrop–Lithic Haplargids Association. This association consists of well-drained, shallow soils and rock outcrops on hills and low mountains. The soils were formed in materials weathered residually from granite rocks, schists, volcanic tuffs and conglomerates, basalt, and some shale and sandstone. From about 1.5 miles northeast of Davis Dam Road to Katherine Landing boat ramp, soils are of the Torrifluvents Association. The Torrifluvents Association consists of well-drained to somewhat excessively drained soils formed in sandy to clay recent mixed alluvium deposited by the Colorado River (Hendricks 1985).

From Davis Dam Road to approximately 1.5 miles northeast, Katherine Landing Access Road generally follows a parallel wash with sand and gravel alluvial fan deposits. From approximately 1.5 miles northeast of Davis Dam Road to the westward curve of Katherine Landing Access Road, the road extends through areas of bedrock (Davis Dam granite) and sand and gravel alluvial fan deposits. From the westward curve of Katherine Landing Access Road to the boat ramp, the road extends through gently sloping terrain with sand and gravel alluvial fan deposits and braided

drainages conveying ephemeral flow to Lake Mohave. Many of the alluvial fan deposits and some of the exposed granite are susceptible to erosion.

Numerous erosional gullies are present on the gently to steeply sloping terrain in the greater project vicinity and in the project limits. These gullies range in size from very small rills to large washes and are formed by overland flows consolidating and eroding channels as they flow downhill. Washes show evidence of continued erosion due to the passage of water, which results in sedimentation and channel migration. In some cases, channel migration could result in roadway undercutting if left unchecked.

In addition to soil disturbance through natural processes, the project limits have man-made soil disturbance through construction and maintenance of the existing Katherine Landing Access Road and associated drainage facilities, including culverts and gabion baskets. Maintenance vehicles pulling off the road and visitor motor vehicles pulling off the road have resulted in some soil compaction adjacent to the roadway. Regular maintenance activities along the road and drainage facilities also result in some additional soil erosion and compaction.

Vegetation

The project area lies in the Mohave Desertscrub community. Native vegetation in the project area includes brittlebush–creosote bush–dominated Mohave desertscrub (Turner 1994). Vegetation varies, depending on the terrain. Where the terrain is flat or rolling hills, the vegetation is dominated by sparse creosote bush. In terrain that is rockier and steeper, vegetation is dominated by dense brittlebush, especially near washes.

Other common plants in the project area include prickly pear (*Opuntia* spp.), cholla (*Cylindropuntia* spp.), quailbush *(Atriplex lentiformis)*, and catclaw acacia *(Acacia greggii).* Rare individual barrel cactus *(Ferocactus cylindraceus),* Graham's nipple cactus *(Mammillaria grahamii),* and honey mesquite *(Prosopis glandulosa)* are also present. Near the Katherine Landing boat ramp, the project limits and surrounding area are highly developed and landscaped, with facilities ranging from parking lots and recreational vehicle and tent camping sites, to motels, stores, and other commercial and park maintenance buildings.

Arabian schismus *(Schismus arabicus)* was the only noxious species observed in the project limits and immediate vicinity during a biological survey (EcoPlan Associates, Inc. 2010). Densities ranged from single individuals up to large patches of Arabian schismus along Katherine Landing Access Road, in washes, and on the surrounding hillsides. This species was observed more frequently along the roadside and was less prevalent farther from the roadway. Tamarisk (*Tamarix* spp.) was also identified near the survey area in the coves of Lake Mohave but was not detected in any of the washes in the project limits.

Wildlife

General biological pedestrian surveys were conducted by EcoPlan biologists throughout the project limits on September 11–13, 2010. Gambel's quail *(Callipepla gambelii)* coveys were abundant in the project limits and were commonly observed moving along wash corridors ahead of surveyors. Signs of small rodent presence were observed (scat, tracks, and burrows), though only round-tailed ground squirrel *(Spermophilus tereticaudus)* were encountered during the survey of the project limits. Aged wild burro *(Equus africanus asinus)* scat was also common along the access road, though no burros or fresh scat were observed during surveys.

Other species typically occurring in Mohave Desertscrub, but not observed during surveys conducted September 11–13, 2010, include large mammals such as desert bighorn sheep *(Ovis canadensis nelson),* coyote *(Canis latrans),* and mule deer *(Odocoileus hemionus);* mice and rats such as Merriam's kangaroo rat *(Dipodomys merriami),* desert woodrat *(Neotoma lepida),* and pocket mice (*Perognathus* spp.); and reptiles such as banded gecko *(Coleonyx variegatus),* chuckwalla *(Sauromalus obesus),* spiny lizard *(Sceloporus magister),* horned lizards (*Phrynosoma* spp.), rattlesnakes (*Crotalus* spp.), or coachwhips (*Masticophis* spp.).

No previous biological surveys have been conducted of the project limits; however, the NPS conducted surveys in the 1990s in the vicinity (refer to the following section).

Federally Listed Species and Species of Special Concern

Threatened and Endangered Species

The USFWS website was accessed for a list of federally listed endangered, threatened, proposed, and candidate species for Mohave County (USFWS 2012). Appendix B summarizes the list and identifies habitat requirements and potential occurrences of each species in the project limits. The Sonoran Desert tortoise, a candidate for listing, is the one species from this table with the potential to be present in the project limits.

<u>Sonoran Desert Tortoise</u>
Extensive suitable habitat exists for the Sonoran Desert tortoise in the project area, particularly in the Black Mountains. Tortoise surveys throughout the Lake Mead NRA were conducted by NPS personnel from 1995 to 1997. Surveyors found that tortoise densities were low, with little or no sign of tortoise activity detected near the project limits (Michael J. Boyles, environmental compliance specialist, NPS, personal communication). The project limits appear to be near the northern extent of the range of the desert tortoise (Arizona Game and Fish Department 2004), though there are scattered records nearby and to the north. The nearest occurrence record is from approximately 1.5 miles southeast of the project limits, and records become more numerous to the southeast.

In the project limits, there is a potential for individuals to occur. No live tortoises or signs of tortoises (e.g., scat, carcasses) were encountered during the September 10–13, 2010, site survey. Many shallow holes and small caves, which could serve as tortoise burrows or shelter sites, were detected throughout the project limits and immediate vicinity. Each was inspected thoroughly for tortoise use; however, no evidence of tortoise use was at these sites. Many are likely used by other reptiles and small mammals.

Other Sensitive Species

<u>Gila Monster</u>

Gila monsters occur from the Sonoran Desert to the western edge of the Mohave Desert. They primarily inhabit rocky foothills and canyons and, less frequently, open, sandy plains. Individual occurrences have been recorded approximately 9 miles east of the project limits, in the Black Mountains south of State Route 68. Gila monsters are difficult to detect, spending more than 95 percent of their lives underground (Nevada Department of Wildlife 2007). Gila monsters are likely in the project limits and would be detected only when individuals emerge from an underground refugium during the summer rainy season and to forage when temperatures allow. Suitable habitat exists in the project limits, and there is potential for Gila monsters to occur, though

no individual Gila monsters or signs of Gila monsters were encountered during the September 10–13, 2010, site survey.

Wildlife of Special Concern in Arizona

The Arizona Game and Fish Department recognizes many Arizona species as sensitive and designates them as Wildlife of Special Concern in Arizona. Several of these are also federally listed and are addressed in Appendix B. The only other Wildlife of Special Concern in Arizona species that has the potential to occur in the project area is the California leaf-nosed bat (Appendix C). No Wildlife of Special Concern in Arizona species were observed during the September 10–13, 2010, site survey.

Floodplains

The Federal Emergency Management Agency Flood Insurance Rate Maps were reviewed to determine the presence of 100-year floodplains in the project limits. Several unnamed washes cross the project limits; however, a majority of the project limits lies outside the 100-year floodplain. The 100-year floodplain in the project limits is associated with an unnamed wash crossed by Katherine Landing Access Road approximately 0.25 mile north of its junction with Davis Dam Road (Flood Insurance Rate Maps 04015C4460G and 04015C4455G).

Water Quality/Quantity

Thirty-six washes cross the project limits, not including the many erosional gullies that are in the mountainous regions of the project area. Five of these 36 washes show indicators of an ordinary high water mark that define Waters of the United States—washes that would fall under the jurisdiction of the U.S. Army Corps of Engineers. The washes in the project area flow generally northeast to southwest across Katherine Landing Access Road. Some of the washes parallel the road for a distance, including one that parallels the west side of Katherine Landing Access Road for approximately 1.4 miles before flowing into Lake Mohave just north of Davis Dam Road.

The previously referenced washes comprise the only surface water in the project limits. These washes, which are dry nearly all of the time, flow only in response to precipitation events. The width of these drainage features varies from 1 to 23 feet. Though no data are available on the volume of flows carried by these washes during storm events, potential flow volumes would be dependent on factors such as duration and intensity of precipitation, and the size of the watershed drained by a particular wash.

Because the washes flow only in response to precipitation events, surface water, when present, is generally high in turbidity. Storm flows entrain loose sediment and can scour out materials from the channel floor or banks.

Streamflow Characteristics

Washes in the project area are ephemeral and carry flows only during localized storm events without any regularity or predictability. Southwesterly flows from these washes are conveyed across Katherine Landing Access Road via culverts, and from there they continue in natural channels to Lake Mohave.

Though all of the washes in the project limits cross Katherine Landing Access Road, some flow parallel to the road, resulting in roadway undercutting due to scour. Scour protection structures,

such as wire gabion baskets and riprap at channel outlets, are present in a few washes in the project limits. A major, unnamed wash flows parallel to Katherine Landing Access Road (identified on Figure 2 as parallel wash) for approximately 1.4 miles on the west side of the road. Evidence is visible of past scour of the channel bank and roadway undercutting along this wash. At a location approximately 1.3 miles north of the Davis Dam Road intersection, this parallel wash has eroded a 15-foot to 20-foot vertical face approximately 10 feet from the edge of the pavement, threatening to undermine Katherine Landing Access Road.

During some storm events, flows from drainages overtop the roadway and result in sediment deposition on the roadway pavement. An existing box culvert approximately 1,500 feet north of the intersection of Davis Dam Road lacks capacity for a 50-year storm. A storm event of this magnitude would likely cause flows to overtop the roadway.

Air Quality

The Clean Air Act of 1990 provides the principal framework for national, state, and local efforts to protect air quality. Under the Clean Air Act, the U.S. Environmental Protection Agency is responsible for setting National Ambient Air Quality Standards for pollutants that are considered harmful to human health and the environment. The Environmental Protection Agency has promulgated National Ambient Air Quality Standards for six criteria pollutants: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and particulate matter. Particulate matter includes inhalable coarse particles less than 10 but more than 2.5 microns in diameter and fine particles equal to or less than 2.5 microns in diameter. Localities with air quality that meet the standards for one or more pollutants are designated as "attainment areas" for that pollutant.

Lake Mead NRA is designated as a Class II air quality area, which means it has good air quality with no additional air quality restrictions above those of the National Ambient Air Quality Standards. The Lake Mead NRA is in attainment for each of the six criteria pollutants.

In the project limits, Katherine Landing Access Road consists of one through lane in each direction for the majority of the road length, with few opportunities for slow-moving or disabled vehicles to pull off the travel lane. During periods of peak visitation, road conditions lead to traffic congestion, including long lines of idling vehicles.

Archeological Resources and Historic Structures

A cultural resource survey was conducted along Katherine Landing Access Road in the project limits, and archival research records were searched to identify previously documented cultural resources (Heilman, Fenicle, and Ruter 2011). Twenty prior investigations identified a total of nine cultural resources within 0.5 mile of the project limits. The cultural resource survey covered the project's area of potential effects, defined as a 400-foot-wide corridor (200 feet on each side of the Katherine Landing Access Road centerline) from Davis Dam Road to the Katherine Landing boat ramp and a 400-foot-wide corridor along Davis Dam Road extending 1,025 feet east and 566 feet west of its intersection with Katherine Landing Access Road.

The cultural resource survey identified two in-use structures and one archeological site in the area of potential effects. Katherine Landing Access Road, one of the two in-use structures, was designed to provide public access to the lake and does not follow prior NPS initiatives of creating a deliberately scenic route or a road that caused little disruption to the natural landscape (Souliere 1995). The construction techniques used on Katherine Landing Access Road, which was built in the early 1950s, incorporated considerable road cutting and filling, and local materials were not

incorporated into the design. The road has been determined not eligible for the National Register of Historic Places (NRHP) by the NPS, and SHPO concurred on June 29, 2012, and August 16, 2012. The second in-use structure is Davis Dam Road (now County Road 68; originally State Route 68). Old State Route 68 was constructed beginning in 1942 and is a component of the Historic State Highway System considered by SHPO to be eligible for NRHP listing under Criterion D for its information potential (*Interim Procedures for the Treatment of Historic Roads* [Arizona Department of Transportation/Federal Highway Administration/SHPO 2002]). NPS determined that Old State Route 68 (County Road 68) is not eligible for the NRHP due to a loss of integrity, and SHPO concurred on June 29, 2012, and August 16, 2012.

The archeological site (AZ F:14:381 [ASM]) consists of a mining prospect (an exploratory test excavated to locate ore deposits) and a rock cairn; however, there are no associated artifacts. Because the prospect was not developed into or associated with a mine, it is considered an unimportant and common component of a mining district. Without associated artifacts, the information potential of the site has been exhausted by the recording completed for the proposed project. The prospect is approximately 1 mile from the nearest mine, and because of its isolated position along a secondary wash, does not convey the impression of being part of an integrated mining system. The site does not have characteristics that would make it a contributing element to the Katherine Mining District; therefore, the NPS determined that the site is not NRHP-eligible, and SHPO concurred on June 29, 2012, and August 16, 2012.

The NPS consultation letter on eligibility, with SHPO concurrence dated June 29, 2012 (Dickinson [Lake Mead NRA] to Garrison [SHPO]), and the SHPO email concurrence dated August 16, 2012 (Daron [Lake Mead NRA] to Jacobs [SHPO]) are included in Appendix A).

Soundscapes

Background noise in the project area is generated from the operation of motor vehicles along the length of Katherine Landing Access Road and watercraft on Lake Mohave near the Katherine Landing boat ramp. Katherine Landing Access Road is the only land-based travel route available for motorists to access Katherine Landing or the facilities and homes along the intersecting Cabinsite Road and Katherine Mine Road. Recreationists using the site to fish from land, swim, picnic, or otherwise engage in non-motorized recreation also contribute to the background noise level. With the noise from motor vehicle traffic, watercraft, and recreationists, this area is in an NPS Development Zone and is not considered an area for solitude and quiet.

Park Management/Operations

Currently, NPS-owned maintenance, police, and emergency vehicles must use Katherine Landing Access Road to respond to incidents and accidents (refer to accident data in the following section on visitor safety) along the roadway, at Katherine Landing, and along Cabinsite Road and Katherine Mine Road. During peak visitation, resulting traffic congestion can notably delay NPS and emergency personnel response. The NPS uses a boat ramp reserved for law enforcement and emergency use that is separate from the boat ramp at Katherine Landing Access Road.

