



Lake Mead National Recreation Area
Nevada • Arizona

National Park Service
US Department of the Interior



Revised Environmental Assessment Willow Beach Road Improvement

November 2020

The estimated lead agency total cost associated with
developing and producing this EA is \$120,000.

US DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE LAKE MEAD NATIONAL RECREATION AREA

Willow Beach Road Improvement Project Environmental Assessment

The National Park Service (NPS) has prepared this environmental assessment (EA) to evaluate the impacts of improving the existing Willow Beach Road, which provides visitors with access from US Highway 93 to the Willow Beach Marina in Lake Mead National Recreation Area (Lake Mead NRA).

This EA presents three alternatives for managing Willow Beach Road in Lake Mead NRA between US Highway 93 and the Willow Beach Marina in Mohave County, Arizona; describes the environment that would be impacted by the alternatives; and analyzes the environmental consequences of implementing the alternatives. Under the no-action alternative, the current management of Willow Beach Road would continue with no changes to the infrastructure. Under the Jumbo Wash alternative, the first 2.7 miles of Willow Beach Road beyond the entrance station would be improved and widened and the remaining portion to the Willow Beach Marina would be realigned through Jumbo Wash, which would remove the road from a narrow canyon that is prone to flash flooding. The northern alignment alternative, which has been identified as the preferred alternative, would improve and widen approximately 0.6 mile of Willow Beach Road beyond the entrance station, realign the remaining portion of the road to the Willow Beach Marina along a ridgeline located north of the existing road, and remove the remaining portion of the existing road. This would keep the road out of the narrow canyon, as well as out of Jumbo Wash, which would reduce the potential for the road from becoming inundated during flash flooding.

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended, to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet the objectives of the proposal, 2) evaluates potential issues and impacts on the park's resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts. This EA was initiated before the 2020 Council on Environmental Quality (CEQ) Implementing NEPA Regulations were in effect and, therefore, was developed in accordance with the 1978 CEQ NEPA Regulations and 2008 Department of Interior NEPA regulations. The process for this EA and content is consistent with those regulations.

How to Comment

We invite you to comment on this EA during the 30-day public review period. You may do so by any one of several methods. The preferred method of providing comments is through the NPS's Planning, Environment, and Public Comment (PEPC) website for the park at: <http://parkplanning.nps.gov/LAKE>. You may also submit written comments to:

Lake Mead NRA
Attention: Compliance Office
c/o Willow Beach Road EA
601 Nevada Way
Boulder City, NV 89005

Only written comments will be accepted. Please submit your comments postmarked or transmitted no later than 30 days of the posting of the notice of availability on the PEPC website. Please be aware that your entire comment will become part of the public record. If you wish to remain anonymous, please clearly state that within your correspondence; however, the National Park Service cannot guarantee that personal information, such as email address, phone number, etc., will be withheld.

Table of Contents

Chapter 1: Purpose of and Need for Action	1
Project Area	1
Revised Environmental Assessment	1
Issues and Resource Topics Dismissed from Detailed Analysis	4
Geologic Features and Processes	4
Water Resources	4
Special-Status Species	5
Cultural Resources	6
Socioeconomics	6
Air Quality	6
Soundscapes	7
Visitor Use and Experience.....	7
Chapter 2: Alternatives	8
Description of the Alternatives	8
No-Action Alternative	8
Jumbo Wash Alternative.....	9
Northern Alignment Alternative	14
Alternatives Considered but Dismissed from Detailed Analysis	16
Mitigation Measures	17
Vegetation	17
Wildlife	18
Scenic Resources	18
Archeological and Cultural Resources.....	18
Chapter 3: Affected Environment and Environmental Consequences	19
General Methods for Analyzing Impacts	19
Scenario for Culumative Impact Analysis	19
Vegetation	20
Vegetation Impacts Assessment.....	21
Impacts of Alternative 1: No-Action Alternative.....	21
Impacts of Alternative 2: Jumbo Wash Alternative.....	21
Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative	23

Wildlife	24
Wildlife Impacts Assessment.....	24
Impacts of Alternative 1: No-Action Alternative.....	24
Impacts of Alternative 2: Jumbo Wash Alternative.....	25
Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative	26
Archeological Resources.....	27
Archeological Resources Impacts Assessment	27
Impacts of Alternative 1: No-Action Alternative.....	27
Impacts of Alternative 2: Jumbo Wash Alternative.....	27
Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative	28
Viewsheds	29
Viewsheds Impacts Assessment.....	30
Impacts of Alternative 1: No-Action Alternative.....	30
Impacts of Alternative 2: Jumbo Wash Alternative.....	31
Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative	31
Floodplains.....	33
Floodplains Impacts Assessment	33
Impacts of Alternative 1: No-Action Alternative.....	33
Impacts of Alternative 2: Jumbo Wash Alternative.....	35
Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative	37
Chapter 4: Consultation and Coordination.....	39
References.....	41

List of Appendices

Appendix A: Floodplains Statement of Findings.....	43
--	----

List of Figures

Figure 1. Project Location Map	2
Figure 2. Project Area	3
Figure 3. Flood Debris across Willow Beach Road	8
Figure 4. Existing Road Surface with Potholes	8
Figure 5. Jumbo Wash Alternative	10
Figure 6. Jumbo Wash Realignment Section	11
Figure 7. Example of Bridge Design and Color.....	12
Figure 8. Box Culvert Drainage Near the Entrance Station.....	13
Figure 9. Northern Alignment Alternative.....	15
Figure 10. Typical View along Willow Beach Road	29
Figure 11. View from Willow Beach Scenic Viewing Area toward Willow Beach Marina	30
Figure 12. View of Marina from Northern Alignment	32
Figure 13. Floodplain in the Project Area.....	34

List of Tables

Table 1. Cumulative Project List	19
--	----

Acronyms and Abbreviations

ADOT	Arizona Department of Transportation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
EA	Environmental Assessment
FHWA	Federal Highway Administration
Lake Mead NRA or park	Lake Mead National Recreation Area
MSE	Mechanically Stabilized Earth
NEPA	National Environmental Policy Act of 1969, as amended
NPS	National Park Service
NRHP	National Register of Historic Places
SHPO	State Historic Preservation Office
USFWS	US Fish and Wildlife Service

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

The purpose and need of this proposed project is to rehabilitate, reconstruct, resurface, and realign a badly deteriorated roadway, reduce hazards associated with flash flooding, minimize costs related to frequent flood damage, and improve safety for the public traveling on Willow Beach Road in Lake Mead National Recreation Area (Lake Mead NRA or park). Because Willow Beach Road has reached the end of its serviceable life, the pavement of the roadway has settled in places creating an uneven surface containing potholes, cracks, and flood debris making driving problematic. In addition, heavy rains lead to flooding and temporary closures of Willow Beach Road, stranding park staff, marina employees, and visitors until the road is repaired. The park has limited resources for maintenance of the roadway; therefore, establishing a road that is resilient to flooding while providing a safe and sustainable driving route from US Highway 93 to the Willow Beach Marina is needed.

PROJECT AREA

Lake Mead NRA covers 142 miles of the Colorado River in northwestern Arizona (Mohave County) and southern Nevada (Clark County). The recreation area encompasses two lakes that were created by impounding the Colorado River, Lake Mead, and Lake Mohave. Lake Mohave was created behind Davis Dam and is 67 miles long with approximately 257 miles of shoreline, although it varies with the water level (figure 1).

Willow Beach Road is a two-lane asphalt surfaced roadway that provides access to Willow Beach. Willow Beach Road currently extends 4.63 miles from US Highway 93 on the east to the Willow Beach Marina on the west. The project area includes the existing Willow Beach Road, Jumbo Wash, and a ridgeline north of Willow Beach Road that connects with the Willow Beach Campground road to tie into the existing marina parking area (figure 2).

REVISED ENVIRONMENTAL ASSESSMENT

This environmental assessment (EA) was initially prepared analyzing two alternatives—the no-action alternative and the Jumbo Wash alternative—and was released for public review in November 2019. Following a 35-day review (November 15 through December 20, 2019), public and agency comments were compiled and considered. During the comment period, the Federal Highway Administration (FHWA) suggested a potential new alignment that would minimize the amount of road within the floodplain. The National Park Service (NPS) determined that this option should be analyzed; therefore, the original environmental assessment has been revised to include the analysis of this new alternative, the northern alignment alternative.

This EA was initiated before the 2020 Council on Environmental Quality (CEQ) Implementing the National Environmental Policy Act of 1969, as amended (NEPA) Regulations were in effect, and therefore was developed in accordance with the 1978 CEQ NEPA Regulations and 2008 Department of Interior NEPA regulations. The process for this EA and content is consistent with those regulations.