Visitor Use/Experience, Visitor Safety, and Visual Resources

Katherine Landing is the southernmost marina at Lake Mead NRA, in the Lake Mohave District. The majority of visitors to Lake Mead NRA are seeking recreational opportunities, including boating, fishing, swimming, and water-skiing. The facilities at or around Katherine Landing include the boat ramp, picnicking facilities, a concessioner-operated motel, tent and recreational vehicle campsites,

boat rental and other commercial enterprises, other smaller lake access points, and backcountry camping sites. Table 4 shows the total number of visitors to Lake Mead NRA and the subset of visitors specifically in the Lake Mohave District for 11 recent years.

Table 4. Annual Visitor Use Data 1999–2009

Year	Lake Mead NRA Total Visitors	Lake Mohave District Total Visitors	Katherine Landing Total Visitors
1999	9,023,943	1,697,618	1,208,141
2000	8,755,005	1,485,817	1,119,537
2001	8,465,547	1,334,939	1,032,490
2002	7,550,284	1,336,391	1,059,056
2003	7,915,581	1,553,982	1,027,269
2004	7,819,984	1,586,143	939,835
2005	7,692,438	1,420,139	835,773
2006	7,777,753	1,809,715	950,643
2007	7,622,139	1,718,951	1,066,069
2008	7,601,863	1,370,300	792,363
2009	7,668,689	1,624,564	905,603

Recreational use of Lake Mead NRA varies throughout the year, peaking during the summer and decreasing over the winter months. Table 5 shows the pattern of visitor use for Lake Mead NRA in 2009, the last full year of record.

Table 5. 2009 Monthly Visitor Use Data

Month	Lake Mead NRA Total Visitors
January	381,924
February	407,104
March	522,533
April	689,340
May	881,445
June	879,411
July	738,932
August	1,027,245
September	783,512
October	692,180
November	516,646
December	426,558

Multiple recreational facilities are available on Lake Mohave, but Katherine Landing has the largest percent of visitor use for boating access due to the large number of existing marina slips. Katherine Landing Access Road provides the only land-based visitor access to the Katherine Landing area and associated recreational facilities. During peak periods of visitation in the summer, traffic congestion on Katherine Landing Access Road occurs while visitors wait their turn to access the boat launch. At times, the line of traffic has been observed from the Katherine Landing boat ramp to Davis Dam Road, approximately 3.8 miles away. There is also anecdotal evidence of direct visitor conflict, likely partly due to frustration from excessive wait times and traffic congestion on Katherine Landing Access Road.

Traffic congestion and the lack of emergency pullouts or clear zones negatively affect traffic safety. From 1996 to 2005, a total of 33 motor vehicle accidents were reported—eight with injury and one with a fatality. With traffic congestion, emergency response to these incidents and accidents is hampered.

Backups and vehicle queueing on Katherine Landing Access Road also negatively affects local residents' access to homes along Cabinsite Road and Katherine Mine Road. With no alternate road access, motorist travel can be blocked or delayed for notable periods while waiting for traffic to clear.

Views from Katherine Landing Access Road vary along the length of the project. From the intersection of Katherine Landing Access Road and Davis Dam Road to the westward curve toward Lake Mohave, the terrain is generally mountainous, with views limited to the immediate foreground, with the exception of occasional openings to the west. In this area, the natural landscape dominates views from the roadway. From that point to the Katherine Landing boat ramp, the foreground terrain opens up, with gently rolling hills that generally slope downward to the west and mountains to the north and south in the midground view outside the project limits. The built environment—including commercial, residential, camping and motel facilities—becomes more visible in proximity to Katherine Landing.

ENVIRONMENTAL CONSEQUENCES

Introduction

This chapter describes the anticipated direct, indirect (secondary), short-term and long term, adverse and beneficial, and cumulative effects on each resource resulting from implementation of the alternatives under consideration—the No Action alternative and two action alternatives.

The analysis is based on the assumption that the mitigation measures identified in the Mitigation Measures of the Action Alternatives section in the "Alternatives" chapter would be implemented for the action alternatives. Overall, the NPS impact analyses and conclusions were based on the review of existing literature and park studies, information provided by experts within the park and other agencies, professional judgment and park staff insights, and public input.

The two action alternatives, Typical Section One and Typical Section Two, are similar in scope and potential impact. Due to this similarity, the discussion of environmental consequences for each of the action alternatives by resource topic begins with an "Impacts Common to All Action Alternatives" section. Separate sections, which provide the impacts specific to each alternative, follow.

Methodology

General definitions used to classify impacts are defined by type, context, duration, and intensity. More specific definitions of impact thresholds are given at the beginning of each resource section when warranted.

- Type describes the classification of the impact as beneficial or adverse and direct or indirect.

  Beneficial: A beneficial impact would maintain positive current conditions of the natural environment, the human environment, or other park resources, or would improve conditions of the existing resources.

  Adverse: An adverse impact would cause deterioration from current conditions of the natural environment, the human environment, or other park resources, or would allow current adverse actions to continue to the detriment of the existing resources.

  Direct: An effect that is caused by an action and occurs in the same time and place.

  Indirect: An effect that is caused by an action that is later in time or farther removed in distance but is still reasonably foreseeable.

- Context describes the area or location in which the impact will occur. Are the effects site-specific, local, regional, or even broader?

- Duration describes the length of time an effect will occur, either short-term or long-term.

  Short-term: The effects of the action, whether beneficial or adverse, would be temporary and would exist only during the construction activities or during the short period thereafter during which resources would adapt to the changes caused by construction.

Long-term: The effects of the action, whether beneficial or adverse, would continue into the foreseeable future, assuming future conditions allowed the impact to continue.

- Intensity describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major. Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic analyzed in this EA.

Cumulative Impacts

The Council on Environmental Quality regulations require the assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as the incremental impact of that action when added to other past, present, or reasonably foreseeable future actions in the general project area. In addition, indirect or secondary impacts could also occur later in time or farther removed in distance from the proposed action. Cumulative impacts are considered for the alternatives carried forward for analysis in this EA.

Geographic Scope and Time Frame

The geographic scope of analysis for this EA covers the Katherine Landing Access Road corridor, the marina/boat ramp, and associated developed area. The time frame considered in the analysis is 10 years, or that time within which future actions could be reasonably foreseen.

Past, Present, and Reasonably Foreseeable Future Actions

Past actions identified in the area of cumulative impact analysis include the initial construction/ development of the Katherine Landing marina and boat ramp, the associated developed area, and area access roads (Katherine Landing Access Road, Katherine Mine Road, and Cabinsite Road). Present and future actions include ongoing park operations and maintenance, and park visitation. Future maintenance activities would likely include pavement repair, pullout area grading, roadway clearing following rockfalls, culvert cleaning and repair, and gabion basket repair.

Reasonably foreseeable future actions include NPS plans for redevelopment and new construction in the Katherine Landing marina and developed area. The timing of the Katherine Landing developed area improvements would depend on a number of factors, including future NPS, state, and partner funding levels, and service-wide priorities. Though full implementation could be many years in the future, it is assumed, for the purpose of assessing cumulative effects, that some percentage of these improvements would be undertaken within 10 years—the duration considered for this analysis.

Comparable plans for redevelopment and new construction in the Cottonwood Cove developed area on the west side of Lake Mohave, in Nevada, were also identified as reasonably foreseeable future actions but were not analyzed in the cumulative analysis because the planned improvements are outside the geographic scope of the cumulative impacts analysis.

Geological Resources and Soils

Intensity-Level Definitions

Negligible: Geological resources and soils would not be affected or the effects would be at or below the level of detection, would be short-term, and the changes would be so slight that they would not be of any measurable or perceptible consequence.

Minor: Effects on geological resources and soils would be detectable, though the effects would likely be short-term and localized, and would be small and of little consequence to the geologic and soil resources of the park. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects on geological resources and soils would be readily detectable, long-term, and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. Effects on geology or soils might occur as a direct or indirect result of the proposed action, and the effect would not be discountable.

Major: Effects on geological resources and soils would be obvious and long-term and would have substantial consequences to geology and soils in the region. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Impacts of No Action Alternative

Under the No Action alternative, regularly scheduled and ongoing maintenance activities would continue. No impacts to geologic resources would occur from the No Action alternative, but soils in the project limits would continue to be susceptible to erosion from the passage of wash flows. Roadway maintenance would continue under this alternative, resulting in the potential for soil erosion and compaction. Soil compaction could also occur as a result of vehicles pulling off Katherine Landing Access Road at undesignated areas. Eroding soils would impact the construction footprint and surrounding areas as eroded soils are transported by sheet flow or wash flows and deposited off-site. Impacts on soils with the No Action alternative would be direct, localized, short-term, negligible, and adverse.

Cumulative Impacts

Past actions, such as construction of the boat ramp and marina, roads, and drainage improvements, and implementation of ongoing maintenance activities have resulted in periodic short-term increases in soil erosion. Reasonably foreseeable future projects, including the redevelopment and new construction in the Katherine Landing marina and developed area, would also contribute to soil erosion. Past, present, and reasonably foreseeable future actions, in combination with the localized, short-term, negligible, adverse effects of the action alternatives, would result in an overall localized, short-term, negligible to minor, and adverse cumulative impact.

Conclusion

The No Action alternative would have direct, short-term, localized, negligible, and adverse impacts to soils from road maintenance activities and the effects of wind and water. Cumulative effects would be localized, short-term, negligible to minor, and adverse.

Impacts Common to All Action Alternatives

Construction of roadway widening and intersection realignment under the action alternatives would require earthwork (cut and fill) and soil compaction, which would directly disturb soils in the immediate construction area and temporarily contribute to soil erosion and sedimentation. Construction activities would occur on previously disturbed and undisturbed terrain and would stay within the recommended American Association of State Highway and Transportation Officials clear zone to minimize the impact of cut slopes and embankments. Following completion of

construction, disturbed areas that are not paved will be restored either by seeding, topsoil salvage and replacement, or a combination of both methods.

Temporary disturbance to soils would also occur with the paving of existing gravel pullouts and informal (unpaved) parking areas. In the long-term, however, paving would permanently stabilize these areas, reducing the expanse of unpaved surfaces subjected to erosion and sedimentation from vehicle movements, wind, and water. Other informal (unpaved) pullouts would be removed and revegetated, further reducing the potential for erosion.

Drainage improvements, including the upgrading of an existing box culvert with extended wingwalls, caps, and higher overflow culverts, the extension of existing culverts, and the establishment of a graded ditch along portions of the roadway, would directly impact soils at the site of the improvement and along any temporary construction access route. Many of the drainage improvements, such as the placement of riprap and construction of bank protection, would reduce the potential for channel bank or floor erosion.

The use and storage of heavy equipment and other vehicles during construction would result in temporary soil disturbance and compaction in the construction area and at locations used for staging and stockpiling. However, these soils would be expected to recover in the long-term once equipment is removed and vehicular traffic ceases. The underlying geology of the project limits would not be impacted. Impacts on soils under the action alternatives would be direct, localized, long-term, minor, and mainly adverse.

Impacts of Typical Section One

Total soil disturbance would be approximately 24 acres under Typical Section One—less than Typical Section Two. Of this total, approximately 15 acres would be on previously disturbed land and approximately 9 acres would be new disturbance.

Impacts of Typical Section Two

Total soil disturbance would be approximately 30 acres under Typical Section Two—more than Typical Section One. Of this total, approximately 19 acres would be on previously disturbed land and approximately 11 acres would be new disturbance

Cumulative Impacts.

These alternatives contribute to a cumulative impact when considered with past construction of the boat ramp and marina, roads, and drainage improvements, and implementation of ongoing maintenance activities. Reasonably foreseeable future projects, including the redevelopment and new construction in the Katherine Landing marina and developed area, would contribute to soil disturbance, and soil erosion and sedimentation. Past, present, and reasonably foreseeable future actions, in combination with the localized, long-term, minor, and adverse impacts of the two action alternatives, would result in an overall localized, long-term, minor, and adverse cumulative impact.

Conclusion.

The action alternatives would result in detectable impacts on soils for approximately 24 acres and 30 acres, respectively. The action alternatives would have direct, localized, long-term, minor, and adverse impacts on soils with the incorporation of previously disturbed and undisturbed soils into paved roadway, pullouts, and drainage structures. Cumulative effects would be localized, long-term, minor, and adverse.

Vegetation

Intensity-Level Definitions

Negligible: Native vegetation would not be affected or the effects would be restricted to individual plants. There would be no effect on overall native vegetation species populations.

Minor: Effects on vegetation would be detectable, with direct effects on individual native plants that could affect a small portion of the overall species population, result in short-term changes to species composition or vegetation structure, or result in the introduction of invasive species in limited locations. Effects would likely be short-term and localized, and would be small and of little consequence to the vegetation resources of the park. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects on vegetation would be readily detectable, long-term, and localized, with sizeable consequences at the population level. Invasive species could be introduced over an extensive portion of the project limits. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. Effects on vegetation might occur as a direct or indirect result of the proposed action, and the effect would not be discountable.

Major: Effects on vegetation would be obvious and long-term and would have substantial consequences to native species population, composition, and structure. Effects would be apparent outside the immediate project limits and would jeopardize continued succession of native vegetation communities. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Impacts of No Action Alternative

The No Action alternative would result in a continuation of current conditions. Loss of control or impaired driving may result in vehicles leaving the road and impacting individual native plants. Vehicle parking on unpaved areas would continue to compact soils, rendering these areas less suitable to revegetation. However, these impacts would not be expected to impact the overall native plant population of any species in Lake Mead NRA. Visitors would continue to inadvertently introduce invasive species to the area, mostly in the area immediately surrounding Katherine Landing Access Road and associated development near the boat ramp, but not at a level that would be anticipated to threaten the native plant populations. Impacts on vegetation with the No Action alternative would be direct, localized, short-term, negligible, and adverse.

Cumulative Impacts.

Past actions, such as construction of the boat ramp and marina, roads, and drainage improvements, and implementation of ongoing maintenance activities have resulted in loss and disturbance of vegetation. Reasonably foreseeable future projects, including the redevelopment and new construction in the Katherine Landing marina and developed area, would also contribute to vegetation loss or disturbance. Past, present, and reasonably foreseeable future actions, in combination with the localized, short-term, negligible, adverse effects of the action alternatives, would result in an overall localized, long-term, minor, and adverse cumulative impact.

Conclusion

The No Action alternative would have direct, localized, short-term, negligible, and adverse impacts on vegetation from ongoing maintenance activities and park visitation. Cumulative effects would be localized, long-term, minor, and adverse.

Impacts Common to All Action Alternatives

Construction of roadway widening under the action alternatives would result in the permanent loss of native and nonnative vegetation along a partially disturbed narrow strip of the first 3 miles of the project length. In the remaining mile, vegetation disturbance would be minimal because the adjacent areas are disturbed, landscaped, and/or developed. Other construction, such as the intersection realignment and some drainage improvements, would convert currently vegetated terrain to the built environment. Because these areas extend farther beyond the existing roadway, they are typically less disturbed than the linear edge of the roadway itself and, therefore, support higher plant densities. For this reason, the intersection realignment and drainage improvements would be expected to have a greater effect on vegetation than roadway widening.

Following construction, all disturbed areas that would not be permanently incorporated into the transportation facility would be restored by seeding with native species, topsoil salvage and replacement, or a combination of both methods. Impacts to vegetation would be short-term in areas that would be temporarily disturbed by construction but reseeded following construction, but long-term in areas that are permanently incorporated into the roadway facility. Impacts to native vegetation as a result of construction activities would not have the potential to threaten a native plant population. Impacts to native vegetation would be direct, localized, long-term, negligible to minor, and adverse.