Willow Beach Road
Lake Mead National Recreation Area, Arizona

National Park Service
U.S. Department of the Interior

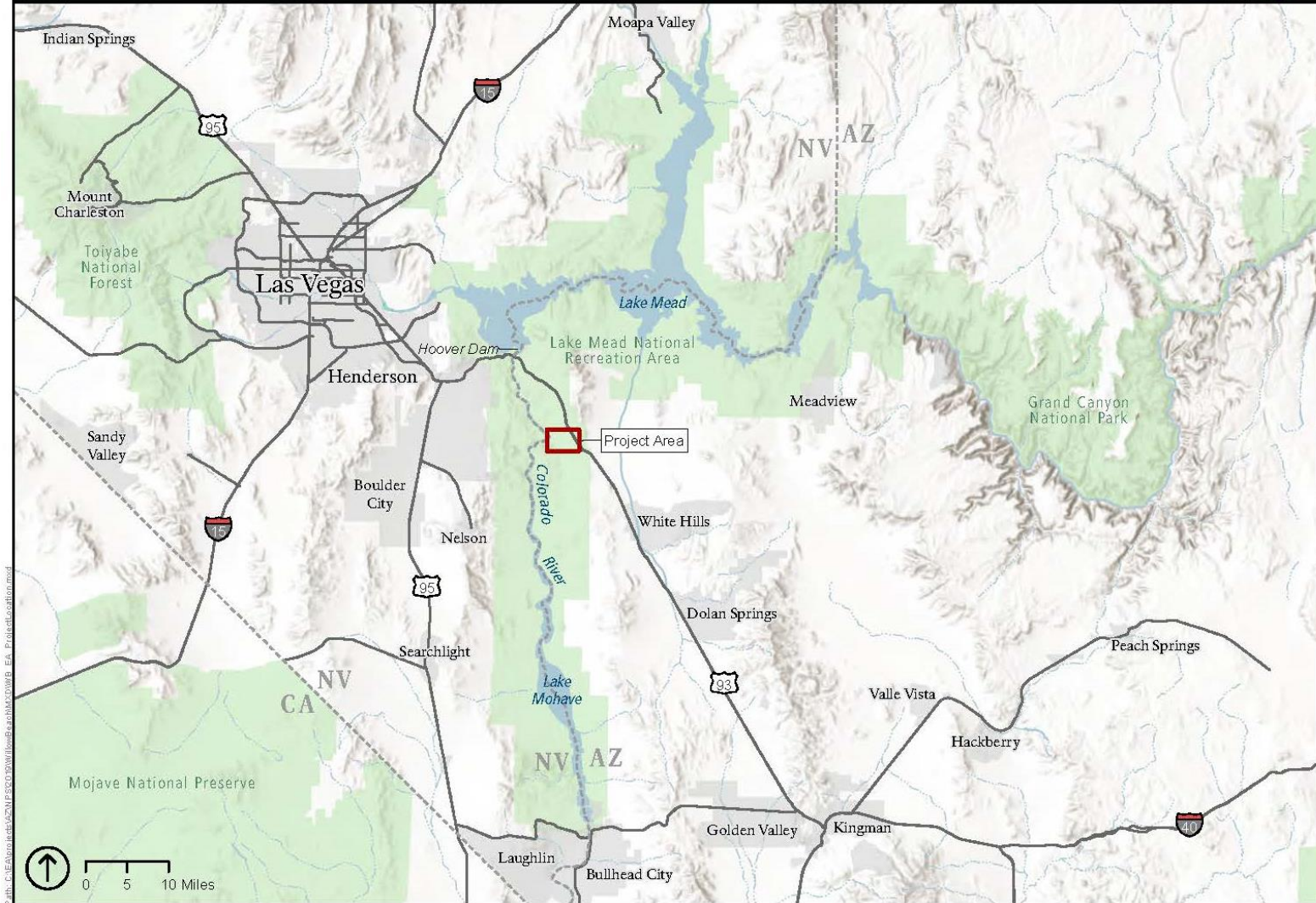


Figure 1. Project Location Map

Willow Beach Road
Lake Mead National Recreation Area, Arizona

National Park Service
U.S. Department of the Interior

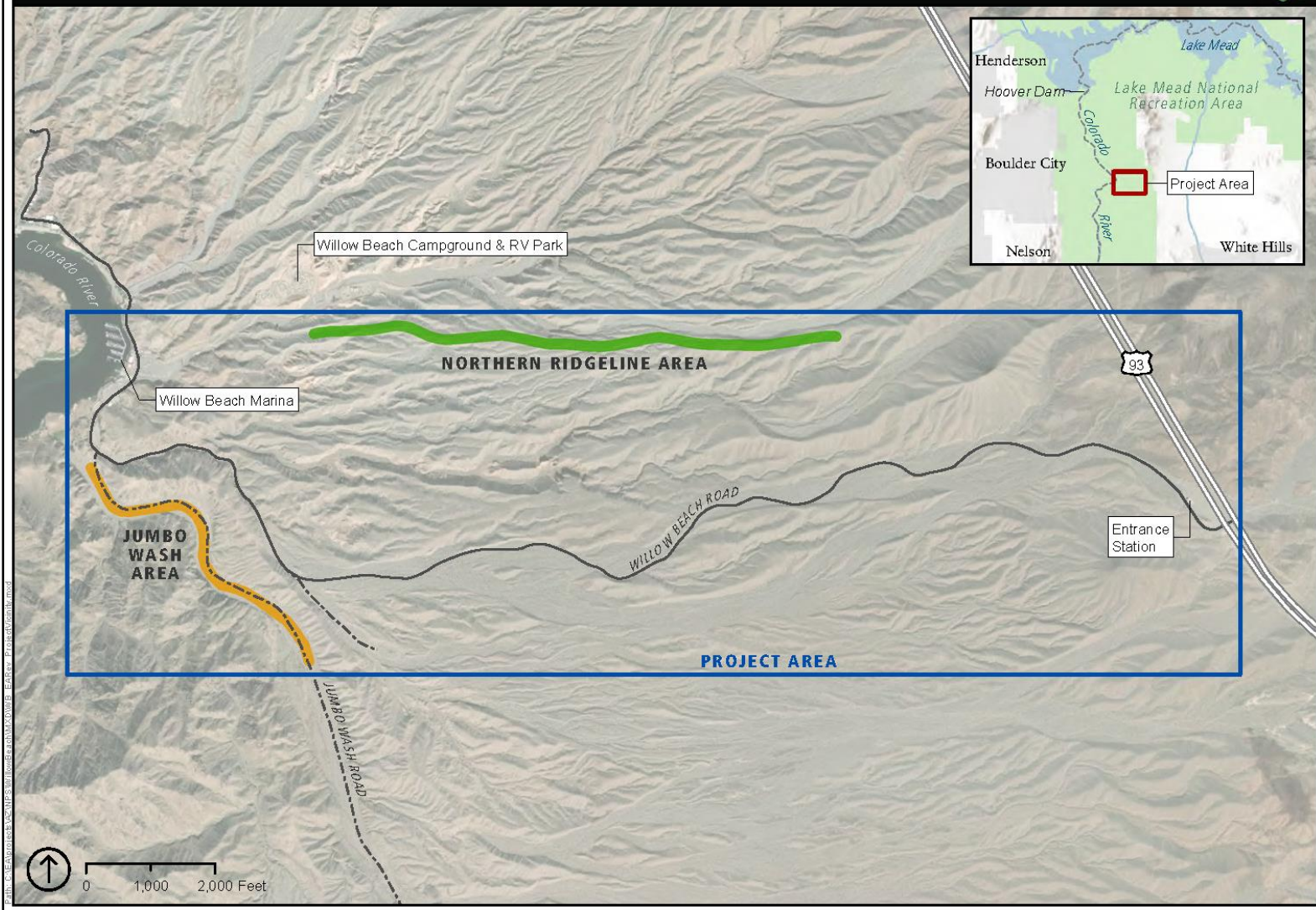


Figure 2. Project Area

ISSUES AND RESOURCE TOPICS DISMISSED FROM DETAILED ANALYSIS

A number of issues were initially considered but were ultimately dismissed from detailed analysis in this EA. These dismissed issues are not potentially significant, are not critical to choosing between alternatives, or are not controversial. These issues are described below with the reason(s) that further analysis was not warranted.

Geologic Features and Processes

The construction of the existing Willow Beach Road altered the natural drainage in the project area. The action alternatives would include a change in the drainage near the entrance station and culverts as needed for side drainage; however, the drainage would remain largely the same following construction activities. The Jumbo Wash alternative would require cutting into and removing rock material of the southern hill to construct the first of two new bridges. Removal of this rock and the addition of the bridges and mechanically stabilized earth (MSE) retaining walls would be a permanent impact on geologic features. Similarly, the northern alignment alternative would require removing rock along a ridge for construction of the road along a new alignment. The excavations would be carried out in such a way as to maintain the stability of the surrounding geology. Naturally occurring asbestos occurs in rocks and soil as a result of natural geological processes and has the potential to occur within the study area. If naturally occurring asbestos were revealed during construction, the National Park Service would work with the US Environmental Protection Agency Region IX and Arizona Department of Environmental Quality to determine the proper remediation actions to ensure the safety of the construction crew, visitors, concessioners, and park staff. For these reasons, this topic has been dismissed from detailed analysis.

Water Resources

The project area includes washes that are immediately upstream of the Colorado River. The span of the Colorado River from the Hoover Dam to Lake Mohave was listed as a Clean Water Act 303(d) impaired water due to selenium in 2004 (ADEQ 2018a); however, this span of the river was recommended for delisting in Arizona's *2018 Delist Report: Delisting Reports Justifying the Removal of Waterbodies from the 2018 Impaired Waters List*, as there were no selenium exceedances in water samples (ADEQ 2018b), and the US Environmental Protection Agency concurred with this conclusion (USEPA 2018). This portion of the Colorado River is also designated as critical habitat for two federally listed fish species – bonytail chub (*Gila elegans*) and razorback sucker (*Xyrauchen texanus*). Impacts to water quality from construction of the action alternatives could include erosion, discharge of fill material, runoff from contaminants, and spills from fuels and other liquids used during construction. However, these potential impacts would be localized and temporary, ceasing after construction is finished. In addition, best management practices, such as silt fences, would be employed to reduce the potential for impacts to water resources.

Because construction activities could involve discharge of fill material to washes within the project area, the FHWA on behalf of Lake Mead NRA would coordinate with the US Army Corps of Engineers, Los Angeles District as the design of the road improvements progresses to determine if Clean Water Act Section 401 and Section 404 permits would be required. If a permit is deemed necessary, it would include stipulations protective of water quality. Similarly, the FHWA would coordinate with the Arizona Department of Environmental Quality to determine whether a Stormwater Pollution Prevention Permit would be necessary for the project. Because impacts to water resources would be localized, temporary, and mitigated through the use of best management practices and include stipulations in potential permits, this topic has been dismissed from detailed analysis.

Special-Status Species

Section 7 of the federal Endangered Species Act requires that a federal agency consult with the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service on any action that may affect endangered or threatened species or candidate species, or that may result in adverse modification of critical habitat. The USFWS and the Arizona Game and Fish Department both publish a list of special-status species segregated by each county in Arizona (USFWS 2019; AGFD 2019).

Federally listed species that could be present within or around the project area include California condor (*Gymnogyps californianus*), California least tern (*Sterna antillarum browni*), yellow-billed cuckoo (*Coccyzus americanus*), Yuma clapper rail (*Rallus longirostris yumanensis*), northern Mexican garter snake (*Thamnophis eques megalops*), bonytail chub, and razorback sucker. However, the project area does not contain suitable habitat or designated critical habitat for California least tern, yellow-billed cuckoo, Yuma clapper rail, or northern Mexican garter snake. As stated in the Water Resources section above, the Colorado River is designated as critical habitat for the bonytail chub and razorback sucker; however, impacts from construction activities, such as sedimentation and erosion, would be controlled through best management practices and stipulations within all necessary permits. California condors could use the project area for foraging. Although temporary adverse impacts would occur to the condor due to noise disturbance during construction, the impacts would be limited to the period of construction (up to 18 months), localized to the project area, and minimized by the implementation of best management practices, such as the use of properly maintained construction equipment and turning off any idling equipment when not in use.

The Sonoran desert tortoise (*Gopherus morafkai*), which is protected under a Candidate Conservation Agreement and a protected species in Arizona, could potentially occur within the project area. It should be noted that Lake Mead NRA is not a party in the Candidate Conservation Agreement for the Sonoran desert tortoise; however, habitat for the Sonoran desert tortoise is present south and east of the Colorado River in Arizona, and the park would take actions to protect this species, where appropriate. Park biologists would conduct a survey for the Sonoran desert tortoise prior to construction, although biologists have not observed signs of this species to date during multiple site visits throughout the project area. If signs of Sonoran desert tortoise are identified within the project area, mitigation measures to avoid impacts to the tortoise would be employed. These mitigation measures would include—but would not be limited to—restricting construction to periods of tortoise inactivity (typically November 1 through March 1) to the extent possible; relocating any tortoises found within the project area to other suitable habitat; vehicle use would be limited to existing or designated routes; and project features would be designed to prevent entrapment of tortoises.

Other protected species in Arizona that could be present in the project area include the golden eagle (*Aquila chrysaetos*) and bald eagle (*Haliaeetus leucocephalus*), both protected by the Bald and Golden Eagle Act (bald eagle is also a species of concern); species of concern banded Gila monster (*Heloderma suspectum cinctum*) and American peregrine falcon (*Falco peregrinus anatum*); and the relict leopard frog (*Lithobates onca*), which is protected under a Candidate Conservation Agreement. Similar to the California condor, golden eagles, bald eagles, and American peregrine falcons could be disturbed during construction due to disturbance from noise, but the impacts would be short-term and localized. The project area does not contain habitat for the relict leopard frog, as this species is associated with streams, springs, and spring-fed wetlands. The project area could provide habitat for the banded Gila monster; therefore, park biologists would conduct surveys for this species prior to construction. Mitigation measures similar to those described for the Sonoran desert tortoise would be employed for the banded Gila monster, including relocating any individuals to suitable habitat outside of the project area and limiting where construction vehicles and equipment can operate.

The National Park Service would implement mitigation measures and best management practices to avoid or substantially reduce impacts to special-status species. For this reason, this topic has been dismissed from detailed analysis.

Cultural Resources

Cultural resources surveys were completed in December 2018 and August 2020 for the alternative alignments (PaleoWest Archaeology 2019, 2020). The 2018 survey focused on the Jumbo Wash area and resulted in the identification of two previously recorded archeological sites, and three isolated occurrences were identified and recorded. The cultural resources survey also identified two historic roads (Jumbo Wash Road and Willow Beach Road). Jumbo Wash Road is recommended not eligible for listing on the National Register of Historic Places (NRHP) and Willow Beach Road is recommended as individually not eligible, and potentially eligible as a contributing element of a historic district on the NRHP. An analysis of the area of potential effects and evaluation of the project scope determined that there would be no adverse effect to archeological resources or to historic structures or districts. The National Park Service sent a letter to the Arizona State Historic Preservation Office (SHPO) on August 9, 2019, initiating consultation with a request to review the cultural resource report and provide concurrence on the NPS determination, and the SHPO provided concurrence on August 21, 2019. The National Park Service also sent letters to all affiliated tribes on August 12, 2019, requesting concurrence on the NPS determination. No responses were received from the tribes.

Following identification of the northern alignment alternative, the 2020 survey was conducted, and it focused on the ridgeline north of the existing Willow Beach Road. This survey located two archeological sites. The National Park Service has determined one of the sites to be eligible, and the other as not eligible for listing on the NRHP. No historic buildings, structures, or districts were identified during this survey. Therefore, historic buildings, structures, and districts have been dismissed from detailed analysis. Impacts to archeological resources are analyzed in this document.

Socioeconomics

The Willow Beach Marina offers canoe, kayak, and powerboat rentals, a campground and RV park, mooring and rafting operations, and marina services, including a convenience store, a gift shop, and a restaurant. The USFWS Fish Hatchery and fishing piers are also accessed on Willow Beach Road. Although construction activities could cause some temporary delays in traffic, the proposed project would be designed to allow for the continuation of the current marina services during construction. Because impacts to concessioners would be minimal and short-term, socioeconomics was not carried forward for detailed analysis.

Air Quality

The 1963 Clean Air Act, as amended (42 United States Code § 7401 et seq.) requires federal land managers to protect air quality and to meet all federal, state, and local air pollution standards. Lake Mead NRA is subject to federal, state, and local air pollution standards. National ambient air quality standards have been established by the US Environmental Protection Agency. Current standards are set for sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, particulate matter equal to or less than 10 microns in size, fine particulate matter equal to or less than 2.5 microns in size, and lead. The proposed project is located in Mohave County, Arizona which is currently in attainment for all criteria air pollutants (ADEQ 2019), and Lake Mead NRA is designated as a Class II area, meaning that it is an area that can sustain a moderate increase in air pollutant concentrations without significant deterioration of the air quality.

The action alternatives could have a slight effect on air quality from the use of construction vehicles, heavy equipment operation, and generation of fugitive dust during construction activities; however, the effects would be localized and temporary, lasting only for the duration of construction. This road improvement project is estimated to take up to 18 months, including demolition and construction. Best management practices to control fugitive dust would be implemented, further reducing potential impacts to air quality. Best management practices would include, but are not limited to, the following: wetting soils to suppress dust, maintaining the existing vegetation to the extent possible, limiting speed limits on unpaved roads, and limiting demolition work in high-wind conditions. For these reasons, air quality is dismissed from further analysis in this EA.

Soundscapes

Human-caused sounds would increase as a result of construction activities, the use of heavy equipment, vehicular traffic, and construction crews. Sounds generated from construction would be temporary, lasting only as long as the construction activity. However, noise abatement would be required to prevent disturbance and nuisance to visitors, residents, workers, and wildlife. Project-related construction noise would be minimized through the use of best management practices, as listed in chapter 2, including limiting work to daylight hours in the project area to avoid night-time noise disruption and properly maintaining construction equipment to minimize noise. Additionally, the project would not increase the amount of traffic on Willow Beach Road. Therefore, soundscapes was dismissed from detailed analysis.

Visitor Use and Experience

Over the past five years, an average of 250,000 people per year visited the Willow Beach Area. In 2020, visitation is expected to reach 350,000 people. The action alternatives would have long-term beneficial impacts on visitor use and experience. As stated above, all recreational activities provided by the Willow Beach Marina would continue to be available during and following construction activities on Willow Beach Road. During construction, the action alternatives could cause some temporary traffic delays; however, these impacts would be short-term, lasting only during certain construction activities. Following construction, visitors would have safer ingress to and egress from the Willow Beach Marina, as the new alignment of Willow Beach Road would reduce the potential for visitors to become stranded at the marina area due to flooding and there would be less flooding debris on the road. For these reasons, visitor use and experience was dismissed from detailed analysis.

CHAPTER 2: ALTERNATIVES

Two action alternatives were chosen for detailed evaluation in this EA in addition to the no-action alternative: the Jumbo Wash alternative and the northern alignment alternative, which the National Park Service has identified as the preferred alternative. The chapter also describes other alternatives that were initially considered but dismissed from detailed analysis and presents mitigation measures for the action alternatives.

DESCRIPTION OF THE ALTERNATIVES

No-Action Alternative

Under the no-action alternative, Willow Beach Road would remain in the current state with a narrow roadway (20- to 21-feet wide), soft shoulders, tight curves, no formal paved pullouts, worn centerline markings, and no edge markings to delineate the travel lanes. The park would continue to repair and clear the road of debris as needed. However, Willow Beach Road has reached the end of its serviceable life, and the roadway conditions would continue to deteriorate (figures 3 and 4). Existing potholes would require more frequent repair, new potholes would form, and the edge of the pavement would continue to deteriorate and ravel.

The road would remain in its current alignment in a narrow canyon. Heavy rain and flash flood events would continue to result in road closures when debris and water would prohibit the safe flow of traffic. Flooding and debris depositing would continue to occur predominately in two areas – within Willow Beach Wash and at the east end of the road near the entrance station. Willow Beach Road would remain closed until any standing water subsides and the flooding debris in the roadway can be cleared. Closures typically last for several hours, but severe events have resulted in closures lasting several days.

At the east end of the road near the entrance station, there are two 10-foot by 10-foot box culverts that carry flow (water) under US Highway 93. During storm events, flow from these box culverts brings debris onto Willow Beach Road. The roadway has an inverted crown in some areas, which makes clearing debris difficult for maintenance crews.