The introduction of new invasive species or the spread of existing invasive species by construction equipment and personnel is a potential impact. Individuals and patches of invasive species are more prevalent along the existing roadway; therefore, a high potential exists for the spread of these species during earthmoving and other construction activities. Invasive species compete with native species for limited resources. Initially, these impacts could be short-term and localized but, if unchecked, could become long-term and spread to a wider area in Lake Mead NRA. To mitigate the potential for such introductions, all construction equipment will be pressure-washed to remove foreign soil and plant matter before entering Lake Mead NRA, and an NPS representative will inspect the equipment to ensure its cleanliness. With the implementation of these measures, the impact of a potential introduction of invasive species from the action alternatives would be direct, localized, long-term, negligible to minor, and adverse.

Impacts of Typical Section One

Due to its slightly more narrow roadway prism, Typical Section One would result in slightly less vegetation loss than Typical Section Two.

Impacts of Typical Section Two

Due to its slightly wider roadway prism, Typical Section Two would result in a slightly greater loss of vegetation.

Cumulative Impacts

Past actions, such as the construction of the boat ramp and marina, roads, and drainage improvements, and implementation of ongoing maintenance activities have resulted in the loss and

disturbance of vegetation. Future maintenance activities would occur primarily in areas where vegetation has been previously disturbed.

Individual recreation vehicles could adversely impact individual plants if the vehicle inadvertently veers off the road or pulls off in areas that are not designated for such use. In addition, visitors to the park could be unwitting carriers of invasive species. These events would be isolated and not anticipated to impact the native plant species populations.

Reasonably foreseeable future projects would contribute to vegetation loss and disturbance from construction of new facilities. Past, present, and reasonably foreseeable future actions, in combination with the localized, long-term, negligible to minor, and adverse impacts of the two action alternatives, would result in an overall localized, long-term, minor, and adverse cumulative impact.

Conclusion

The action alternatives would have long-term, localized, negligible to minor, and adverse impacts to vegetation from new construction. Cumulative effects would be long-term, localized, minor, and adverse.

Wildlife

Intensity-Level Definitions

Negligible: Wildlife and habitats would not be affected or the effects would be at or below the level of detection, would be short-term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species population.

Minor: Effects on wildlife and habitats would be detectable, though the effects would likely be short-term and localized, and would be small and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects on wildlife and habitats would be readily detectable, long-term, and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.

Major: Effects on wildlife and habitats would be obvious and long-term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Impacts of No Action Alternative

Under the No Action alternative, there would be no project-related removal or disturbance of wildlife habitat; however, existing drainage problems would not be corrected, and soil erosion and sedimentation would be expected to continue, potentially degrading wildlife habitat in the immediate vicinity. Traffic noise would continue to displace some species of wildlife in adjacent natural areas. Because there would be no new construction with the No Action alternative, impacts on wildlife habitat would be negligible and, therefore, no discernable effects on wildlife would be expected.

Cumulative Effects

Because there would be no discernable impact on wildlife under the No Action alternative, it would not contribute to cumulative effects on wildlife.

Conclusion

With the No Action alternative, impacts on habitat would be negligible, and no discernable effects on wildlife would be expected. As such, this alternative would not contribute to cumulative effects on wildlife.

Impacts Common to All Action Alternatives

As described in the previous section on vegetation, impacts to native vegetation would be direct, negligible to minor, short-term and long-term, and adverse. Because vegetation removal would be minor and would occur along the existing roadway, it is not expected to impact wildlife use, except in the small, localized areas where vegetation is converted to man-made structures. Construction activities would occur primarily in areas where regular disturbance due to maintenance or visitor use has occurred.

Extending culverts, adding new culverts, and installing scour protection measures could have the potential to affect wildlife movement. The addition of riprap to culvert inlets and outlets could provide a barrier to wildlife movement because some species are unable or unwilling to cross riprap. Measures such as providing riprap-free wildlife ramps into the culvert would be used to mitigate the impact of riprap placement on wildlife movement.

Under the action alternatives, construction activities would result in some displacement or avoidance by wildlife of adjacent natural areas due to noise and/or human presence. These effects would be temporary and limited to the period of construction. Following construction, traffic noise would continue to displace some species of wildlife in adjacent natural areas.

With mitigation measures to provide continued wildlife movement across Katherine Landing Access Road, impacts to wildlife would be direct, localized, short-term and long-term, negligible to minor, and adverse.

Impacts of Typical Section One

The potential to affect wildlife movements would be somewhat less under Typical Section One because it would add only approximately 4 feet to the length of existing culverts. However, because these extensions would be slight, wildlife that previously crossed Katherine Landing Access Road through these culverts would be expected to continue to use these culverts despite their longer length.

Impacts of Typical Section Two

The potential to affect wildlife movements would be somewhat greater under Typical Section Two because it would add approximately 8 feet to the length of existing culverts. However, these extensions would also be considered slight and, therefore, wildlife that previously crossed Katherine Landing Access Road through these culverts would be expected to continue to use these culverts despite their longer length.

Cumulative Effects

Past actions, such as construction of the boat ramp and marina, roads, and drainage improvements, and implementation of ongoing maintenance activities have resulted in loss of wildlife habitat. Past construction of roads and developed areas has adversely affected wildlife movements. Reasonably foreseeable future projects, including new construction in the marina developed area, would contribute to habitat loss. Past, present, and reasonably foreseeable future actions, in combination with the localized, short-term and long-term, negligible to minor, and adverse effects of the action alternatives, would result in an overall localized, long-term, minor, and adverse cumulative effect.

Conclusion

The action alternatives would have direct, localized, short-term and long-term, negligible to minor, and adverse impacts on wildlife from construction noise, traffic noise, and habitat degradation and loss. Cumulative effects would be localized, long-term, minor, and adverse.

Federally Listed Species and Species of Special Concern

Intensity-Level Definitions

Minor: Effects on special status species would be discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or completely beneficial.

Moderate: Effects on a listed species might occur as a direct or indirect result of the proposed action, and the effect would not be discountable. Moderate impacts to species would result in a local population decline due to reduced survivorship, declines in population, and/or a shift in the distribution; no direct casualty or mortality would occur.

Major: Major impacts would involve a disruption of habitat, nests, and breeding grounds of a protected species such that direct casualty or mortality would result in removal of individuals of a protected species from the population.

Impacts of No Action Alternative

This alternative would have no effect on threatened, endangered, or species of special concern because no construction would occur.

Cumulative Effects

Because there would be no effect on threatened, endangered, or species of special concern with the No Action alternative, the No Action alternative would not contribute to cumulative effects.

Conclusion

The No Action alternative would have no effect on threatened or endangered species or species of special concern. The No Action alternative would not contribute to cumulative effects on threatened or endangered species or species of special concern.

Impacts Common to All Action Alternatives

The action alternatives would impact previously undisturbed terrain and previously disturbed ground that is not currently paved or covered by a man-made structure. No threatened

or endangered species or species of special concern were observed during the biological site visit; however, the project vicinity provides suitable habitat for the Sonoran Desert tortoise (a candidate for listing under the Endangered Species Act), the Gila monster (a species of concern), and the California leaf-nosed bat (a species on the list of Wildlife of Special Concern in Arizona). Because of the relatively small area of disturbance, this project would not be expected to impact the overall species population. Due to the potential presence of Sonoran Desert tortoise, a desert tortoise education program shall be presented to all personnel on-site during construction. It is possible that individuals of a species may be impacted during construction. This impact would be considered direct, localized, short-term, minor, and adverse.

Impacts of Typical Section One

Though there would be slightly less ground and vegetation disturbance under Typical Section One, there would be no discernable difference between the two action alternatives in their potential to impact candidate species or species of concern.

Impacts of Typical Section Two

Though there would be slightly more ground and vegetation disturbance under Typical Section Two, there would be no discernable difference between the two action alternatives in their potential to impact candidate species or species of concern.

Cumulative Effects

Past construction and development have resulted in short-term noise disturbance to wildlife, loss and degradation of wildlife habitat, and the introduction of barriers to wildlife movements. Reasonably foreseeable future actions, particularly construction in currently undeveloped areas, could contribute to the loss of suitable habitat for the Sonoran Desert tortoise, the Gila monster, and the California leaf-nosed bat. Past, present, and reasonably foreseeable future actions, in combination with the localized, short-term, minor, and adverse impacts of the two action alternatives, would result in an overall localized, long-term, minor, and adverse cumulative impact.

Conclusion

The action alternatives would have direct, localized, short-term, minor, and adverse impacts on threatened or endangered species or species of special concern due to potential impacts to individuals during construction. Cumulative effects would be localized, long-term, minor, and adverse.

Floodplains

Intensity-Level Definitions

Negligible: 100-year floodplains would not be affected to an extent that would result in a change in floodplain topography.

Minor: Effects on 100-year floodplains would be detectable, with direct effects on a small portion of the topography of the floodplain. These effects would not change the flood conveyance capacity of the 100-year floodplain and would not result in additional flooding outside the original floodplain. Effects would likely be short-term and localized, and would be small and of little consequence to the floodplain. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects on 100-year floodplains would be readily detectable and long-term. The topography of the floodplain would be changed to an extent that would alter the current pattern of flood flow conveyance. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. Effects on 100-year floodplains would be long-term and not completely beneficial.

Major: Effects on 100-year floodplains would be obvious and long-term, and would have substantial consequences to flood flow conveyance. Effects would be apparent outside the immediate project limits. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Impacts of No Action Alternative

This alternative would have no impact on the 100-year floodplain because no construction would occur. Ongoing maintenance of the roadway and associated culverts would not result in changes to the floodplain topography.

Cumulative Effects

Because this alternative would have no potential impact on the 100-year floodplain, there would be no potential to contribute to cumulative impacts to this resource.

Conclusion

The No Action alternative would have no impact on the topography of the 100-year floodplain because no construction would occur. Because the No Action alternative would not impact the 100-year floodplain, there would be no potential for this alternative to contribute to cumulative impacts to this resource.

Impacts Common to All Action Alternatives

The action alternative improvements would occur along an existing roadway alignment, and the extent of roadway widening would be minor. A culvert extension would be required in a channel associated with a 100-year floodplain. Because the permanent improvement would be in the channel, this alternative would not substantially modify the topography of the floodplain. The culvert extension would be of adequate size to convey flows under the road. Temporary impacts to the 100-year floodplain would occur as construction equipment traverses the floodplain to access the unnamed wash for culvert extension activities. A temporary road across the floodplain would likely be required to access the wash. Following construction, the temporary road would be removed and the terrain returned to its original configuration. The Floodplain Statement of Finding concluded that both action alternatives would be acceptable under Executive Order 11988 for the protection of floodplains (Appendix D). Further minimization of impacts would result from the development and implementation of an erosion and sediment control plan during construction. Impacts to the 100-year floodplain as a result of the action alternatives would be direct, localized, short-term, negligible to minor, and adverse.

Impacts of Typical Section One

Though there would be slightly less ground disturbance under Typical Section One, there would be no discernable difference between the two action alternatives in their potential to impact the 100-year floodplain.

Impacts of Typical Section Two

Though there would be slightly more ground and vegetation disturbance under Typical Section Two, there would be no discernable difference between the two action alternatives in their potential to impact the 100-year floodplain.

Cumulative Effects

Past actions, including road construction and other development, have altered surface drainage patterns and impacted the 100-year floodplain. Ongoing maintenance in some drainage structures would result in intermittent and short-term impacts on the 100-year floodplain. Reasonably foreseeable future actions, especially construction in previously undisturbed areas, would have the potential to alter surface drainage patterns and impact the 100-year floodplain. Past, present, and reasonably foreseeable future actions, in combination with the localized, short-term, negligible to minor, and adverse impacts of the action alternatives, would result in an overall localized, long-term, minor to moderate, and adverse cumulative impact.

Conclusion

Due to temporary construction impacts, the action alternatives would have direct, localized, short-term, negligible to minor, and adverse impacts on the 100-year floodplain. Cumulative effects would be localized, long-term, minor to moderate, and adverse.

Water Quality/Quantity

Intensity-Level Definitions

Negligible: Impacts are not detectable, are well below water quality standards for the designated use, and are in historical ambient or desired water quality baseline conditions.

Minor: Impacts are detectable, are well below state and/or Environmental Protection Agency–established water quality numeric standards for the designated use, and are in the historic water quality baseline at all times. State anti-degradation policy is not violated.

Moderate: Impacts are detectable and within state or Environmental Protection Agency–established water quality numeric standards for the designated use but exceed the historic water quality baseline on a limited time and space basis. State anti-degradation policy is not violated.

Major: Impacts are detectable and persistently alter the historic water quality baseline but do not violate state anti-degradation policy. State or Environmental Protection Agency–established water quality numeric standards for the designated use are locally approached, equaled, or slightly singularly exceeded on a short-term and temporary basis.

Impacts of No Action Alternative

No change in water quantity would result with the No Action alternative. The No Action alternative would not result in direct increases in point or non-point sources of water pollution. However, maintenance would have the potential to increase sediment load in the ephemeral washes on an intermittent and short-term basis. Because no construction action would be taken, no water quality

certification would be required for this alternative. Impacts of the No Action alternative on water quality would be direct, localized, short-term, negligible, and adverse.

Cumulative Effects

Past actions, including development of roads, a boat ramp, and a marina and developed area, have resulted in soil erosion and sedimentation, and the associated degradation of surface water quality. Ongoing maintenance activities would continue to result in intermittent and localized soil erosion and sedimentation. Reasonably foreseeable future projects, specifically new construction in the Katherine Landing marina and developed area, would contribute to soil erosion and sedimentation and the introduction of new impermeable surfaces. Past, present, and reasonably foreseeable future actions, in combination with the localized, short-term, negligible, and adverse effects of the No Action alternative, would result in an overall localized, long-term, minor, and adverse cumulative effect.

Conclusion

The No Action alternative would have direct, localized, short-term, negligible, and adverse impacts on water quality from some maintenance activities. Cumulative effects would be localized, long-term, minor, and adverse.

Impacts Common to All Action Alternatives

Under the action alternatives, work would occur in at least 19 of the 36 ephemeral washes that cross the project limits, including five washes identified as potential Waters of the United States. Scour protection measures would reduce bank and floor erosion, thereby reducing suspended sediment carried during flow events. Culvert extensions would be adequate to convey flow and would not adversely impact water quality or quantity. Permanent fill such as culvert extensions and riprap would be placed in Waters of the United States. Long-term impacts to Waters of the United States would be minor and beneficial. In some locations, temporary roads would need to be constructed to provide wash access during construction. Any work occurring in Waters of the United States would require authorization under Section 401 and Section 404 of the Clean Water Act. Construction contractors shall adhere to the conditions of these authorizations when working in Waters of the United States.

Construction of roadway widening, intersection realignment, and the paving of existing gravel pullouts and informal (unpaved) parking areas would temporarily disturb soils in the construction area, which could contribute to soil erosion and migration to adjoining areas, including dry wash beds. Future precipitation events could entrain loose soils, adversely affecting water quality.