Figure 3. Flood Debris across Willow Beach Road

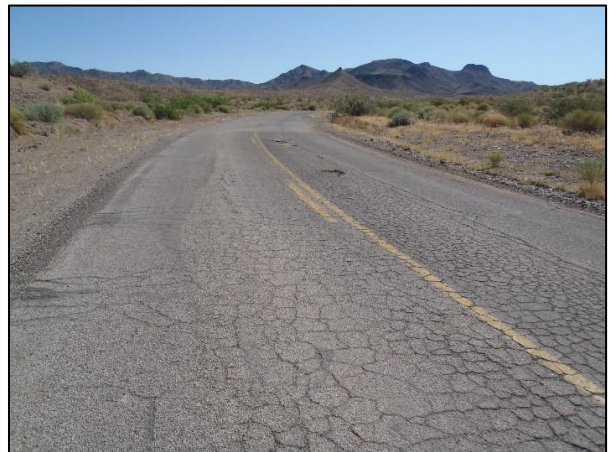


Figure 4. Existing Road Surface with Potholes

Jumbo Wash Alternative

Roadway Improvement Section. From milepost 0.2 (near the entrance station) to milepost 2.9 (north of the intersection with the maintenance area access road), the Jumbo Wash alternative (figure 5) would include widening the roadway to a consistent 26-foot width (11-foot travel lanes with 2-foot shoulders) to meet standards identified in Park Road Standards (NPS 1984). The widened shoulders would allow for an improved clear zone, the unobstructed area beyond the road where a vehicle leaving the road can travel without issue. The shoulders would also allow law enforcement to safely conduct traffic stops. Selected curves would be widened to improve sight distance and allow for more consistent speeds. Centerline and edge line pavement markings would be added, and centerline rumble strips would be included in this section of the road. Some sections of the road may need edge protection, such as cut-off walls, to minimize the potential for erosion. To improve the park's ability to quickly maintain the roadway after storm events, the proposed roadway would keep a consistent crown section for the entire length.

Narrow Canyon Section. From approximately milepost 2.9 to the Willow Beach Marina parking lot, the road would be removed from the narrow canyon (figure 6). Willow Beach Road would be realigned to cross over the ridgeline and into the adjacent Jumbo Wash. To accommodate the realignment, two bridges would be constructed, and Jumbo Wash Road between the two new bridges would be elevated out of the floodplain. The bridge over the narrow canyon would be constructed approximately 12 feet above the canyon and would be 30-feet wide (11-foot lanes with 2-foot shoulders and 2-foot lateral offsets to the bridge rails) and approximately 240- to 300-feet long. A cut would be made into the southern hill for the bridge to pass through, reducing the grade of the road. The fill areas beyond the cut would be lined with MSE retaining walls. The realigned road would enter Jumbo Wash at the abandoned campground, within the limits of the protective berm. No major changes to the Willow Beach Wash storm flow patterns would be needed.

A second bridge would be added across from Jumbo Wash Road into the Willow Beach developed area near the fire station. This bridge would also be 30-feet wide (11-foot lanes with 2-foot shoulders and 2-foot offsets to rail) and approximately 200-feet long or longer to create better geometry with access to paddlecraft beach. The ditch along the road would be constructed wide enough to accommodate some rockfall. A new access road that connects into the parking lot would be added to maintain access to the existing paddlecraft launch ramp (figure 6). Both bridges would be similar in design and cut areas would have naturalized slopes. The concrete would be colored or painted to blend into the surrounding landscape. Figure 7, below, is a bridge constructed on Northshore Road north of Lake Mead. This figure illustrates how the design, texture, and color of the bridge and MSE walls blend into the environment.

Willow Beach Road
Lake Mead National Recreation Area, Arizona

National Park Service
U.S. Department of the Interior

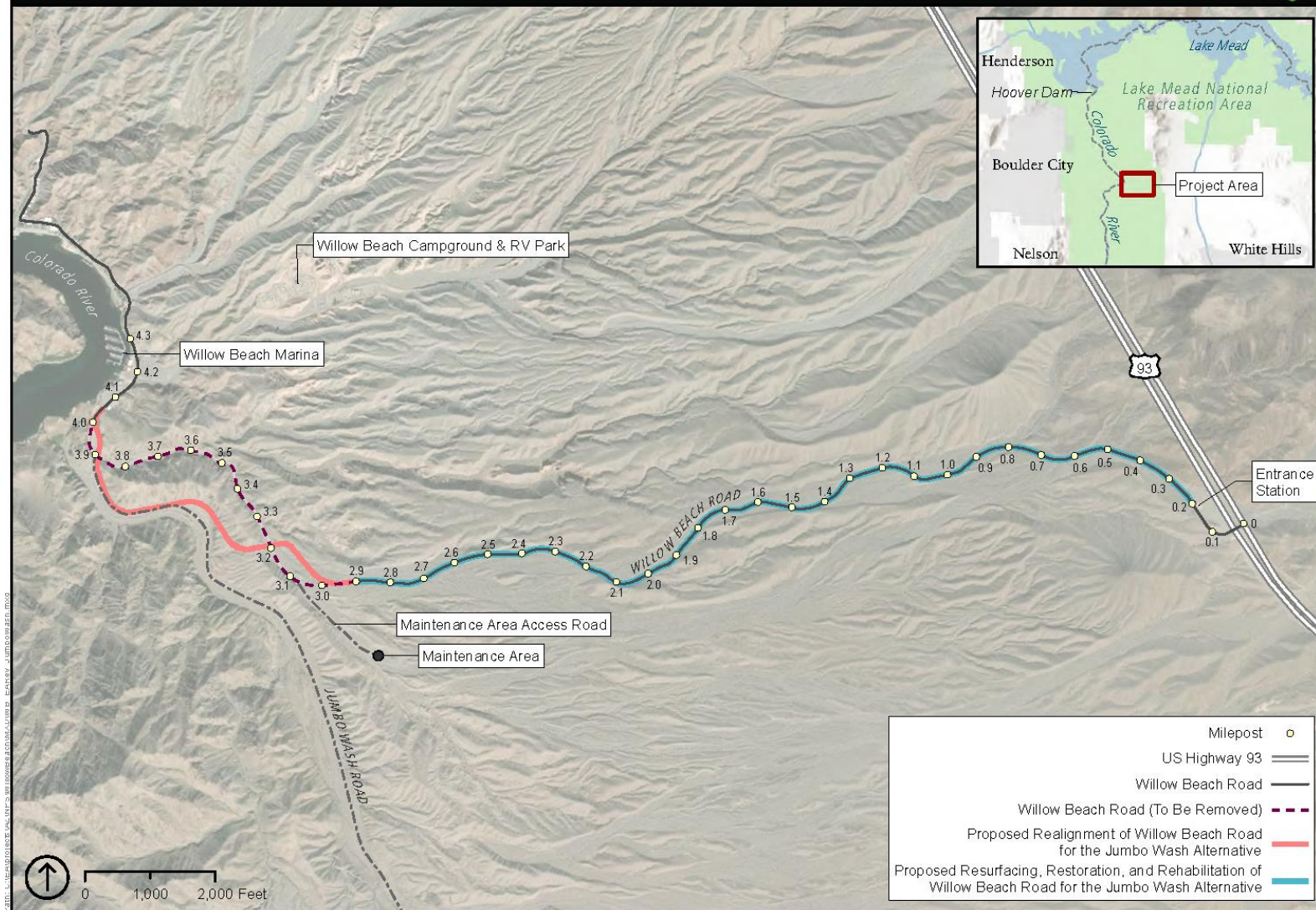


Figure 5. Jumbo Wash Alternative

Willow Beach Road
Lake Mead National Recreation Area, Arizona

National Park Service
U.S. Department of the Interior

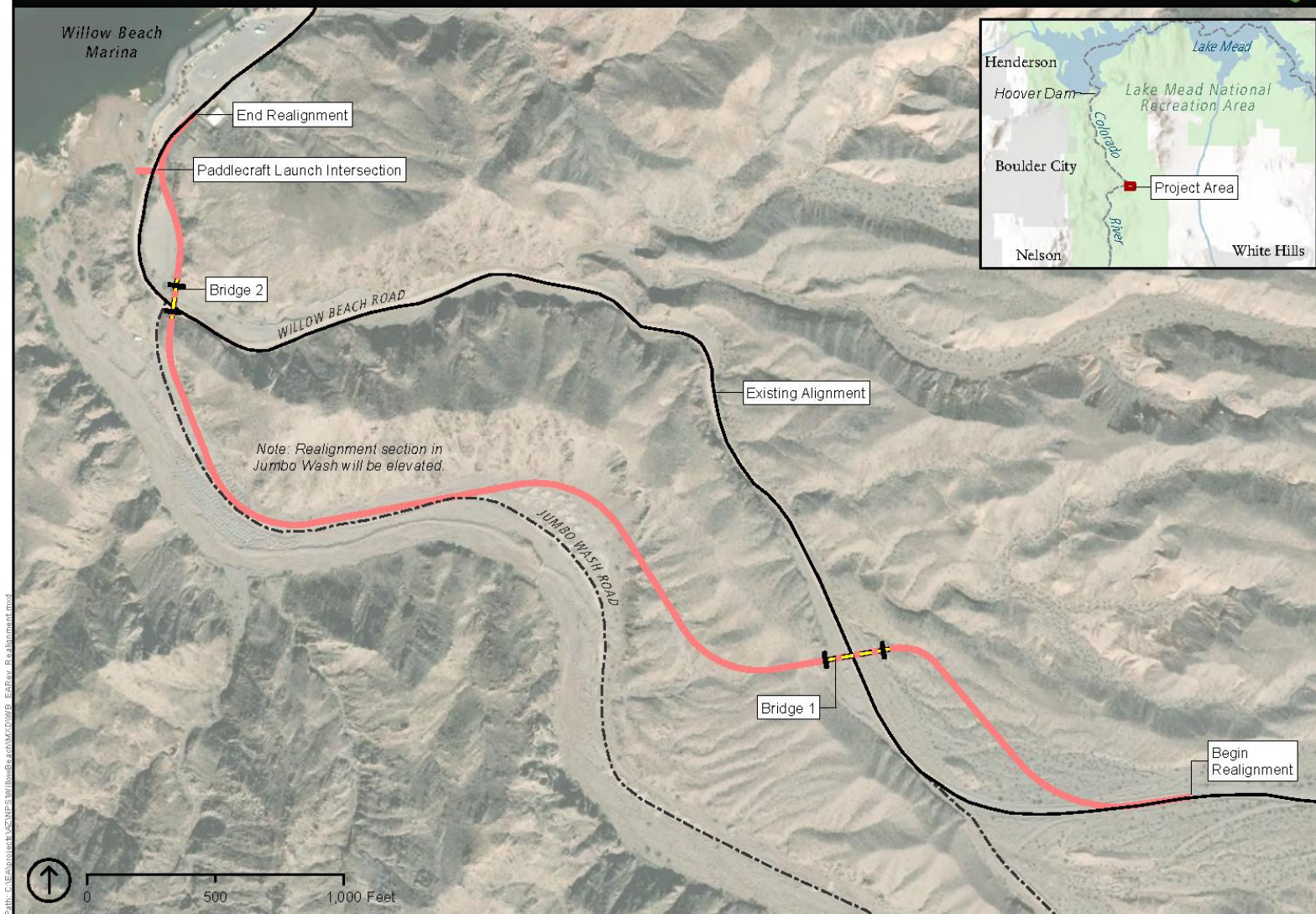


Figure 6. Jumbo Wash Realignment Section



Figure 7. Example of Bridge Design and Color

Drainage Crossing Near the Entrance Station. Currently, two 10-foot by 10-foot box culverts carry flow (water) under US Highway 93 at the east end of the road near the entrance (between mileposts 0.2 and 0.3). Under the Jumbo Wash alternative, the drainage area would be channelized from the existing box culverts to a newly installed U-shaped box culvert at the utility road crossing. The flow out the box culvert would exit via an outlet into the existing flow path to the right of the roadway. The U-shaped box culvert would have a removable grate under the utility road crossing, which would aid park maintenance staff in cleaning debris from the box culvert (figure 8).

Accessibility. In conformance with applicable laws and regulations, specifically the Architectural Barriers Act of 1968 (Public Law 90-480), the Rehabilitation Act of 1973 (Public Law 93-112), and the 1984 Uniform Federal Accessibility Standards (49 Code of Federal Regulations [CFR] 31528), specific parking areas in parking lots, curb cuts, sidewalks, and all other facilities associated with this project would be physically accessible.

Other Connected Actions. Other connected road actions include:

- Utility lines and poles would be moved, and main power transformers would be relocated in Jumbo Wash to accommodate the new road alignment. A new fiber-optic line may be installed along the alignment in the disturbed area.
- Staging areas would be created to store equipment and materials.
- Two intersections would be created in Jumbo Wash. One would maintain access to the utilities and wellheads close to the north end of the existing Jumbo Wash Road. The other intersection would provide continued access for vehicles to travel south on Jumbo Wash Road. This intersection would be in the vicinity of the former campground in a previously disturbed area.
- Between two and five pullouts would be formalized (paved). These pullouts would be located in areas where visitors and staff have created informal pullouts and the land is already disturbed.
- Asphalt removed of the existing road in the narrow canyon would be pulverized and reused to the extent possible in the new road surfaces or to shore up Jumbo Wash dike. Any materials not used would be disposed of off-site at an appropriate facility.

Willow Beach Road
Lake Mead National Recreation Area, Arizona

National Park Service
U.S. Department of the Interior

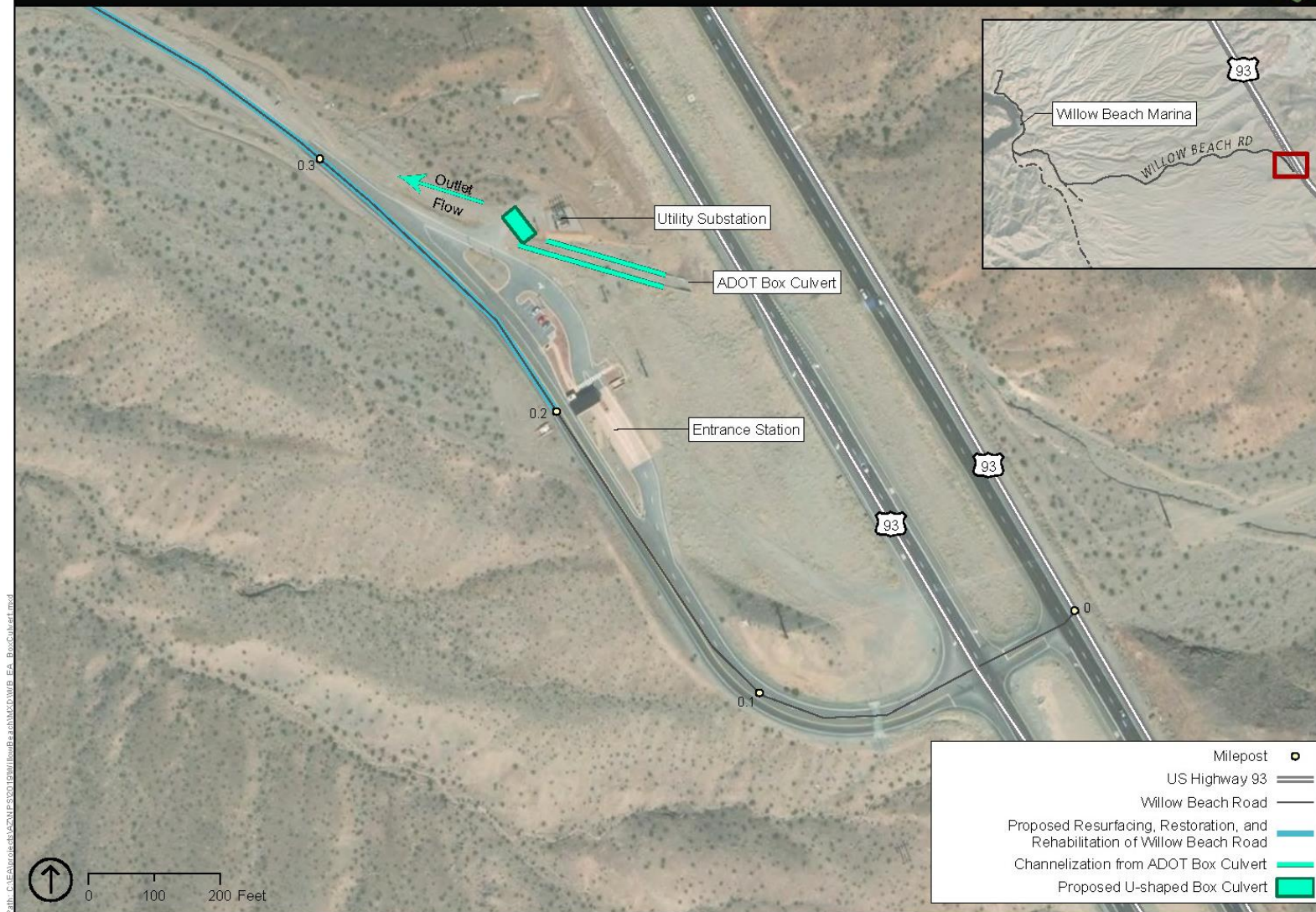


Figure 8. Box Culvert Drainage Near the Entrance Station

Northern Alignment Alternative

Roadway Improvement Section. Starting at approximately milepost 0.2 (near the entrance station) to milepost 0.8, the northern alignment alternative (figure 5) would widen the existing section of roadway to a consistent 30-foot width (12-foot travel lanes with 3-foot shoulders) to meet standards identified in Park Road Standards (NPS 1984). The widened shoulders would allow for an improved clear zone, the unobstructed area beyond the road where a vehicle leaving the road can travel without issue. The shoulders would also allow law enforcement to safely conduct traffic stops. Curves may be widened to improve sight distance and allow for more consistent speeds. Centerline and edge line pavement markings would be added, and centerline rumble strips would be included in this section of the road. Some sections of the road may need edge protection, such as cut-off walls, to minimize the potential for erosion. The roadway would keep a consistent crown section for the entire length.

New Northern Alignment. A new road would be constructed from approximately milepost 0.8 of the existing Willow Beach Road to the existing road that leads from the marina parking lot to the Willow Beach campground (figure 9). This road would be constructed along a ridgeline located north of the existing Willow Beach Road. The new Willow Beach Road would reduce the amount of road located within the floodplain. Beyond the conjunction with the existing road, the new alignment would cross one wash and be spanned with two 10-foot by 10-foot box culverts (figure 8). Two smaller (4-foot by 4-foot) box culverts would be installed at approximately mileposts 1.0 and 1.1 for additional drainage. The new roadway would be approximately 2.6-miles long and constructed to a consistent 30-foot width (12-foot travel lanes with 3-foot shoulders) to meet standards identified in Park Road Standards (NPS 1984). The design speed would be 45 miles per hour.

The roadway would also have three formal pullouts (paved) that would be 14-feet wide located at approximately mileposts 1.1, 1.6, and 2.2. At approximately milepost 2.0, a scenic overlook would be constructed to provide views of the river bend. The overlook would have 10 parking spaces and a vault toilet.

The new alignment would tie into the existing Willow Beach campground access road located southwest of the campground. A new turn off to the campground access road would be constructed. The existing low-water crossing would be replaced with three 10-foot by 10-foot box culverts that would direct the water into the existing concrete channel.