Following completion of construction, disturbed areas that are not paved will be restored, either by seeding, topsoil salvage and replacement, or a combination of both methods. Following construction, areas that are paved would be permanently stabilized and not be subjected to erosion and sedimentation from vehicle movements, wind, and water. Disturbed areas that are not paved, however, will be stabilized either by seeding, topsoil salvage and replacement, or a combination of both methods. The placement of riprap and other erosion control measures at culvert outlets would reduce flow velocities, minimize scour action, and reduce the potential for turbidity in surface waters.

To mitigate temporary impacts to water quality from construction, a Section 402 National Pollutant Discharge Elimination System permit, including an erosion and sediment control plan, would be obtained and conditions of the permit followed during construction. Vegetation removal would be

minimized to the extent practicable. Construction impacts to water quality with the action alternatives would be direct, localized, short-term, minor, and adverse. Following construction, impacts to water quality would be direct, localized, long-term, negligible, and beneficial.

Impacts of Typical Section One

Because Typical Section One would have a slightly more narrow roadway footprint, acreage of permanent fill within Waters of the United States as a result of extending culverts would be somewhat lower with this alternative than Typical Section Two.

Impacts of Typical Section Two

Because Typical Section Two would have a slightly wider roadway footprint, acreage of permanent fill within Waters of the United States as a result of extending culverts would be somewhat larger with this alternative than with Typical Section One.

Cumulative Effects

Past development actions, which have increased impermeable surfaces in the area, contribute to storm water runoff velocities and increase turbidity of surface water during these events. Ongoing maintenance activities would result in localized soil erosion and sedimentation, but drainage improvements would be expected to have a beneficial long-term minor impact on water quality through reductions in erosion and sediment load. Reasonably foreseeable future projects, specifically new construction in the Katherine Landing marina and developed area, would contribute to soil erosion and sedimentation and the introduction of new impermeable surfaces. Past, present, and reasonably foreseeable future actions, in combination with the direct, localized, short-term, minor, and adverse impacts of the action alternatives, would result in an overall localized, long-term, minor, and adverse cumulative impact.

Conclusion

The action alternatives would have the potential for direct, localized, short-term, minor, and adverse impacts during construction and direct, localized, long-term, negligible, and beneficial impacts following construction. No violations of water quality standards would be expected. Cumulative effects would be localized, long-term, minor, and adverse.

Streamflow Characteristics

Intensity-Level Definitions

Negligible: Impacts would not be detectable and would not result in observable changes to flow conveyance or streamflow characteristics.

Minor: Impacts would be detectable, with direct effects on streamflow characteristics, including flow conveyance. These effects would not change the capacity of the channel and would not result in increased risk of overtopping or scour. Effects would likely be short-term and localized, and would be small and of little consequence to the wash. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Impacts would be readily detectable and long-term. The wash channel would be changed to an extent that would alter the current pattern of flow conveyance.

Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. Effects would not be discountable.

Major: Impacts would be obvious and long-term and would have substantial consequences to flow conveyance. Effects would be apparent outside the immediate project limits. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Impacts of No Action Alternative

The No Action alternative would not directly alter streamflow characteristics; however, without construction of a retaining wall or implementation of other measures to prevent wash scour from undercutting Katherine Landing Access Road, stream processes (bank cutting) would be expected to continue to undercut the roadway, potentially leading to roadway failure. Impacts on streamflow characteristics with the No Action alternative would be indirect, localized, long-term, minor, and adverse.

Cumulative Effects

Streamflow characteristics of the project area have been adversely altered by past development actions such as the consolidation of drainage features, installation of culverts and other conveyance structures, and the armoring of drainage channels. Present actions, namely ongoing maintenance of drainage channels and culverts, would have a negligible effect on streamflow characteristics. Reasonably foreseeable future actions, including the redevelopment and new construction in the marina and developed area, would be expected to have a minor effect on streamflow characteristics. Past, present, and reasonably foreseeable future actions, in conjunction with the localized, long-term, minor, and adverse impacts of the No Action alternative, would result in a localized, long-term, minor to moderate, and adverse cumulative impact.

Conclusion

The No Action alternative would have indirect, localized, long-term, minor, and adverse impacts to streamflow characteristics from continued undercutting of Katherine Landing Access Road by one of the larger washes in the project area. Cumulative effects would be localized, long-term, minor to moderate, and adverse.

Impacts Common to All Action Alternatives

The action alternatives have the potential to impact streamflow characteristics as a result of drainage improvements in the project limits. The installation of riprap and other scour protection measures in the washes would result in a minor change in the physical characteristics of the ephemeral wash channels in the project area by reducing their tendency to scour the channel floor or banks. At about 1.3 miles north of the intersection with Davis Dam Road, a segment of the previously described parallel wash would be armored. At about 400 feet to the south, existing gabion baskets would be removed and replaced with riprap and a retaining wall of approximately 270 feet in length would serve to protect the roadway from the natural processes of the wash. These activities have a beneficial impact by reducing scour and protecting the roadway and drainage structures, thereby reducing maintenance and frequent, continued disturbance of the wash corridors during maintenance activities. The addition of scour measures such as riprap would add roughness to the channel and would reduce flow velocities in the immediate area of the improvements. In some locations, road crossings may be altered slightly. This would result in a localized, minor change to streamflow characteristics. These changes would not be expected to have an adverse impact on the wash or flow conveyance.

Construction would occur when washes are dry. Should a flow event occur during construction, equipment and other materials would be removed from the wash so flows would not be blocked and water quality would not be impaired.

The action alternatives would result in a direct, localized, long-term, minor, beneficial impact to streamflow characteristics from decreased scour/erosion potential and localized decreased velocities. Work in Waters of the United States would require authorization under Sections 401 and 404 of the Clean Water Act.

Impacts of Typical Section One

With regard to potential impacts on streamflow characteristics, the effects of Typical Section One would have no discernible difference from those of Typical Section Two.

Impacts of Typical Section Two

With regard to potential impacts on streamflow characteristics, the effects of Typical Section Two would have no discernible difference from those of Typical Section One.

Cumulative Effects

Past development actions have adversely modified streamflow. Present actions, namely ongoing maintenance of drainage channels and culverts, would have a negligible effect on streamflow characteristics. Reasonably foreseeable future actions would be expected to have a minor effect on streamflow characteristics with redevelopment and new construction in the marina and developed area. Because the effects of the action alternatives to stream flow characteristics would be beneficial, the action alternatives would not contribute to adverse cumulative impacts of past and reasonably foreseeable future actions.

Conclusion

The action alternatives would have direct, localized, long-term, minor, and beneficial impacts to streamflow characteristics due to decreased scour and localized decreased velocities following construction activities. The action alternatives would not contribute to adverse cumulative effects of past and reasonably foreseeable future actions.

Air Quality

Intensity-Level Definitions

Negligible: Impacts would not be detectable and would not result in observable changes to air quality. The project area would maintain its Class II air quality designation.

Minor: Impacts would be detectable, with direct effects on air quality. These effects would not change the overall air quality designation of the project area. Effects would likely be short-term and localized, and would be small and of little consequence. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Impacts would be readily detectable and long-term. Changes in air quality would be expected to result in a reclassification of the air quality designation for the project area. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. Effects would not be discountable.

Major: Impacts would be obvious and long-term and would have substantial consequences to air quality. Effects would be apparent outside the immediate project area. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Impacts of No Action Alternative

Under the No Action alternative, the generation of air pollutants from construction activities would not occur. However, without construction, no measures would be implemented to reduce traffic congestion during peak visitation. An increase in air pollutant emissions would be expected during peak travel times from traffic congestion and idling vehicles in long launch queues. This increase in air pollutant emissions would result in an indirect, localized, long-term, negligible to minor, and adverse impact on air quality.

Cumulative Effects

Past actions, such as construction of roads and other development, have resulted in periodic and negligible to minor increases in air pollutant emissions from the operation of vehicles and equipment and the generation of particulate matter from ground-disturbing operations. Ongoing maintenance activities also periodically contribute to short-term and negligible increases in engine emissions and soil disturbance. Reasonably foreseeable future projects, including the redevelopment and reconstruction in the Katherine Landing marina and developed area, would contribute to short-term and minor increases in engine emissions and particulate matter. Without improvements to Katherine Landing Access Road, continued growth in park visitation would be expected to increase levels of traffic congestion and associated increases in air pollutant emissions. Past, present, and reasonably foreseeable future actions, in combination with the localized, long-term, minor, and adverse impacts of the No Action alternative, would result in an overall localized, long-term, minor, and adverse cumulative impact.

Conclusion

The No Action alternative would have indirect, localized, long-term, negligible to minor, and adverse impacts on air quality from traffic congestion and idling vehicles. Cumulative effects would be localized, long-term, minor, and adverse.

Impacts Common to All Action Alternatives

During construction of the action alternatives, deterioration of air quality would be expected with the operation of construction equipment and the movement of soil. Temporary construction-related impacts on air quality with the action alternatives would be direct, localized, short-term, negligible, and adverse.

Following construction, the action alternatives would have the potential to reduce traffic congestion and vehicle queues and emissions associated with vehicle idling during peak visitation periods by creating additional pullout areas for disabled vehicles and adding lanes at key locations. The action alternatives would, therefore, have the potential to reduce the generation of air pollutant emissions that currently occurs along Katherine Access Road during peak visitation. Improvements would not be expected to result in changes to the current Class II air quality designation. Following construction, impacts on air quality would be direct, localized, long-term, negligible, and beneficial.

Impacts of Typical Section One

Because Typical Section One would disturb six less acres during construction than Typical Section Two, the quantity of emissions associated with construction of Typical Section One would be somewhat less than Typical Section Two. However, these construction-related effects would cease upon completion of construction, and would be localized and short-term. Following construction, this action alternative and Typical Section Two would have equal potential to reduce the generation of air pollutant emissions during peak traffic.

Impacts of Typical Section Two

During construction, deterioration of air quality would be expected with the operation of construction equipment and the movement of soil. Because Typical Section Two would disturb 6 more acres during construction than Typical Section One, the quantity of emissions associated with construction of Typical Section Two would be somewhat more than Typical Section Two. However, these construction-related effects would cease upon completion of construction, and would be localized and short-term. Following construction, this action alternative and Typical Section One would have equal potential to reduce the generation of air pollutant emissions during peak traffic.

Cumulative Effects

Past actions, such as construction of roads and other development, have resulted in periodic and negligible to minor increases in air pollutant emissions from the operation of vehicles and equipment and the generation of particulate matter from ground-disturbing operations. Ongoing maintenance activities also periodically contribute to short-term and negligible increases in engine emissions and soil disturbance. Reasonably foreseeable future projects would contribute to short-term and minor increases in engine emissions and particulate matter from the redevelopment and new construction in the boat ramp, marina and developed area. Past, present, and reasonably foreseeable future actions, in combination with the localized, short-term, negligible, and adverse effects of construction and the localized, long-term, negligible, and beneficial impacts of implementation, would result in an overall localized, long-term, negligible to minor, and adverse cumulative impact.

Conclusion

The action alternatives would have direct, localized, short-term, negligible, and adverse impacts to air quality during construction and direct, localized, long-term, negligible, and beneficial impacts following construction. Cumulative effects would be localized, long-term, negligible to minor, and adverse.

Archeological Resources and Historic Structures

Section 106 of the National Historic Preservation Act, as amended in 1992 (16 U.S. Code 470 et seq.); NPS DO 28, *Cultural Resource Management Guideline* (1998); and NPS *Management Policies* (2006) require the consideration of impacts on historic properties. The NRHP is the nation's inventory of historic places and the national repository of documentation on property types and their significance. The above-mentioned legislation and policies require federal agencies to coordinate consultation regarding the potential effects to properties listed on, or eligible for, the NRHP.

Properties may be of local, state, or national importance. Typically, historic properties are at least 50 years old, but younger properties may be considered for listing if they are of exceptional importance.

If a federal agency determinates that a proposed project is an undertaking, it has an obligation to determine the undertaking's effect on historic properties and to consult with SHPO (and sometimes the Advisory Council on Historic Preservation) regarding that determination. There are three possible effect determinations:

- "No historic properties affected"
- "No adverse effect"
- "Adverse effect"

The Lake Mead NRA has conducted Section 106 consultation with regard to the proposed undertaking as a separate effort from this EA and made a determination of "no historic properties affected." SHPO concurred by letter dated June 29, 2012 (Dickinson [Lake Mead NRA] to Garrison [SHPO]) and by email on August 16, 2012 (Daron [Lake Mead NRA] to Jacobs [SHPO]). These concurrences are included in Appendix A.

Intensity-Level Definitions

Negligible: There would be no direct or indirect impacts on any cultural resource potentially eligible for, or listed on, the NRHP.

Minor: Direct or indirect impacts to a cultural resource potentially eligible for, or listed on, the NRHP are anticipated; however, these effects would be minor in number, extent, and/or duration and would not diminish the overall integrity of the resource (i.e., those characteristics of the resource that qualify it for listing on the NRHP [contribute to its significance] would not be measurably affected).

Moderate: Direct or indirect impacts to a cultural resource potentially eligible for, or listed on, the NRHP are anticipated, and these effects would be greater in number, extent, and/or duration than minor impacts, but impacts to those characteristics of the resource that qualify it for listing on the NRHP (contribute to its significance) would be treated in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties through preservation, rehabilitation, restoration, or reconstruction, or through beneficial practices compatible with the nature of the resource.

Major: Direct or indirect impacts to a cultural resource potentially eligible for, or listed on, the NRHP are anticipated, and these effects would be more substantial in number, extent, and/or duration than moderate impacts. Major impacts would result in the alteration of some or all of the characteristics of the resource that qualify it for listing on the NRHP (contribute to its significance) and could potentially disqualify the property from listing on the NRHP.

Impacts of No Action Alternative

The No Action alternative would have no effect on historic properties (i.e., cultural resources eligible for the NRHP) because none are in the area of potential effects.

Cumulative Effects

Because there are no effects to historic properties under the No Action alternative, there would be no potential for cumulative impacts to these resources.

Conclusion

The No Action alternative would have no direct or cumulative effects on this resource because there are no historic properties in the area of potential effects.

Impacts Common to All Action Alternatives

The action alternatives would have no effect on historic properties because none are in the area of potential effects. The NPS consulted with SHPO on a determination of "no historic properties affected," and SHPO concurred by letter dated June 29, 2012 (Dickinson [Lake Mead NRA] to Garrison [SHPO]) and by email on August 16, 2012 (Daron [Lake Mead NRA] to Jacobs [SHPO]) (Appendix A).

Impacts of Typical Section One

Because there are no historic properties in the area of potential effects, there would be no effect on historic properties with the implementation of Typical Section One or Typical Section Two.

Impacts of Typical Section Two

Because there are no historic properties in the area of potential effects, there would be no effect on historic properties with the implementation of Typical Section One or Typical Section Two.

Cumulative Effects

Because there would be no effects to historic properties under the action alternatives, there would be no potential to contribute to cumulative impacts to this resource.

Conclusion

This alternative would result in a determination of "no historic properties affected" and would have no effect on historic properties and no potential to contribute to cumulative effects on this resource.

Soundscape

Intensity-Level Definitions

Negligible: Sound levels would not increase from the baseline acoustic conditions for this developed area. Sounds created would be consistent with existing human-made sounds and acoustic management goals and objectives in the area. Sound levels would rarely exceed levels specified in 36 CFR 2.12.