Existing Willow Beach Road. The existing Willow Beach Road would be obliterated from milepost 0.8 to 3.9 and restored to natural conditions (figure 9). The section of the road from milepost 3.9 to the Willow Beach Marina parking lot (milepost 4.2) would be retained to provide access to Jumbo Wash Road.

Drainage Crossing Near the Entrance Station. Changes to the drainage near the entrance station would be the same as described for the Jumbo Wash alternative (figure 8).

Accessibility. Accessibility in parking lots, curb cuts, sidewalks, and all other facilities associated with this project would be the same as described for the Jumbo Wash alternative.

Willow Beach Road
Lake Mead National Recreation Area, Arizona

National Park Service
U.S. Department of the Interior

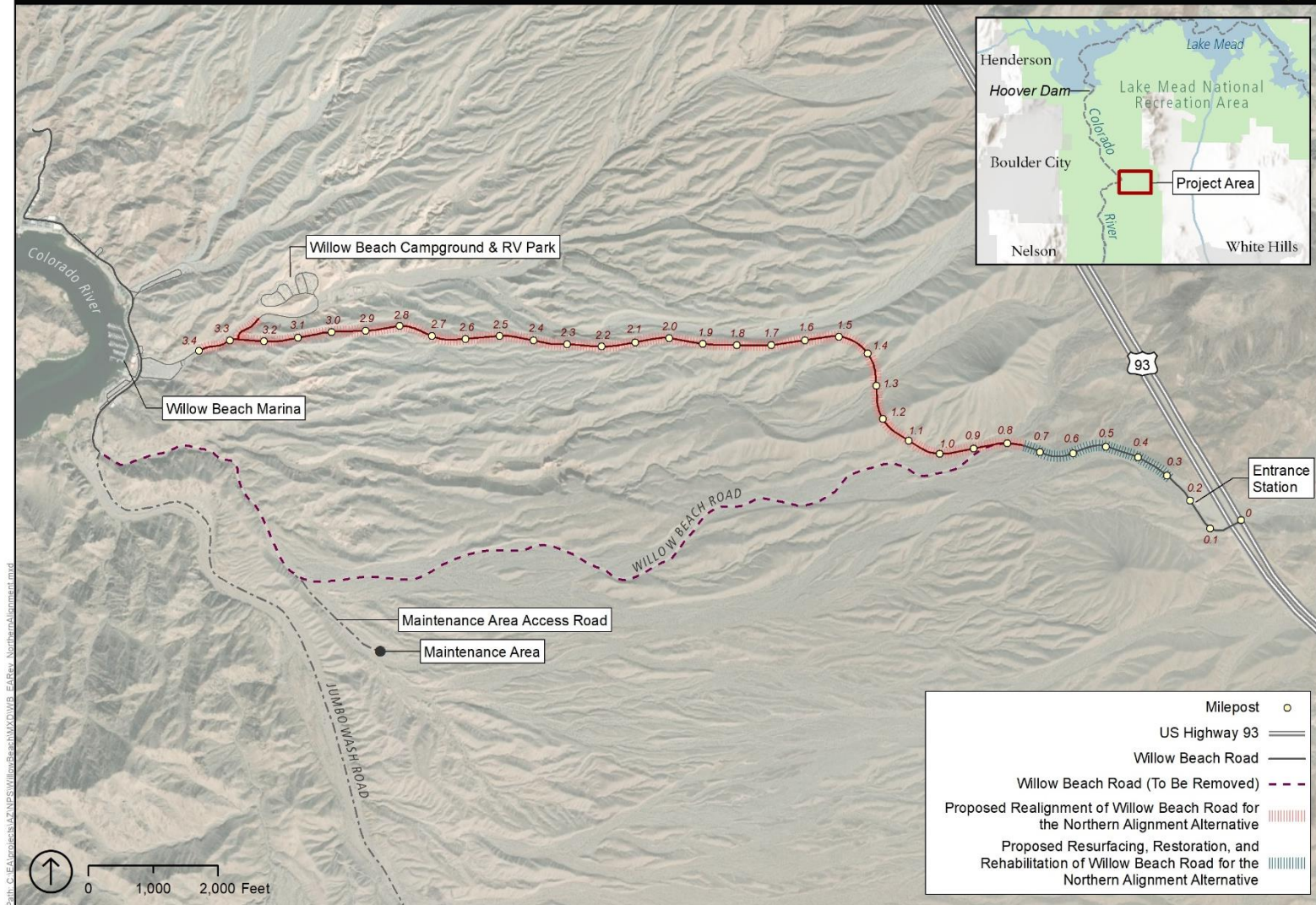


Figure 9. Northern Alignment Alternative

Other Connected Actions. Other connected road actions include:

- Staging areas would be created to store equipment and materials. Staging areas would be located near milepost 0.8 where the new alignment begins and possibly within the parking areas of the marina. A staging area near milepost 0.8 would affect a previously undisturbed area and would be restored at the end of the project. Staging of materials in the parking areas would be placed to avoid impacts to traffic flow.
- The maintenance area at approximately milepost 3.2 of the existing Willow Beach Road would be largely abandoned in place. This unpaved maintenance area, approximately 600 feet by 200 feet (2.8 acres), is no longer in use. Concrete storage bins at the site would have holes punched in them for drainage, and any vertical walls would be collapsed and buried. The fencing would be removed. There may be some light scarifying of the soil.
- Asphalt removed from the existing Willow Beach Road would be pulverized and reused to the extent possible in the new road surfaces or to shore up Jumbo Wash dike. Any materials not used would be disposed of off-site at an appropriate facility.
- The current parking lot in the developed area would be re-stripped and the islands may be reconfigured to change vehicle circulation.
- A new fiber-optic line may be installed along the alignment in the disturbed area.

ALTERNATIVES CONSIDERED BUT DISMISSED FROM DETAILED ANALYSIS

During the initial design process for this project, the National Park Service considered other options to improve public safety through the narrow canyon. The following alternatives were considered for project implementation but were dismissed from further analysis because these options did not individually meet NPS objectives for creating a more sustainable roadway.

- **Complete Resurfacing, Restoration, and Rehabilitation:** Under this alternative, Willow Beach Road improvements would be completed in the existing alignment. This alternative would not meet the purpose and need to reduce risks from flash flood events, as the road would still be routed in the current location through the wash associated with the narrow canyon.
- **Maintenance Area Access Road Realignment:** Willow Beach Road would be relocated to the south across the maintenance area access road and into Jumbo Wash. Willow Beach Road through the narrow canyon would be eliminated, and storm drainage would continue to flow through the narrow canyon. This alternative would require longer bridges or a series of box culverts to cross the maintenance area access road. The length of realignment is longer than other alternatives and would require significant earthwork, so there would be more resource and cost impacts. There would be a significant amount of borrow material required to build the new roadway slopes, and importing material is anticipated to be costly due to the haul distance. This realignment option would have higher resource and cost impacts and fewer safety benefits.
- **Channel Diversion:** This alternative would divert the flow from Willow Beach Wash into Jumbo Wash south of Willow Beach Road across the maintenance area access road. The ridge west of Willow Beach Wash would be excavated to connect the channel to Jumbo Wash and a berm would be constructed. Roughly 1.0 mile of Willow Beach Road would be realigned. The resource impacts of this alternative are considered severe due to the excavation needed to connect Willow Beach Wash and Jumbo Wash. This channel diversion option has high resource impacts and would not achieve the goal of minimizing the safety hazard of traffic in the canyon during storm

events because other downstream drainage channels would still cause flash flooding in the Willow Beach Wash slot canyon.

- **Non-Bridge Options:** This alternative would replace the proposed bridges with a tunnel, box culverts, or a low-water crossing. These options were considered during the 30% design review but dismissed due to higher resource and cost impacts and lower safety benefits.

MITIGATION MEASURES

To minimize impacts related to the action alternatives, the National Park Service would implement mitigation measures whenever feasible. Subject to the final design and approval of plans by relevant agencies, mitigation measures would include, but would not be limited to, the items listed below.

General

- The current Willow Beach Access Road would continue to remain open and maintained during construction (except during flood events), so visitors could still access the marina, campground, beaches, and other facilities. It would also allow the USFWS to access their fish hatchery.
- Erosion control measures would be implemented to minimize impacts to water quality during construction activities. These measures include sediment traps, erosion check structures, and/or weed-free fiber rolls or straw-filled wattles.
- Fugitive dust plumes would be reduced to the extent possible using water sprayed on the soil during earth-disturbing activities. Water used during road construction would be pumped from Lake Mohave, stored in a tank on the boat ramp or other location close to the water's edge, and hauled by truck. Concrete and asphalt batch plants would be located outside the park; however, it is expected that the contractor would use existing commercial sources of concrete and asphalt.

Vegetation

- Following construction, disturbed areas adjacent to the road would be restored to natural conditions to the extent possible. Revegetation work would use desert soil conserved along the corridor and native species from genetic stocks originating in Lake Mead NRA. Revegetation efforts would also attempt reconstruction of the natural spacing, abundance, and diversity of native plant species.
- No imported topsoil (desert soil) or hay bales would be used during revegetation, in an effort to avoid introduction of exotic plant species or inappropriate genetic stock of native plant species.
- Desert soil would be stored as near its original location as possible to minimize vegetation impacts and potential compaction and erosion of bare soils. Salvaged desert soil would be stored at the construction staging area. Replacement of the desert soil would include spreading, scarification, mulching, and seeding and/or planting species native to the immediate area. Stones and disturbed bedrock along the roadside would be treated with a simulated desert varnish material such as Permeon, to reduce visual impacts related to construction. As necessary, desert soil replacement techniques would be used to re-establish desert crust surface and minimize impacts from invasive plant species.
- To avoid transport of nonnative species to the project area, all construction vehicles would be washed and inspected prior to use.
- Following revegetation, restored areas would be monitored and managed to prevent colonization by nonnative invasive species.