Minor: Sound levels would occasionally exceed baseline acoustic conditions for this developed area. Sounds created would be consistent with existing human-made sounds and acoustic management goals and objectives in the area. Sound levels would occasionally exceed levels specified in 36 CFR 2.12.

Moderate: For much of the time when present, noise levels would be high compared with the baseline acoustic conditions for this developed area. During the busiest days, a

majority of the area may experience human-caused noise at moderate to high levels. Sound levels would occasionally exceed levels specified in 36 CFR 2.12.

Major: For much of the time, noise levels would be high compared with the baseline acoustic conditions for this developed area. During the busiest days, the area may experience human-caused noise at moderate to high levels. Sound levels would frequently exceed noise levels specified in 36 CFR 2.12.

Impacts of No Action Alternative

The No Action alternative would have no impact on the soundscape in the project area because no construction would occur. Motor vehicle traffic on Katherine Landing Access Road and boat traffic in Lake Mohave would continue to be the main sources of noise, and this alternative would not result in a change in noise levels.

Cumulative Effects

The No Action alternative would have no impact on the soundscape in the project area and would have no potential to contribute to cumulative impacts on this resource.

Conclusion

The No Action alternative would have no impact on the soundscape in the project area because no construction would occur. The No Action alternative would not contribute to cumulative impacts on this resource.

Impacts Common to All Action Alternatives

The operation of heavy equipment and other construction techniques (i.e., blasting) during construction of the action alternatives would result in a temporary and localized increase in noise levels. Temporary, construction-related impacts on the soundscape would be direct, localized, short-term, minor to moderate, and adverse. Following construction, the action alternatives would result in a decrease in traffic noise by reducing vehicle congestion and idling during peak visitation periods. Long-term impacts on the soundscape associated with implementation of the action alternatives would be indirect, localized, long-term, negligible, and beneficial.

Impacts of Typical Section One

With its more narrow width, construction of Typical Section One would be expected to have a somewhat shorter construction duration than Typical Section Two, but the difference in impacts to the soundscape would be expected to be negligible.

Impacts of Typical Section Two

Typical Section Two could have a longer construction duration and could have more potential for blasting than Typical Section One, but the difference in impacts to the soundscape would be expected to be negligible.

Cumulative Effects

Past actions, such as construction of roads and other development, have resulted in temporary and minor increases in noise from the operation of vehicles and equipment during construction. Ongoing maintenance activities also periodically contribute to a temporary increase in noise. Reasonably foreseeable future projects would contribute to short-term increases in noise from construction activities in the marina and developed area. Past, present, and reasonably foreseeable

future actions, in combination with the localized, short-term, minor to moderate, and adverse impacts of the action alternatives, would result in an overall localized, long-term, minor to moderate, and adverse cumulative impact.

Conclusion

The action alternatives would have direct, localized, short-term, minor to moderate, and adverse impacts to the soundscape during construction, and indirect, localized, long-term, negligible, and beneficial effects following construction from the reduction in traffic congestion and vehicle idling. Cumulative effects would be localized, long-term, minor, and adverse.

Park Management/Operations

Intensity-Level Definitions

Negligible: Park operations would not be affected or the effect would be at or below the lower levels of detection and would not have an appreciable effect on park operations.

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

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

Major: The effects would be readily apparent and long-term and would result in a substantial change in park operations in a manner noticeable to staff and the public and markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, could be expensive, and their success could not be guaranteed.

Impacts of No Action Alternative

The No Action alternative would not correct existing design deficiencies, improve public safety, reduce maintenance requirements, or reduce traffic congestion or queueing. The No Action alternative would continue to place workload demands on park maintenance, law enforcement, and emergency response personnel. Impacts on park management and operations with the No Action alternative would be indirect, parkwide, long-term, minor, and adverse.

Cumulative Effects

Past development of the Katherine Landing area introduced a visitor destination and substantially increased visitation to the area, placing ongoing demands on NPS personnel for park maintenance, law enforcement, and emergency response. As the existing infrastructure ages, additional demands would be placed on NPS personnel to maintain, repair, and upgrade these facilities. Reasonably foreseeable future actions, including redevelopment and new construction in the marina and developed area, have the potential to support park management and operations by decreasing the need for maintenance and consolidating facilities and use areas. Past, present, and reasonably foreseeable future actions, in combination with the parkwide, long-term, minor, and adverse impacts of the No Action alternative, would result in an overall parkwide, long-term, minor, and adverse cumulative impact.

Conclusion

The No Action alternative would have indirect, localized, long-term, minor, and adverse impacts on the workload of NPS maintenance, law enforcement, and emergency response personnel because there would be no roadway improvements on Katherine Landing Access Road. Cumulative effects would be parkwide, long-term, minor, and adverse.

Impacts Common to All Action Alternatives

The action alternatives would correct design deficiencies, improve road conditions, improve public safety, reduce the incidence of rocks and debris on the roadway, and reduce congestion, thereby reducing the burden on NPS maintenance, law enforcement, and emergency response personnel. The wider paved shoulder would provide more space along the roadway for maintenance and emergency services to access and respond to incidents and accidents, particularly those that result in the blocking of the travel lane or lanes. The NPS would continue to use a separate, dedicated boat ramp for law enforcement and emergency response watercraft. The project would have no impact on access to, or use of, this separate boat ramp. Impacts on park management and operations following construction would be direct, parkwide, long-term, minor, and beneficial.

During construction, travel lane restrictions could contribute to temporary traffic congestion, which could extend the time needed for emergency service personnel to respond to incidents and accidents. Construction-related impacts on park management and operations with the action alternatives would be direct, localized, short-term, negligible, and adverse.

Impacts of Typical Section One

With its more narrow width, construction of Typical Section One would have a shorter construction duration than Typical Section Two, but the difference between the action alternatives would be expected to be negligible.

Impacts of Typical Section Two

Typical Section Two could have a longer construction duration and would have more potential need for blasting than Typical Section One, but the difference between the action alternatives would be expected to be negligible.

Cumulative Effects

Past development of the Katherine Landing marina and developed area introduced a visitor destination and increased visitation to the area, placing ongoing demands on NPS personnel for park maintenance, law enforcement, and emergency response. As the existing infrastructure ages, additional demands would be placed on NPS personnel to maintain, repair, and upgrade these facilities. Reasonably foreseeable future actions, including redevelopment and new construction in the marina and developed area, have the potential to support park management and operations by decreasing the need for maintenance. Past, present, and reasonably foreseeable future actions, in combination with the localized, short-term, negligible, and adverse effects during construction and the parkwide, long-term, minor, and beneficial impacts of implementation, would result in an overall parkwide, long-term, minor, and beneficial cumulative impact.

Conclusion

The action alternatives would have direct, localized, short-term, negligible, and adverse impacts during construction, and direct, parkwide, long-term, minor, and beneficial impacts on park management and operations following construction by decreasing maintenance and increasing

emergency response efficiency. Cumulative effects would be parkwide, long-term, minor, and beneficial.

Visitor Use/Experience, Visitor Safety, and Visual Resources

Intensity-Level Definitions

Negligible: Public health and safety and visitor experience, enjoyment, use of park resources, and visual resources would not be affected, or the effects would be at or below the level of detection, would be short-term, and the changes would be so slight that they would not be of any measurable or perceptible consequence.

Minor: Effects on visitors' safety, experience, enjoyment, use of park resources, and visual resources would be detectable, though the effects would likely be short-term and localized, would not have an appreciable adverse effect on public safety, and would be of small or little consequence to the aesthetic character of the area. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects on visitors' experience, enjoyment, use of park resources, and visual resources would be readily detectable, long-term, and localized, with consequences to the aesthetic character of the area. The impact to visitor safety would be sufficient to cause a permanent adverse change in accident rates at existing low accident locations or create the potential for additional visitor conflicts in areas that do not currently exhibit noticeable visitor conflict trends. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.

Major: Effects on visitors' experience, enjoyment, use of park resources, and visual resources would be obvious and long-term and would have substantial consequences. The impact to visitor safety would be substantial, either through the elimination of potential hazards or the creation of new areas with a high potential for serious accidents or hazards. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Impacts of No Action Alternative

Under the No Action alternative, existing travel delays, traffic congestion, and increased emergency response times on Katherine Landing Access Road would continue. No improvements in public safety would be anticipated under the existing conditions: narrow lanes, tight curves, limited sight distance, and lack of clear zones. Delays could be exacerbated if park visitation during peak periods increases. The No Action alternative would not alter the existing condition with regard to visitor experience and visitor safety.

This alternative would have no impact on visitation to Lake Mohave. The number of visitors would continue to be dependent on external factors, such as gas prices, general public interest in visiting the national parks, and other factors.

The No Action alternative would have no impact on the visual resources in the park or along Katherine Landing Access Road.

Cumulative Effects

The No Action alternative would have no impact on visitor experience, public safety, visitation rates, or visual resources; therefore, it would not contribute to cumulative effects of past, present, or reasonably foreseeable future actions on these resources.

Conclusion

The No Action alternative would have no impact on visitor experience, public safety, visitation rates, or visual resources in the project area. Therefore, this alternative would not contribute to cumulative effects of past, present, or reasonably foreseeable future actions on these resources.

Impacts Common to the Action Alternatives

The implementation of the action alternatives would reduce traffic delays along Katherine Landing Access Road during peak visitation. A reduction in traffic delays and the addition of safety improvements (e.g., construction of shoulders, vehicle pullouts, and widened travel lanes) would be expected to reduce traffic accidents and incidents, reduce emergency vehicle response times, and enhance visitor enjoyment by reducing travel delays to Katherine Landing and the boat ramp.

The action alternatives would not be expected to increase visitation to Lake Mohave but would contribute to a more enjoyable overall experience for visitors already planning to travel to Lake Mohave.

Traffic delays and congestion associated with construction may have an adverse but temporary impact on visitor use and experience. In addition, if work would occur at night, construction lighting would have a temporary visual impact in the project area. However, these impacts would cease upon completion of construction. With the rugged terrain and steep fill slopes along the roadway, the widening of the shoulder under the action alternatives (particularly Typical Section Two) would extend cut and fill slopes and constitute a visual impact.

Impacts on visitor use, experience, and safety with either action alternatives would be indirect, localized, long-term, moderate, and beneficial. Impacts on visual resources from roadway widening would be direct, localized, long-term, minor to moderate, and adverse.

Impacts of Typical Section One

Because Typical Section One would have only 2-foot-wide shoulders (compared with the 4-foot-wide shoulders with Typical Section Two), there would be only half as much space on the shoulders for vehicles that inadvertently track off the travel lanes, disabled vehicles, maintenance vehicles, and emergency vehicles. Typical Section One would provide nine pullouts for disabled, emergency, and maintenance vehicles—one more than Typical Section Two.

Typical Section One would widen the roadway slightly. The visual impact of such widening would be detectable. Cut and fill slopes would be needed, but these actions would be compatible with the existing transportation corridor, and impacts to visual resources would be minor.

Impacts of Typical Section Two

Typical Section Two would provide wider shoulders, which could be used by advanced bicyclists. With its wider shoulders, Typical Section Two would provide more recovery room for vehicles that inadvertently track off the travel lanes, provide more space for disabled vehicles to pull off of the travel lane, and provide more space for the maneuvering of emergency and maintenance vehicles.

Typical Section Two would provide eight pullouts for disabled, emergency, and maintenance vehicles.

Typical Section Two would widen the roadway pavement to 32 feet (4 feet more than Typical Section One). The wider footprint of Typical Section Two would be expected to result in substantially larger cut and fill slopes than Typical Section One. These cut and fill slopes would be readily detectable. Impacts to visual resources from this alternative would be moderate.

Cumulative Effects

Past actions, such as construction of access roads, the boat ramp, marina, and associated developed area have provided recreational opportunities for visitors. Reasonably foreseeable future actions, including the redevelopment and new construction of the developed area, would provide improved recreational opportunities and updated facilities and infrastructure for visitor use. Past, present, and reasonably foreseeable future actions, in combination with the localized, long-term, moderate, and beneficial impacts, of the two action alternatives, would result in an overall localized, long-term, moderate, and beneficial cumulative impact.

Conclusion

The action alternatives would have indirect, long-term, moderate, and beneficial impact on visitor experience and safety by improving roadway conditions and reducing congestion during peak travel periods. The action alternatives would have direct, direct, localized, long-term, minor to moderate, and adverse impacts from roadway widening. No increase in visitation would be anticipated as a result of these alternatives. Cumulative effects would be localized, long-term, moderate, and beneficial.

CONSULTATION AND COORDINATION

Agency Consultation and Coordination

Lake Mead NRA issued a press release on October 28, 2010, to initiate the scoping process and posted a notice on the NPS website and the Planning Environment and Public Comment project home page. Letters of support were received from Bullhead City Parks, Recreation, and Community Services and the Bullhead Regional Economic Development Authority.

In accordance with Section 106 of the National Historic Preservation Act, the Lake Mead NRA consulted with SHPO with regard to the proposed undertaking as a separate effort from this EA. The NPS consultation letter on the eligibility of the cultural resources, with SHPO concurrence on June 29, 2012 (Dickinson [Lake Mead NRA] to Garrison [SHPO]), is included in Appendix A. The Lake Mead NRA consultation email on a determination of "no historic properties affected" with SHPO concurrence on August 16, 2012 (Daron [Lake Mead NRA] to Jacobs [SHPO], email) is also included in Appendix A.

Consultation with the USFWS in accordance with the Endangered Species Act was not required or undertaken because no federally listed species are present in the project limits.

Environmental Assessment Review and List of Recipients

To inform the public of the availability of the EA, the NPS distributed a press release to the media and notified various agencies, tribes, and members of the public that are on the Lake Mead NRA mailing list. The Lake Mead NRA mailing list is composed of 244 federal, state, and local agencies; individuals; businesses; and organizations. The EA is distributed to those individuals, agencies, and organizations likely to have an interest in this project. Entities on the park mailing list that do not receive a copy of the EA receive a letter notifying them of its availability and methods of accessing the document. Copies of the EA will be provided to interested individuals upon request. Copies of the document will also be available for review at Lake Mead NRA and on the Internet at http://parkplanning.nps.gov.

The EA is subject to a 30-day public comment period. During this time, the public is encouraged to submit written comments to the NPS address provided at the beginning of this document. Following the close of the comment period, all public comments will be reviewed and analyzed prior to the release of a decision document. The NPS will issue responses to substantive comments received during the public comment period and will make appropriate changes to the EA as needed.

List of Preparers

The following individuals participated in the development of this document:

Tracy Cudworth, NPS
Steven Hoffman, NPS
Lee Terzis, NPS
Michael Boyles, NPS
Leslie J. Stafford, EcoPlan Associates, Inc.
Tricia Balluff, EcoPlan Associates, Inc.
Kathy Thielmann, EcoPlan Associates, Inc.
J. Simon Bruder, EcoPlan Associates, Inc.
Thomas C. Ashbeck, EcoPlan Associates, Inc.

REFERENCES

Arizona Department of Transportation/Federal Highway Administration/SHPO. 2002. *Interim Procedures for the Treatment of Historic Roads.*

Arizona Game and Fish Department. 2004. *Gopherus agassizii* occurrences in Arizona. Arizona Game and Fish Department, Phoenix, Arizona.