- Best management practices for construction equipment would be followed to avoid exposure of the environment to risks, such as oil leaks and fuel spills.

Wildlife

- All vegetation removal would occur during the non-breeding season for birds (between September 1 to February 28) to avoid impacts to nesting birds known to occur in the project area.
- If construction activities cannot occur outside the bird nesting season, surveys would be conducted by a qualified biologist no more than five days prior to scheduled construction activity to determine if active nests are present within the area of impact. Any nesting locations found during surveys would be buffered and a barrier established (e.g., plastic fencing) to avoid impacts.

Scenic Resources

- Willow Beach Road improvements would be limited to the minimum road corridor necessary for a safe driving experience, wherever possible. Cut and fill slopes will be rounded at the tops and superficially contoured in such a way as to minimize unnatural looking straight lines and angles, and to match the surrounding natural landscape of the area. Both the designs and colors of construction materials and structures would blend with the surroundings. Rocks disturbed during construction, exposed culvert ends, and flared end sections would be treated with a varnish such as Permeon to match local soil colors to reduce visibility to visitors. Metal items like guardrails and signposts would have a natural colored metal, like Corten, or stained/painted to match the surrounding colors.

Archeological and Cultural Resources

- Should unknown archeological resources be uncovered during construction, work would be halted in the discovery area and the Lake Mead NRA staff would consult with the Arizona SHPO according to 36 CFR 800.13 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990.
- The National Park Service is preparing a memorandum of agreement in consultation with the Arizona SHPO and interested Tribes. The memorandum of agreement includes stipulations that serve as avoidance, minimization, and mitigation measures for adverse effects to archeological resources.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the methodology for analyzing impacts on the affected environment within the project area for each impact topic retained for detailed analysis and an analysis of the impacts that could result from implementing either of the alternatives. This chapter is organized by impact topic to allow a comparison among alternatives based on issues.

GENERAL METHODS FOR ANALYZING IMPACTS

In accordance with Council on Environmental Quality regulations, direct, indirect, and cumulative impacts are described (40 CFR 1502.16) and the intensity of the impacts is discussed in the context of the park and region (40 CFR 1508.27). Where appropriate, mitigating measures for adverse impacts are also described and incorporated into the evaluation of impacts. The specific methods used to assess impacts for each resource may vary; therefore, these methodologies are described under each impact topic.

The National Park Service based these impact analyses and conclusions on a review of existing literature, studies, and research performed by the park staff, information provided by experts within the National Park Service, and other agencies and institutions, professional judgment, park staff expertise and insights, and public input.

SCENARIO FOR CULUMATIVE IMPACT ANALYSIS

Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. To determine potential cumulative impacts, past, present, and foreseeable future actions and land uses were identified in or near the project area. Cumulative impacts are considered for the no-action alternative and the action alternatives, by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions and are presented at the end of each impact topic discussion. Table 1 shows the projects considered in the cumulative impact analysis for each resource.

Table 1. Cumulative Project List

Project	Project Description	Status
Bridge on Interstate-11 (I-11) over the Hoover Dam	This project improved traffic circulation on I-11, which resulted in increased visitation to Willow Beach.	Past
Upgrades to US Highway 93	This project widened US Highway 93 from 2 lanes to 4 improving access to and resulting in increased visitation to Willow Beach.	Past
Low Water Amendment to General Management Plan	Low water conditions could cause visitors that normally visit Temple Bar to switch to Willow Beach. Willow Beach and Temple Bar are 45 minutes (drive) apart, making Willow Beach a reasonable alternative if the boat ramp at Temple Bar is under construction.	Ongoing
Arizona Department of Transportation (ADOT) culvert project	The culverts drain to the wash increasing runoff into the wash and onto the road near the entrance station.	Past

Project	Project Description	Status
Abandonment of Jumbo Wash Campground	The campground was abandoned after a flash flood in 1979, but the road continues to be used to access a network of approved roads, some of which are used by visitors for recreation, including 4-wheel drive use and access to Black Canyon on Lake Mohave. Two transmission lines cross Black Canyon with associated roads that can be accessed via Jumbo Wash Road. The transmission line access roads are minimally maintained when work needs to be done on the line. The other roads are not regularly maintained but would be subject to maintenance if there are significant washouts or become otherwise impassable.	Past/Ongoing
Remodel and construction of facilities at Willow Beach	Upgrades and additions were made to the marina, store, campground, and housing units. Visitation increased as a result of these improvements.	Past/Ongoing

VEGETATION

The vegetation communities along the existing Willow Beach Road and the proposed Jumbo Wash Road, and northern alignment include creosote bush shrubland, semi-desert wash woodland/scrub, and semi-desert scrub shrublands. These three habitats are the most common in Lake Mead NRA, with creosote bush shrubland covering nearly half of the lands within the park (Salas 2016).

Creosote bush shrubland is the dominant habitat within Lake Mead NRA and consists of a sparse to intermittent shrub layer with a sparse to open herbaceous layer and trees are sparse if present. The characteristic species of creosote bush shrubland habitat is creosote bush (*Larrea tridentata*). Other common species in this habitat type include burrobush (*Ambrosia dumosa*) and brittlebush (*Encelia farinosa*) (Salas 2016).

Semi-desert wash woodland/scrub habitat can be found on channel beds and channel bottoms where flooding is infrequent between elevations of 500 to 4,850 feet. This habitat type contains an open to continuous tree canopy with a sparse to continuous shrub understory. The dominant trees species includes desert willow (*Chilopsis linearis*), honey mesquite (*Prosopis glandulosa*), and screwbean mesquite (*Prosopis pubescens*). Shrub species associated with this woodland/scrub habitat are many and can include Mojave rabbitbrush (*Ericameria paniculata*), arrowweed (*Pluchea sericea*), catclaw acacia (*Acacia greggii*), and burrobrush (*Hymenoclea salsola*), in addition to creosote bush (Salas 2016).

Semi-desert scrub shrublands habitat is typically found on rocky slopes and alluvial fans and is located adjacent to creosote bush shrubland in the project area. This habitat is characterized by creosote bush and burrobush. Associated species may include brittlebush (*Encelia farinosa*), Nevada ephedra (*Ephedra nevadensis*), ocotillo (*Fouquieria splendens*), and Andersons wolfberry (*Lycium andersonii*). This habitat has sparse to open shrub and herbaceous layers, typically without a tree layer (Salas 2016; USGS 2015).

The vegetation communities bordering the existing Willow Beach Road include creosote bush shrubland and semi-desert wash woodland/scrub. The Jumbo Wash and northern alignments both contain all three habitats. The vegetation adjacent to the existing Willow Beach Road has been trampled by vehicles leaving the paved roadway, resulting in bare soils adjacent to the roadway. Maintenance activities, such as road repair and cleaning following flood events, also continue to result in vegetation disturbance, as these actions can lead to trampling of plants. Similarly, vegetation in the Jumbo Wash area is sparse, as it has been previously disturbed from use as a campground, an unimproved road, and a maintenance area.

Vegetation Impacts Assessment

Baseline conditions in the project area were determined using maps showing vegetation cover. The analysis of vegetation considered that changes in plant community size, integrity, or continuity could occur as a result of the implementation of the alternatives. In this section, the impacts on vegetation from the three alternatives are analyzed. Construction activities associated with the Jumbo Wash and northern alignment alternatives could cause direct and indirect impacts on the vegetation community through vegetation removal, soil compaction, disturbance, and spread of nonnative species.

Impacts of Alternative 1: No-Action Alternative

Under the no-action alternative, there would be no construction activities, but routine maintenance activities, such as repairing asphalt pavement and clearing the road of debris, would continue. Although existing impacts on vegetation communities would continue, there would be no new impacts within the project area.

Cumulative Impacts: Under the no-action alternative, vegetation within the project area would remain unchanged; therefore, it would not contribute to cumulative impacts when considered with past, present, and reasonably foreseeable future projects occurring at Lake Mead NRA.

Conclusion: Under the no-action alternative, treatment of vegetation would remain the same as current conditions. Vegetation communities within the project area would be unchanged, and the no-action alternative would not contribute to cumulative impacts on vegetation.

Impacts of Alternative 2: Jumbo Wash Alternative

Long-term adverse impacts on vegetation would occur from the rehabilitation of Willow Beach Road between mileposts 0.2 and 2.9 and from the new road alignment from milepost 2.9 to the marina, as vegetation and soils would be permanently removed within the footprint of the road. Approximately 2.7 miles of Willow Beach Road (from milepost 0.2 to milepost 2.9) would remain in its current alignment but would be widened from the current 20- to 21-foot width to 26-feet wide. This is an area of approximately 1.6 to 2.0 acres; however, the construction would only result in direct, permanent impacts to approximately 0.7 acre of desert scrub shrub habitat beyond the existing road, as much of the area adjacent to the road has been previously disturbed from vehicle use. Willow Beach Road currently does not have shoulders and the areas adjacent to the road have been disturbed by vehicles that leave the roadway, resulting in areas of unvegetated soil adjacent to the existing road. The realignment of the remainder of Willow Beach Road (from milepost 2.9 to the marina) to relocate the road from the narrow canyon would require vegetation removal and disturbance from cut and fill along the realignment route. Nearly half of the 1.2-mile new alignment would lie in previously disturbed areas associated with Jumbo Wash and would therefore not have an impact on vegetation. The realignment would result in direct impacts to approximately 9.5 acres of vegetation. Of this total, 2.6 acres would be permanent from the placement of the new road, and the remaining 6.9 acres in areas of cut and fill would be rehabilitated and revegetated following construction.