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Fish and Wildlife Service, Washington, D.C. Northern Prairie Wildlife Research Center Online, Jamestown, North Dakota. http://www.npwrc.usgs.gov/resource/wetlands/classwet/index.htm (Version 04DEC1998).

EcoPlan Associates, Inc., 2010. *Reconstruct Katherine Landing Access Road Biological Resource Survey, Mohave County, Arizona.* November 3, 2010.

Heilman, J., D. Fenicle, H. Ruter. 2011. *Cultural Resource Survey Along the Katherine Landing Access Road, Lake Mead National Recreation Area, Mohave County, Arizona.* EcoPlan Associates, Inc., Mesa, Arizona. February 2011.

Hendricks, D. M. 1985. *Arizona Soils.* Tucson, AZ: University of Arizona Press.

Nevada Department of Wildlife. 2007. *Gila Monster Status, Identification, and Reporting Protocol for Observations.* Southern Region, Las Vegas, Nevada.

NPS. 1986. *Lake Mead NRA General Management Plan.* U.S. Department of the Interior, July 1986.

_____. 1998. Director's Order 28, *Cultural Resource Management Guideline*. www.nps.gov/history/history/online_books/nps28/28contents.htm. Accessed May 3, 2012.

_____. 2000a. *Lake Mead NRA 2001–2005 Strategic Plan.*

_____. 2000b. Director's Order 47, *Soundscape Preservation and Noise Management*. http://www.nps.gov/policy/DOrders/DOrder47.html. Accessed March 21, 2012.

_____. 2003. Director's Order 77-2. *Floodplain Management.*

_____. 2004. Reference Manual 77, *Natural Resource Management*. http://www.nature.nps.gov/Rm77/. Accessed March 21, 2012.

_____. 2006. *Management Policies.* http://www.nps.gov/policy/MP2006.pdf. Accessed December 21, 2010.

Souliere, L. E. 1995. *Historic Roads in the National Park System*. U.S. Department of the Interior, National Park Service. Denver, Colorado.

Turner, R. M. 1994. Mohave desertscrub. In *Desert Plants, Biotic Communities of the American Southwest–United States and Northwestern Mexico,* edited by D. E. Brown. 4(1–4):145–155.

U.S. Congress. 1916. 39th Congress, 535th Session. *The National Park Service Organic Act*, August 25, 1916.

_____. 1964. 88th Congress, 653rd Session. *Public Law 88-639 Enabling Legislation,* Lake Mead National Recreation Area, 8 October 8, 1964.

USFWS. 2012. Arizona Ecological Services Field Office website. http://www.fws.gov/southwest/es/arizona/documents/countylists/mohave.pdf. Updated April 25, 2012. Accessed June 21, 2012.

ACRONYMS

CFR	Code of Federal Regulations
DO	Director's Order
EA	Environmental Assessment
NEPA	National Environmental Policy Act
NPS	National Park Service
NRA	National Recreation Area
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
SHPO	State Historic Preservation Office
USFWS	U.S. Fish and Wildlife Service

GLOSSARY

Critical habitat. Specific areas occupied by a federally listed or endangered plant or animal at the time it is listed and that contain physical or biological features essential to the conservation of the species or that may require special management or protection. Critical habitat may also include specific areas outside an area occupied by a federally listed species, if the Secretary of the Interior determines that these areas are essential for conserving the species.

Cultural resource. A location of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. Cultural resources include prehistoric and historic archeological sites, structures, buildings, objects, artifacts, works of art, architecture, and natural features that were important in past human events. They may consist of physical remains or areas where significant human events occurred, even though evidence of the events no longer remains. They may include definite locations of traditional, cultural, or religious importance to specified social or cultural groups.

Endangered species. An animal or plant species that is in danger of extinction throughout all or a significant portion of its range (as defined in the Endangered Species Act of 1973, as amended).

Ground disturbance. Any NPS-authorized action that disturbs vegetation and surface soil, increasing erosion potential above normal site conditions.

Invasive plant species. A plant species that was introduced to the ecosystem after European contact as a direct or indirect result of human activity and that produces large numbers of offspring at considerable distances from parent plants.

Mitigation. Mitigation includes the following: (a) avoiding impacts by not taking an action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impacts by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating impacts over time by preservation and maintenance operations during the life of the action; and (e) compensating for impacts by replacing or providing substitute resources or environments (40 CFR 1508.20).

Mitigation measures. Methods or procedures designed to reduce or lessen the adverse impacts caused by an action or management activities.

National Register of Historic Places (NRHP). The official list, established by the National Historic Preservation Act, of the nation's cultural resources worthy of preservation. The NRHP lists archeological, historic, and architectural properties (i.e., districts, sites, buildings, structures, and objects) nominated for their local, state, or national significance by state and federal agencies and approved by the NRHP staff. The NPS maintains the NRHP.

Native species. A species of plant or animal that naturally occurs in an area (indigenous) and that was not introduced by humans.

Noxious species. According to the Federal Noxious Weed Act (Public Law 93-629), a weed that causes disease or has other adverse effects on humans and their environment and, therefore, is detrimental to the agriculture and commerce of the United States and to public health.

Project area. The larger, general area outside the specific location where project activities would occur.

Project limits. The physical area in which project activities would occur, including the footprint of potential disturbance and limits of effect.

Rehabilitation. A management practice that restores landscapes or structures to a desired quality.

Species of special concern. Plant and animal species listed as sensitive by federal or state governments or agencies.

Threatened species. Any plant or animal species likely to become endangered in the foreseeable future throughout all or part of its range and designated by the U.S. Fish and Wildlife Service under the Endangered Species Act.

Wildlife. A broad term that includes birds, reptiles, amphibians, and non-domesticated mammals.

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

National Park Service 101208

March 2013

United States Department of the Interior National Park Service

Appendix A

National Park Service Consultation with
Arizona State Historic Preservation Office

United States Department of the Interior

NATIONAL PARK SERVICE

LAKE MEAD NATIONAL RECREATION AREA
601 NEVADA HIGHWAY
BOULDER CITY, NEVADA 89005

IN REPLY REFER TO:

June 12, 2012

Mr. James Garrison
Arizona State Historic Preservation Officer
Arizona State Parks
1300 West Washington
Phoenix, Arizona

Dear Mr. Garrison:

The National Park Service (NPS) is proposing to reconstruct the Katherine Landing Access Road in Lake Mead National Recreation Area (LAKE), Mohave County, Arizona (LAKE CRP 11-039). Improvements would extend the entire 3.85 mile length of the road from the intersection with Davis Dam Road to the Katherine Landing marina's boat dock. Two alternatives are being considered: Alternative 1 would have 12 foot travel lanes with 2 foot shoulders and Alternative 2 would have 12 foot travel lanes with 4 foot shoulders. The APE for the project is a 400 foot wide corridor (200 feet on each side of the Katherine Landing Access Road's center line) running the 3.85 mile length of the road. The APE also includes a 400 foot wide corridor centered on the Davis Dam road, State Route 68, and extending 1,0256 feet east and 566 feet west of its intersection with the Katherine Landing Access Road.

The APE was inventoried for cultural resources by EcoPlan Associates, Inc. and the enclosed report titled *Cultural Resource Survey along the Katherine Landing Access Road, Lake Mead National Recreation Area, Mohave County, Arizona* was prepared (Heilman et al 2011). Three cultural resources were documented within the APE including: AZ F:15:10, a section of State Route 68; AZ F:14:380, a mining prospect and rock cairn; and AZ F:14:381, the Katherine Landing Access Road.

The NPS asks that you review the enclosed documentation and concur with the following recommendations:

Site AZ F:14:380 (ASM), a mining prospect and rock cairn, is not individually eligible for the NRHP and does not have characteristics that would make it a contributing element to the Katherine Mining District.

Site AZ F:14:381 (ASM), the Katherine Landing Access Road, is not individually eligible for the NRHP and is not a contributing element to a larger Mission 66 Katherine Landing Historic District.

Site AZ F:15:10 (ASM), Old State Route 68: EcoPlan Associates, Inc. recommended AZ F:15:10 (ASM) eligible for the National Register of Historic Places (NRHP) as a contributing component to the Arizona Historic State Highway System (HSHS) under Criterion D. When constructed in the mid 1940s State Route 68 was a narrow (28 foot wide) two lane road over 25 miles long and ran from US 93 west of Kingman, Arizona to Davis Dam, and connected with Nevada State Route 77 on Davis Dam in 1951. This was the only crossing of the Colorado River between Hoover Dam and Needles and was heavily used.

State Route 68 was widened to a four lane highway in the early 1990s. Old State Route 68, AZ F:15:10 (ASM), is the only two lane segment remaining. It is approximately 1 mile long and runs from State Route 68 to just east of Davis Dam (Figure 1). A Bridge was built connecting Laughlin, Nevada and Bullhead City, Arizona in the mid 1990s replacing the State Route 68 alignment across Davis Dam. The section across Davis Dam was closed to through traffic for security reasons after September 11, 2001.

The NPS recommends AZ F:15:10 (ASM), Old State Route 68, as not eligible for the NRHP because of a loss of integrity. Over 24 miles of the original road has been obliterated, destroying it's integrity. Heilman et al (2011) notes that the remaining mile long segment has been widened to 30 feet, the intersection with the Katherine Landing Access Road has been widened to 32 feet, and pullouts have been added on both sides of the intersection. These changes have negatively impacted the integrity aspects of design and workmanship of the remaining mile long segment of the road. In addition the loss of over 24 miles of the original road and the closing of the road to through traffic over Davis Dan has negatively impacted the integrity aspects of setting, feeling, and association for the remaining mile long segment of the road.

If you have questions about this project please contact park's Cultural Resource Manager Steve Daron at 702-293-8859 or by email at steve_daron@nps.gov.

Sincerely

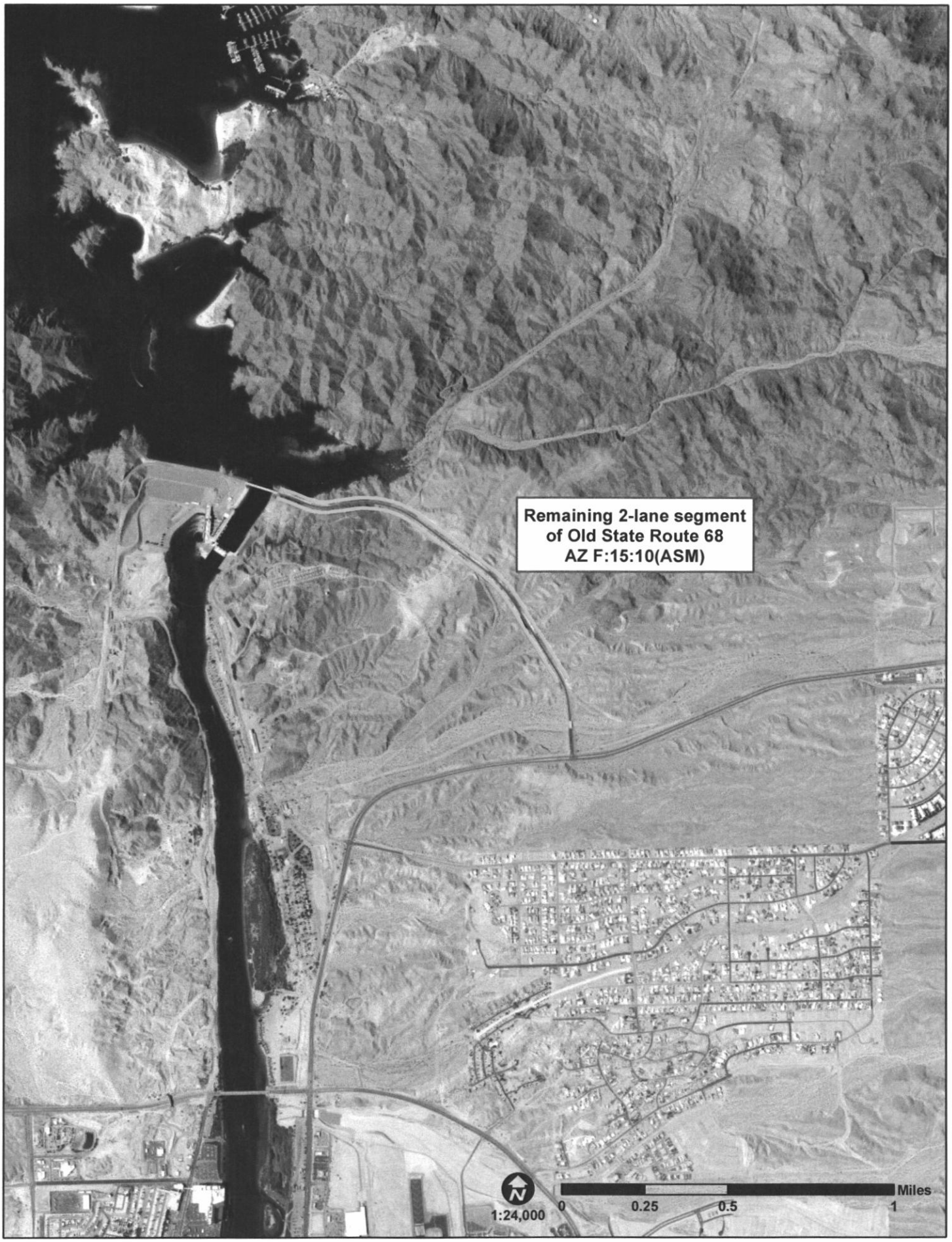
for William K. Dickinson
Superintendent

Enclosures

References

Heilman, Jill, Diane Fenicle, and Helana Ruter
2011 *Cultural Resource Survey along the Katherine Landing Access Road, Lake Mead National Recreation Area, Mohave County, Arizona*. EcoPlan Associates, Inc., Masa, Arizona.

Figure 1


Remaining 2-lane segment
of Old State Route 68
AZ F:15:10(ASM)
N
1:24,000
0
0.25
0.5
1
Miles

United States Department of the Interior

NATIONAL PARK SERVICE

LAKE MEAD NATIONAL RECREATION AREA
601 NEVADA HIGHWAY
BOULDER CITY, NEVADA 89005

IN REPLY REFER TO:

June 12, 2012

Mr. James Garrison
Arizona State Historic Preservation Officer
Arizona State Parks
1300 West Washington
Phoenix, Arizona

Dear Mr. Garrison:

The National Park Service (NPS) is proposing to reconstruct the Katherine Landing Access Road in Lake Mead National Recreation Area (LAKE), Mohave County, Arizona (LAKE CRP 11-039). Improvements would extend the entire 3.85 mile length of the road from the intersection with Davis Dam Road to the Katherine Landing marina's boat dock. Two alternatives are being considered: Alternative 1 would have 12 foot travel lanes with 2 foot shoulders and Alternative 2 would have 12 foot travel lanes with 4 foot shoulders. The APE for the project is a 400 foot wide corridor (200 feet on each side of the Katherine Landing Access Road's center line) running the 3.85 mile length of the road. The APE also includes a 400 foot wide corridor centered on the Davis Dam road, State Route 68, and extending 1,0256 feet east and 566 feet west of its intersection with the Katherine Landing Access Road.

The APE was inventoried for cultural resources by EcoPlan Associates, Inc. and the enclosed report titled *Cultural Resource Survey along the Katherine Landing Access Road, Lake Mead National Recreation Area, Mohave County, Arizona* was prepared (Heilman et al 2011). Three cultural resources were documented within the APE including: AZ F:15:10, a section of State Route 68; AZ F:14:380, a mining prospect and rock cairn; and AZ F:14:381, the Katherine Landing Access Road.

The NPS asks that you review the enclosed documentation and concur with the following recommendations:

Site AZ F:14:380 (ASM), a mining prospect and rock cairn, is not individually eligible for the NRHP and does not have characteristics that would make it a contributing element to the Katherine Mining District.

Site AZ F:14:381 (ASM), the Katherine Landing Access Road, is not individually eligible for the NRHP and is not a contributing element to a larger Mission 66 Katherine Landing Historic District.

Site AZ F:15:10 (ASM), Old State Route 68: EcoPlan Associates, Inc. recommended AZ F:15:10 (ASM) eligible for the National Register of Historic Places (NRHP) as a contributing component to the Arizona Historic State Highway System (HSHS) under Criterion D. When constructed in the mid 1940s State Route 68 was a narrow (28 foot wide) two lane road over 25 miles long and ran from US 93 west of Kingman, Arizona to Davis Dam, and connected with Nevada State Route 77 on Davis Dam in 1951. This was the only crossing of the Colorado River between Hoover Dam and Needles and was heavily used.

State Route 68 was widened to a four lane highway in the early 1990s. Old State Route 68, AZ F:15:10 (ASM), is the only two lane segment remaining. It is approximately 1 mile long and runs from State Route 68 to just east of Davis Dam (Figure 1). A Bridge was built connecting Laughlin, Nevada and Bullhead City, Arizona in the mid 1990s replacing the State Route 68 alignment across Davis Dam. The section across Davis Dam was closed to through traffic for security reasons after September 11, 2001.

The NPS recommends AZ F:15:10 (ASM), Old State Route 68, as not eligible for the NRHP because of a loss of integrity. Over 24 miles of the original road has been obliterated, destroying it's integrity. Heilman et al (2011) notes that the remaining mile long segment has been widened to 30 feet, the intersection with the Katherine Landing Access Road has been widened to 32 feet, and pullouts have been added on both sides of the intersection. These changes have negatively impacted the integrity aspects of design and workmanship of the remaining mile long segment of the road. In addition the loss of over 24 miles of the original road and the closing of the road to through traffic over Davis Dan has negatively impacted the integrity aspects of setting, feeling, and association for the remaining mile long segment of the road.

If you have questions about this project please contact park's Cultural Resource Manager Steve Daron at 702-293-8859 or by email at steve_daron@nps.gov.

Sincerely

for William K. Dickinson
Superintendent

Enclosures

with clarifications, recommendations

CONCUR

Arizona State Historic Preservation Office

References

Heilman, Jill, Diane Fenicle, and Helana Ruter
2011 *Cultural Resource Survey along the Katherine Landing Access Road, Lake Mead National Recreation Area, Mohave County, Arizona.* EcoPlan Associates, Inc., Masa, Arizona.

Leslie Stafford

From: Lee_Terzis@nps.gov
Sent: Monday, August 20, 2012 10:49 AM
To: Steve_Daron@nps.gov
Cc: Bruce_Nyhuis@nps.gov; Simon Bruder; Margo_Brooks@nps.gov; Michael_J_Boyles@nps.gov; Tracy_Cudworth@nps.gov; Leslie Stafford; Ginger Molitor
Subject: Re: Katherine Landing Access Road

Attachments: pic27666.gif

pic27666.gif (10 KB)

Steve, thank you for following up with SHPO, we appreciate it.

Have a good week.

Lee

----- Original Message -----
From: Steve Daron
Sent: 08/20/2012 09:18 AM CDT
To: Lee Terzis
Cc: Bruce Nyhuis; Simon Bruder <jsbruder@ecoplanaz.com>; Margo Brooks; Michael Boyles; Tracy Cudworth
Subject: Fw: Katherine Landing Access Road Lee, Thanks for catching what was left out of the AZ SHPO letter, i.e.
concurrence of no effect on historic properties for the project. I talked to David Jacobs at the AZ SHPO office and the emails below resolve the issue.

Steve Daron
Park Archeologist
Lake Mead National Recreation Area
(702) 293-8859
----- Forwarded by Steve Daron/LAME/NPS on 08/20/2012 09:09 AM -----

djacobs@azstatepa
rks.gov
To
08/16/2012 01:56 PM
Steve_Daron@nps.gov
cc
Subject
RE: Katherine Landing Access Road

Steve-
Our office concurs with your finding that the project will have no effect on historic properties.
David Jacobs, Arizona State Historic Preservation Office -----Original Message-----
From: Steve_Daron@nps.gov

Sent: Tuesday, August 14, 2012 3:09pm
To: djacobs@azstateparks.gov
Subject: Katherine Landing Access Road

David,

On June 12, 2012, the park sent a letter relating to the reconstruction of the Katherine Landing Access Road. In the letter the NPS recommended that three sites in the APE, sites AZ F:15:10, a section of State Route 68; AZ F:14:380, a mining prospect and rock cairn; and AZ F:14:381, the Katherine Landing Access Road, were not eligible for the National Register. You concurred with that recommendation on June 29, 2012.

Unfortunately, the park failed to ask that you also concur with a finding that the project will have no effect on historic properties. Given that there are no historic properties in the APE, the park asks that you concur with a finding of no effect on historic properties for the project to reconstruct the Katherine Landing Access Road.

Steve Daron
Cultural Resource Manager
Lake Mead National Recreation Area
(702) 293-8859

(Embedded image moved to file: pic27666.gif)Arizona State Parks

Appendix B

Potential Occurrences of U.S. Fish and Wildlife Service
Listed Species in the Project Limits

Potential Occurrences of U.S. Fish and Wildlife Service Listed Species in the Project Limits

Common Name	Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Threatened and Endangered Species				
Arizona cliffrose	*Purshia subintegra*	E	White limestone soils derived from tertiary lakebed deposits. Elevation: <4,000 feet.	No potential for occurrence. No suitable habitat in the project area. Project area lacks characteristic white soils of tertiary limestone lakebed deposits. Nearest populations near town of Bagdad along Burro Creek, approximately 85 miles southeast of the project limits.
Bonytail chub	*Gila elegans*	E	Warm, swift, turbid mainstem rivers of the Colorado River basin, reservoirs in lower basin. Elevation: <4,000 feet.	No potential for occurrence. No suitable habitat in the project limits. Bonytail chub occur in the Colorado River from the upper end of Lake Mohave south to approximately the confluence with the Bill Williams River, including the stretch of the river just west of the project limits.
California condor	*Gymnogyps californianus*	E	High desert canyons and plateaus. Elevation: Varies.	No potential for occurrence. Though suitable foraging habitat is in the project area, especially where there are cliffs and potential for large mammal roadkill, no California condors have been seen in the area, and the project is outside the known range, which occurs in and near the Grand Canyon.
California least tern	*Sterna antillarum browni*	E	Open, bare, or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems. Elevation: <2,000 feet.	Low potential for occurrence. California least terns are not known to breed along the Colorado River, though transient migrants have been documented in Mohave County. Individual birds may be observed on or along the river and may fly over the project limits.
Desert tortoise, Mohave population	*Gopherus agassizii*	T	Mohave desertscrub (north and west of the Colorado River) in basins and bajadas but also found on rocky slopes. Elevation: <4,000 feet.	No potential for occurrence. The project area is outside the range for the Mohave population of the desert tortoise, which occurs on the west side of the Colorado River in California, Nevada, and the Virgin River area in Arizona.

Potential Occurrences of U.S. Fish and Wildlife Service Listed Species in the Project Limits

Common Name	Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Holmgren (Paradox) milk vetch	*Astragalus holmgreniorum*	E	Just under limestone ridges and along draws in gravelly clay hills. Elevation: 2,700 to 2,800 feet.	No potential for occurrence. No suitable habitat. The project area lies outside the known range and is below the elevation range of the species. Nearest populations occur near the Virgin River at the Arizona/Utah state border in northern Mohave County, approximately 160 miles northeast of the project limits.
Hualapai Mexican vole	*Microtus mexicanus hualpaiensis*	E	Moist, grass/sedge habitats along permanent or semi-permanent waters (springs or seeps). Elevation: 3,500 to 7,000 feet.	No potential for occurrence. The project area lies outside the known range and is below the elevation range of the species. Nearest populations occur east of Kingman, Arizona, approximately 40 miles east of the project limits.
Humpback chub	*Gila cypha*	E	Large, warm turbid rivers, especially canyon areas with deep, fast water. Elevation: <4,000 feet.	No potential for occurrence. No suitable habitat in the project limits. Humpback chub occur in the Colorado River upstream of Lake Mead, approximately 75 miles north of the project limits.
Jones cycladenia	*Cycladenia humilis* var. *jonesii*	T	Mixed desert scrub, juniper, or wild buckwheat–Mormon tea. Elevation: 4,390 to 6,000 feet.	No potential for occurrence. No suitable habitat. The project area lies outside the known range and is below the elevation range of the species. Nearest populations occur near the Arizona–Utah border in northern Mohave County, approximately 180 miles northeast of the project limits.
Mexican spotted owl	*Strix occidentalis lucida*	T	Nests in canyons and dense forests with multilayered foliage structure. Elevation: 4,100 to 9,000 feet.	No potential for occurrence. No suitable habitat. The project area lies outside the known range and is below the elevation range of the species. Nearest populations occur approximately 135 miles east of the project limits, near Prescott, Arizona.
Razorback sucker	*Xyrauchen texanus*	E	Riverine and lacustrine areas, generally not in fast-moving water and may use backwaters. Elevation: <6,000 feet.	No potential for occurrence. No suitable habitat in the project limits. Razorback suckers may occur in the Colorado River throughout Arizona, including the reach of the river just west of the project limits.

Potential Occurrences of U.S. Fish and Wildlife Service Listed Species in the Project Limits

Common Name	Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Siler pincushion cactus	*Pediocactus sileri*	T	Desertscrub transitional areas of Navajo, sagebrush, and Mohave Deserts. Elevation: 2,800 to 5,400 feet.	No potential for occurrence. The project area lies outside the known range and is below the elevation range of the species. Nearest populations occur near the Arizona–Utah border in northern Mohave County, approximately 150 miles northeast of the project limits.
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	Cottonwood/willow and tamarisk vegetation communities along rivers and streams. Elevation: <8,500 feet.	No potential for occurrence. No suitable habitat in the project limits. Willow flycatchers are known to have bred in the past along the Colorado River, as close as 25 miles north and 30 miles south of the project limits, and may use the reach of the Colorado River just west, outside of the project limits, as a migratory pathway but would not be expected to remain and breed.
Virgin River chub	*Gila seminuda*	E	Deep, swift waters but not turbulent; occurs over sand and gravel substrates in water less than 86 degrees Fahrenheit. Tolerant of high salinity and turbidity. Elevation: <4,500 feet.	No potential for occurrence. No suitable habitat. The project area lies outside the known range of the species. Nearest populations occur in the Virgin River at the Arizona–Utah border in northern Mohave County, approximately 160 miles northeast of the project limits.
Woundfin	*Plagopterus argentissimus*	E	Inhabits shallow, warm, turbid, fast-flowing water. Tolerates high salinity. Elevation: <4,500 feet.	No potential for occurrence. No suitable habitat. The project area lies outside the known range of the species. Nearest populations occur in the Virgin River at the Arizona–Utah border in northern Mohave County, approximately 160 miles northeast of the project limits.
Yuma clapper rail	*Rallus longirostris yumanensis*	E	Fresh water and brackish marshes. Elevation: <4,500 feet.	No potential for occurrence. No suitable habitat in the project limits. The closest known occurrences are approximately 30 miles south of the project limits, though they may occur along the entire Colorado River, where suitable habitat exists, from Mexico north to Lake Mead, and beyond.

Potential Occurrences of U.S. Fish and Wildlife Service Listed Species in the Project Limits

Common Name	Scientific Name	Status	Habitat Requirements	Potential for Occurrence
			Candidate Species	
Desert tortoise, Sonoran population	*Gopherus agassizii*	C	Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran desertscrub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal. Elevation: <7,800 feet.	Low potential for occurrence. See section following table for a more detailed discussion of the Sonoran population of the desert tortoise.
Fickeisen Plains cactus	*Pediocactus peeblesianus* var. *fickeiseniae*	C	Shallow soils derived from exposed layers of Kaibab limestone. Found on canyon margins, well-drained hills in Navajoan Desert, or Great Plains grassland. Elevation: 4,000 to 5,000 feet.	No potential for occurrence. The project area lies outside the known range and is below the elevation range of the species. Nearest populations occur in northern Mohave County, approximately 140 miles northeast of the project limits.
Gierisch mallow	*Sphaeralcea gierischii*	C	Found only on gypsum outcrops associated with Harrisburg member of Kaibab Formation. Elevation: <5,000 feet.	No potential for occurrence. No suitable habitat. The project area lies outside the known range of the species. Nearest populations occur near the Virgin River at the Arizona–Utah border in northern Mohave County, approximately 160 miles northeast of the project limits.
Relict leopard frog	*Lithobates onca*	C	Permanent streams, springs, and spring-fed wetlands with open shorelines and available pools. Elevation: <1,980 feet.	No potential for occurrence. No suitable habitat. Closest known populations occur at Willow Beach along the Colorado River in northwest Mohave County, approximately 45 miles northeast of the project limits.
Roundtail chub	*Gila robusta*	C	Cool to warm waters of rivers and streams, often occupy the deepest pools and eddies of large streams. Elevation: 1,000 to 7,500 feet.	No potential for occurrence. No suitable habitat. Closest known populations occur in the Big Sandy and Santa Maria river drainages in southern Mohave County, approximately 70 miles southeast of the project limits.

Potential Occurrences of U.S. Fish and Wildlife Service Listed Species in the Project Limits

Common Name	Scientific Name	Status	Habitat Requirements	Potential for Occurrence
Yellow-billed cuckoo	*Coccyzus americanus*	C	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries). Elevation: <6,500 feet.	No potential for occurrence. No suitable habitat. Closest known occurrences are along the Colorado River approximately 40 miles south of the project limits.

C = Candidate, E = Endangered, T = Threatened (USFWS 2012)

Reference

USFWS. 2012. Arizona Ecological Services Field Office website. http://www.fws.gov/southwest/es/arizona/documents/countylists/mohave.pdf. Updated April 25, 2012. Accessed June 21, 2012.

Appendix C

Potential Occurrences of Arizona Game and Fish Department
Wildlife of Special Concern in Arizona Species in the Project Limits

Potential Occurrences of Arizona Game and Fish Department
Wildlife of Special Concern in Arizona Species in the Project Limits

Common Name	Scientific Name	Habitat Requirements	Potential for Occurrence
California leaf-nosed bat	*Macrotus californicus*	Roosts in mines, caves, and rock shelters, preferring roost sites with large areas of ceiling and flying space. Forages for insects in desertscrub.	High potential for occurrence. Suitable foraging habitat exists, and suitable roosts may occur in the rocky hillsides in the project area. Occurrences have been recorded in the immediate project area.

Appendix D

Floodplain Statement of Findings

FLOODPLAIN STATEMENT OF FINDINGS

Rehabilitate Katherine Landing Access Road
Environmental Assessment
Lake Mead National Recreation Area
Arizona

Recommended:_____
Superintendent, Lake Mead National Recreation Area Date

Concurred:_____
Chief, Water Resources Division Date

Concurred:_____
Regional Safety Officer, Pacific West Region Date

The above signatures certify that this document is technically adequate and consistent with NPS policy.

Approved:_____
Director, Pacific West Region Date

Introduction

Executive Order 11988, Floodplain Management, directs federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Section 4.6.4 of the National Park Service (NPS) Management Policies states that the National Park Service will (1) manage for the preservation of floodplain values, (2) minimize potentially hazardous conditions associated with flooding, and (3) comply with the NPS Organic Act and all other federal laws and Executive Orders related to the management of activities in flood-prone areas. Pursuant to these directives and in accordance with Director's Order (DO) 77-2 (Floodplain Management), the NPS has reviewed the project area for flood hazards and has prepared this Statement of Findings.

The project is along Katherine Landing Access Road at the south end of Lake Mead National Recreation Area, approximately 1 mile north of Bullhead City on the Arizona side of the Colorado River. For the majority of the project area, Katherine Landing Access Road is a two-lane undivided roadway. The road begins (milepost 0.0) at its junction with Davis Dam Road and curves north and west for approximately 3.87 miles to the Katherine Landing boat ramp at Lake Mohave, which is formed by the impoundment of water by Davis Dam less than 1 mile to the south. The topography of the area is generally mountainous from Davis Dam Road north to the westward curve of Katherine Landing Access Road. The area then transitions to relatively open topography that gently descends to Lake Mohave. No wetlands are in the project area.

This Statement of Findings describes the flood hazards, alternatives carried forward for analysis in the associated Environmental Assessment, and possible mitigation measures for impacts to the floodplain.

Purpose and Need

Reconstruction of the Katherine Landing Access Road is being proposed to correct a number of interrelated conditions that negatively affect public safety and visitor experience. The purpose of the action is to enhance public safety and support a quality visitor experience by correcting deficiencies in existing road design and conditions, including road and shoulder widths, horizontal and vertical curves, pavement condition, drainage structures, rockfall hazards, pullouts, vehicular circulation, traffic queueing, drainage problems, and threats to roadway embankment. Improvements would be implemented in a way that minimizes impacts to the area's natural and cultural resources. The following paragraphs describe the project need.

Pavement

Pavement on the roadway and parking areas is deteriorating due to large volumes of traffic and normal wear. The deteriorating condition of the road may contribute to an elevated number of accidents along portions of the road. There is a need to reduce maintenance requirements and costs due to deficiencies in the road condition and prevent catastrophic failure that could lead to road closure.

Road and Shoulder Widths/Horizontal and Vertical Curves

Roadway travel lanes are narrow (11 feet wide) for the type of vehicle and average speed of traffic on this road, and segments of the roadway have tight horizontal curves with

substandard superelevations (banking or tilting of the roadway surface). The existing roadway geometry does not fit the typical vehicle type (passenger truck with boat trailer and motor homes). The combination of the narrow roadway, tight curves, and recreational traffic causes centerline crowding, centerline overruns, and tracking off the pavement, contributing to vehicular accidents. Furthermore, the existing roadway section does not accommodate an adequate clear zone beyond the edge of the pavement that allows drivers to stop safely or regain control of their vehicle if it tracks off the roadway pavement. Delineator posts are frequently struck by vehicles towing larger boat trailers. In mountainous areas, there is evidence that trailers have struck the adjacent cut slopes. Tight vertical curves through mountainous areas limit motorists' sight distance (the stretch of roadway visible to a motorist) and contribute to accidents, including rear-end collisions. The potential for collisions is exacerbated on Katherine Landing Access Road because vehicles hauling boat trailers have greater difficulty stopping unexpectedly.

Rockfall Hazards

Rocks and debris fall onto the roadway with regularity, creating a hazard and requiring removal by maintenance crews. Exposed granite in roadway cuts is relatively friable (easily crumbled), and cut slopes are relatively steep, with the base of the slopes terminating close to the edge of the roadway pavement. This combination creates a condition where the weathering process, particularly erosion of cut slopes, has the potential to dislodge a considerable volume of debris onto the shoulders and into the travel lanes of the roadway.

Pullouts

Pullouts are limited and are not situated at regular intervals along the route. Many of the existing unmarked pullouts are not paved or delineated. For vehicles traveling toward Katherine Landing, there are few pullouts, leaving some motorists no option but to use pullouts on the opposite side of the road. For more than 2 miles (from approximately 1.2 miles north of Davis Dam Road to 0.4 mile east of the boat ramp), the existing roadway bench is extremely narrow, limiting the opportunities for motorists to pull off the roadway. Limited opportunities to safely pull off the roadway can affect park staff working along the roadway (e.g., litter removal, roadside assistance, law enforcement) and visitors. Accidents and engine failure on the travel lanes can result in lane blockage and traffic backups, and can also block emergency vehicle access.

Vehicular Circulation/Traffic Queueing

Trailers with watercraft queue up on Katherine Landing Access Road awaiting their turn to launch. The number of watercraft allowed on Lake Mohave at a time is restricted; therefore, once this capacity is reached, launching is delayed until boats exit the lake. During the peak summer period, boat launch queues often extend beyond the entrance station, blocking other vehicle access, including traffic entering or exiting Cabinsite Road. On weekends in peak season, launch queues can extend back to Davis Dam Road.

Three inbound lanes are between the entrance station and the boat ramp—one is dedicated to vehicles launching watercraft, a second provides a dedicated right-turn lane for Cabinsite Road, and a third allows for regular through traffic. Vehicles hauling watercraft to be launched must line up in the designated launching lane. Some visitors mistakenly choose the wrong lane; others choose the wrong lane purposefully to move up in the queue. Long launch queues and associated delays frustrate visitors. When boaters cut in line, visitor tempers can flare and, in some cases, altercations have resulted. Entrances to the overflow parking lot used regularly for the staging of large boats, including houseboats,

have inadequate widths for larger vehicles. While entering or exiting this lot, larger trailers with boats routinely jump over the curbs, cracking curbs and knocking over NPS signs.

Drainage Issues/Roadway Embankment Stability

A major, unnamed wash that parallels the road for approximately 1.4 miles and other minor drainages threaten the road embankment and can cause overtopping of the roadway and sediment deposition. Some existing culverts are in need of replacement and inlet and outlet protection. All other existing culverts would require extending the overall length to accommodate greater road width. The box culvert approximately 1,500 feet north of the intersection of Davis Dam Road on Katherine Landing Access Road lacks capacity for a 50-year storm. This storm event is likely to overtop the roadway. Existing wire basket gabions installed to armor wash banks and protect the roadway embankment are deteriorating and failing in several locations. The parallel roadside wash has eroded a 15-foot to 20-foot vertical face approximately 10 feet from the edge of the pavement, threatening to undermine Katherine Landing Access Road approximately 1.3 miles north of the Davis Dam Road intersection.

Description of Alternatives

Improvements are proposed for Katherine Landing Access Road in Lake Mead National Recreation Area, approximately 1 mile north of Bullhead City in Arizona. The purpose of the action is to enhance public safety and support a high-quality visitor experience by correcting deficiencies in existing road design and conditions, including road and shoulder widths, horizontal and vertical curves, pavement condition, drainage structures, and rockfall hazards. The No Action Alternative and two action alternatives are carried forward for analysis in the Environmental Assessment.

No Action Alternative

Activities under the No Action Alternative would include routine maintenance activities and other normal daily park operations, and any previously approved plans. Katherine Landing Access Road would continue to be open, the roadway would continue to deteriorate, and existing concerns would remain.

Components Common to Both Action Alternatives

The following improvements are common to Typical Section One and Typical Section Two:

- The intersection of Davis Dam Road and Katherine Landing Access Road would be reconfigured. A “T” intersection would be constructed to provide unimpeded traffic flow on Katherine Landing Access Road. At the intersection, the new road segments would consist of one 12-foot-wide through lane in each direction. The abandoned portions of roadway would be obliterated and revegetated.
- The action alternatives would rehabilitate, reconstruct, and resurface Katherine Landing Access Road from Davis Dam Road to the Katherine Landing boat ramp. Existing travel lanes would be widened to 12 feet. Shoulders would be paved on both sides of the highway. The width of the shoulders would depend on the action alternative implemented. A graded ditch would also be established along portions of the highway. Existing guardrail would be replaced and new guardrail installed at various locations. Existing gravel pullouts would be paved and others would be removed.

- Pavement rehabilitation, roadway widening, and other improvements would be undertaken at the fee station, and a dedicated turn lane would be constructed at Katherine Mine Road and Cabinsite Road. New concrete curb and gutter would replace asphalt curbing.
- Parking improvements would include the rehabilitation of existing parking areas, the paving of informal parking areas, and the obliteration of some existing parking areas.
- All drainage improvements would occur along Katherine Landing Access Road. Riprap would be placed on both sides of the roadway for scour protection, as needed. Due to lane widening, approximately 19 existing culverts in the project limits, including the one associated with the 100-year floodplain, would be extended, and structure components, such as headwalls, wingwalls, elbows, end sections, and riprap inlet and outlet protection, would be incorporated, as needed.

  Specific improvements in washes not associated with the 100-year floodplain include upgrading the existing concrete box culvert with extended wingwalls, cap, and new higher overflow culverts approximately 1,500 feet north of the Davis Dam Road/Katherine Landing Access Road intersection. Approximately 1.1 miles north of this intersection, on the west side of the road, a row of gabion baskets would be removed and replaced with riprap, and a new mechanically stabilized earth-retaining wall (approximately 270 feet long) would be constructed on the roadway edge. A new culvert would be installed under the Katherine Mine Road intersection parallel to Katherine Landing Access Road. Existing surface drainage features would be rehabilitated.

Typical Section One

The action alternative referred to as Typical Section One would widen the road from the current 22 feet to 28 feet—two 12-foot-wide travel lanes and two 2-foot-wide paved shoulders. Typical Section One would provide six formal (paved) pullouts and three informal (unpaved) pullouts.

Typical Section Two—Preferred Alternative

The Typical Section Two action alternative would widen the road from the current 22 feet to 32 feet—two 12-foot-wide travel lanes and two 4-foot-wide paved shoulders. Typical Section Two would provide six formal pullouts and two informal pullouts. The NPS selected Typical Section Two as the agency's Preferred Alternative.

Classification of Both Action Alternatives (DO 77-2)

Construction activities associated with these two action alternatives are classified as Class I actions (DO 77-2). According to DO 77-2, a Class I action "includes the location or construction of administrative, residential, warehouse and maintenance buildings, non-excepted parking lots or other manmade features, which by their nature entice or require individuals to occupy the site, are prone to flood damage, or result in impacts to natural floodplain values. Actions in this class are subject to the floodplain policies and procedures if they lie within the 100-year regulatory floodplain."

Floodplains Description

According to Federal Emergency Management Agency Flood Insurance Rate Maps (FIRMs), the proposed project crosses the 100-year floodplain (FIRM Nos. 04015C4460G and 04015C4455G). The unnamed wash associated with the 100-year floodplain crosses Katherine Landing Access Road approximately 0.23 mile north of the current Davis Dam Road intersection via a concrete box culvert with grouted riprap on the road embankment and gabion baskets along the wash banks near the road on the upstream side.
The unnamed wash flows into Lake Mohave above Davis Dam on the west side of Katherine Landing Access Road. According to the Environmental Compliance Specialist with Lake Mead National Recreation Area, washes in the project area, including the unnamed wash associated with the 100-year floodplain, carry flows only during localized storm events without any regularity or predictability. The 100-year floodplain in the project area is approximately 300 feet wide by 400 feet long (2.75 acres).

In addition to the paved roadway and associated dirt shoulders and pullout areas, the project is in the Mohave Desertscrub biotic community and supports vegetation that varies with terrain conditions. Sparse creosote bush *(Larrea tridentata)* is the dominant vegetation in the flat or gently rolling hills, and the rockier and steeper terrain supports dense brittlebush *(Encelia farinosa),* particularly near ephemeral washes.

Justification for Use of the Floodplain and Investigation of Alternative Sites

The purpose of the project is to enhance public safety and support a high-quality visitor experience by correcting deficiencies in road design and conditions. Because the purpose of the project is to improve Katherine Landing Access Road, all action alternatives include work within the 100-year floodplain where the floodplain crosses the road. The only alternative that would not result in impacts to the 100-year floodplain would be the No Action Alternative, which does not meet the project purpose and need. There is no practical alternative to improve the road design and conditions without impacting this floodplain.

Typical Section Two, the Preferred Alternative, would have a slightly greater impact to the 100-year floodplain than Typical Section One due to the construction of a slightly wider roadway. The difference in total roadway width between the two alternatives would be 4 feet.

Hydrologic Risk

Flood depths of the probable maximum flood in the project area are estimated at approximately 3 to 8 feet, and flood depths of the 100-year flood are estimated at approximately 1 to 6 feet. Conditions associated with flooding in the project area are not considered particularly hazardous, though the hazard increases near the boat ramp, where development such as motels, trailer camping areas, and other visitor use areas exist.

Katherine Landing Access Road is designed with culverts to convey the flow of water under the roadway; this flow could potentially destabilize the embankments. An unnamed wash that flows parallel to Katherine Landing Access Road for approximately 1.4 miles on the west side of the road has resulted in scour and roadway undercutting. This wash is not within a 100-year floodplain, and scour issues associated with the roadway would be

resolved as part of this project by armoring the portion of the wash near the road. Other drainage improvements would also be undertaken as part of the project, as described previously.

Mitigative Actions

Impacts to the floodplain would be minimal because project activities would occur along an existing roadway alignment and the extent of roadway widening would be minor. This project would not substantially modify the topography of the floodplain in the project area.

A culvert extension would be required in a channel associated with a 100-year floodplain. The existing culvert is of adequate size to convey flows under the road, and the culvert extension would retain the same size. Because the permanent improvement would be in the channel, this alternative would not substantially modify the topography of the designated 100-year floodplain in the project area. Temporary impacts to the 100-year floodplain would occur as construction equipment traverses the floodplain to access the unnamed wash for culvert extension activities. A temporary road across the floodplain would likely be required to access the wash. Following construction, the temporary road would be removed and the terrain returned to its original elevation.

An erosion and sediment control plan would be developed and implemented during construction to minimize disturbance to the natural environment, including floodplains, in the project area. In addition, the removal of native vegetation would be minimized to the extent practicable.

Conclusion

There is no practical alternative alignment to the action alternatives to improve the Katherine Landing Access Road. Either of the two action alternatives would improve public safety and visitor experience by correcting deficiencies in existing road design, improving pavement condition, and improving drainage and associated structures. Mitigation would be implemented, and regulations and policies complied with, to minimize impacts to floodplains and the surrounding environment during and after construction. Mitigation measures would include the following:

- Following construction, any temporary roads across the 100-year floodplain will be obliterated and the floodplain graded to match the surrounding terrain.
- Removal of native vegetation will be minimized to the extent practicable.
- All disturbed areas that would not be permanently incorporated into the transportation facility will be restored by seeding with native species, topsoil salvage and replacement, or a combination of both methods.

No long-term adverse impacts to floodplains would occur from implementing either of the action alternatives. Therefore, the National Park Service finds both action alternatives to be acceptable under Executive Order 11988 for the protection of floodplains.