Short-term adverse impacts to vegetation and soils adjacent to the road footprint would occur during construction activities from trampling and compaction. Assuming a 50-foot buffer on either side of the construction footprint for the rehabilitation portion of the project, an additional 32.7 acres of vegetation could be indirectly impacted. Most work for the realignment portion of the Jumbo Wash alternative would occur within the direct limit of disturbance; however, a buffer of 20 feet was used to account for any indirect impacts from use of construction equipment. The realignment would result in an additional 2.4 acres of indirect impacts on vegetation. Impacts within these buffers would be from potential trampling of

vegetation and compaction of soils. Compacted soils often become devoid of vegetation, as the soil's ability to hold and conduct water, nutrients, and air necessary for plant root growth is affected (UM 2018). Soil compaction can also increase erosion, which removes topsoil, reduces levels of soil organic matter, and contributes to the breakdown of soil structure (USDA 1996). Staging areas would be approximately 3.0 acres, but they would be located in previously disturbed areas within Jumbo Wash and would not result in impacts to vegetation.

During construction activities, plants and topsoil would be salvaged and plant seeds would be collected by the park to be used to restore areas that were temporarily disturbed during construction, helping to stabilize soils and reduce impacts from construction activities. Disturbed areas include cut and fill areas associated with the realignment portion of the Jumbo Wash alternative and the buffers used for movement of equipment during construction. Once construction of the new alignment from milepost 2.9 to the marina is complete, the existing portion of Willow Beach Road through the narrow canyon (approximately 1.2 miles and 3.0 acres) would be demolished and the asphalt would be removed. The roadbed and additional areas adjacent to the existing Willow Beach Road that have been disturbed from vehicles pulling off of the road would be de-compacted, restored, and maintained in natural conditions, resulting in a beneficial impact on the vegetation communities within the project area. Vegetation removal and soil disturbance could facilitate the spread of nonnative invasive plant species, ultimately altering vegetation communities. To minimize the risk of invasive species being introduced or spread, all construction vehicles would be washed and inspected prior to use in the project area, and restored areas would be monitored and managed for the control of invasive species following revegetation efforts.

Although individual plants could be lost, the Jumbo Wash alternative would not have population-level impacts. The majority of the project area has been previously disturbed, and the desert scrub shrub habitats present in the project area are the most common in the park. The impacts from the Jumbo Wash alternative would affect a small portion of similar habitat that is available throughout the park.

Cumulative Impacts: Past and present projects presented in table 1 that would affect vegetation include those that allow for increased visitation at the Willow Beach area—upgrades to US Highway 93, the bridge on I-11 over the Hoover Dam, construction at the Willow Beach Marina, and low water conditions. The road upgrades improved circulation to the roads leading to the Willow Beach area, the facility upgrades at Willow Beach attracted visitors, and low water conditions at Temple Bar could cause visitors to use the water access at Willow Beach. This increase in visitation, and thus vehicles, could cause long-term adverse impacts on vegetation from trampling along Willow Beach Road. The Jumbo Wash alternative would also result in adverse impacts on vegetation, but the incremental impacts of this alternative would not make a substantial contribution to the impacts on vegetation that already occurred.

Conclusion: The Jumbo Wash alternative would require the removal of vegetation to complete construction activities to rehabilitate and realign Willow Beach Road within the project area. Creosote bush shrubland, semi-desert wash woodland/scrub, and semi-desert scrub shrublands vegetation within an area of approximately 3.3 acres would be subject to permanent removal and an additional 27.0 acres would be susceptible to indirect, temporary impacts from trampling during construction activities. Following construction, disturbed areas associated with construction activities and approximately 1.2 miles (3.0 acres) of the existing road currently located in the narrow canyon would be removed and the area would be revegetated with soils and plants salvaged during construction. Vegetation clearing could have an impact on individual plants but would not have population-level effects. When considering the small amount of area that would be impacted and the area that would be restored, the impacts that would result from the Jumbo Wash alternative are minimal. The Jumbo Wash alternative would not substantially contribute to cumulative adverse impacts on vegetation.

Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative

The northern alignment alternative would result in long-term adverse impacts on vegetation within the project area. Widening of the existing portion of Willow Beach Road between mileposts 0.2 and 0.8 would result in a permanent loss of approximately 0.6 acre of habitat. The areas adjacent to the existing road have been previously disturbed from vehicles leaving the roadway; therefore, widening the road in this area would result in removal of approximately 0.2 acre of established vegetation. The realignment of the road between mileposts 0.8 and 3.0 (of the new northern alignment) would occur within habitats that have not been recently disturbed and would require permanent removal of approximately 9.0 acres of vegetation. At the western end of the project area, the northern alignment would tie into the road leading to the campground and the marina. In this area, approximately 0.3 acre of vegetation would be removed to construct the northern alignment alternative. Overall, the northern alignment alternative would result in the permanent removal of approximately 9.5 acres of established vegetation from the placement of new pavement within the project area. Constructing the new road along the northern alignment would require vegetation removal and disturbance from cut and fill, resulting in temporary removal of approximately 29.3 additional acres of vegetation. Beyond the direct construction footprint, a 20-foot buffer was assumed that would capture any short-term, indirect impacts on vegetation from movement of construction equipment. Vegetation within this buffer (approximately 6.9 acres) would not be removed but could be affected by trampling and soil compaction, as discussed for the Jumbo Wash alternative.

Once construction of the new alignment is complete, the existing portion of Willow Beach Road between mileposts 0.8 and 3.9 would be demolished and the asphalt removed. The disturbed area along this alignment (approximately 7.5 acres) would be restored and maintained in natural conditions, resulting in a beneficial impact. Areas temporarily affected along the new alignment (cut and fill areas and buffers) would also be restored following construction. Plants and topsoil salvaged from the construction area, along with seeds collected by park staff, would be used to restore disturbed areas and stabilize soils. Restoration efforts would result in the restoration of approximately 36.2 acres. Following revegetation, the restored areas would be monitored and managed to prevent colonization by nonnative invasive species. Although the maintenance area in the Jumbo Wash area would not be formally restored, the area would be allowed to restore naturally, representing another 2.8 acres that would not be continually disturbed. To reduce the potential for colonization and spread of invasive species, all construction vehicles would be washed and inspected prior to use in the project area, and restored areas would be monitored and managed for the control of invasive species following revegetation efforts.

The northern alignment alternative would result in the loss of individual plants, but as the affected vegetation communities are common throughout the park, the amount of permanent loss would not represent population-level impacts.

Cumulative Impacts: As discussed under the Jumbo Wash alternative, those past and present projects that allow for increased visitation could present an adverse impact on vegetation within the project area—upgrades to US Highway 93, the bridge on I-11 over the Hoover Dam, construction at the Willow Beach Marina, and low water conditions. The northern alignment alternative would also result in adverse impacts on vegetation, but the incremental impacts of this alternative would not make a substantial contribution to the impacts on vegetation that already occurred.

Conclusion: The northern alignment alternative would require the removal of vegetation to complete construction activities to rehabilitate and realign Willow Beach Road within the project area. Construction activities would result in the permanent removal of approximately 9.5 acres of creosote bush shrubland, semi-desert wash woodland/scrub, and semi-desert scrub shrublands vegetation, and an additional 36.2 acres would directly and indirectly be impacted from removal and trampling, respectively, during construction activities, though these impacts would be temporary. Restoration activities would reestablish

vegetation in the 36.2 acres disturbed during construction, as well as the 7.5 acres located in the existing Willow Beach Road alignment that would be removed following construction. Further, the former maintenance area in Jumbo Wash would be abandoned and allowed to naturally recover. Rehabilitation and realignment of Willow Beach Road along the northern alignment would affect a small amount of vegetation compared to the amount of the communities available within the park. The northern alignment alternative would not result in population-level impacts on these communities and would not contribute significantly to the cumulative adverse impacts on vegetation in the park.

WILDLIFE

The ecosystems of Lake Mead NRA provide habitat for a diversity of animal species, including over 400 confirmed species of amphibians, reptiles, birds, mammals, and fish (NPS 2019b). The desert scrub/shrub habitats present at the project site provide cover and food for a variety of small mammals, reptiles, and birds. Common mammals include coyote (*Canis latrans*), bobcat (*Lynx rufus*), desert bighorn sheep (*Ovis canadensis nelsoni*), black-tailed jackrabbit (*Lepus californicus*), desert woodrat (*Neotoma lepida*), and little pocket mouse (*Perognathus longimembris*); and common reptiles found in desert scrub/shrub include coachwhip (*Masticophis flagellum*), desert iguana (*Dipsosaurus dorsalis*), common side-blotched lizard (*Uta stansburiana*), zebra-tailed lizard (*Callisaurus draconoides*), and Mojave rattlesnake (*Crotalus scutulatus*) (Wrangle 2019). The sparse vegetation in the project area is used by a variety of birds including Gambel's quail (*Callipepla gambelii*), greater roadrunner (*Geococcyx californianus*), phainopepla (*Phainopepla nitens*), and black-tailed gnatcatcher (*Poliophtila melanura*) (Cornell 2019). All of these species are common breeding species in the park (NPS 2019b).

Wildlife Impacts Assessment

Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and ecological integrity of plants and animals (NPS 2006). The desert scrub shrub communities at Lake Mead NRA provide important habitat for wildlife, and construction activities could impact wildlife by disturbing breeding, feeding, and other behaviors. This analysis on wildlife considered the changes and disturbance on wildlife habitat, wildlife species, and the natural processes sustaining them that would occur as a result of the implementation of the alternatives. The impacts on wildlife were analyzed qualitatively.

Impacts of Alternative 1: No-Action Alternative

There would be no construction under the no-action alternative and the existing Willow Beach Road would remain in its current alignment and condition. Park staff, visitor, and concessioner activities would continue, similar to current conditions, which can impact wildlife through occasional disturbance. Under this alternative, no additional impacts on wildlife would occur.

Cumulative Impacts: Under the no-action alternative, wildlife within the project area would remain unchanged; therefore, it would not contribute to cumulative impacts when considered with past, present, and reasonably foreseeable future projects occurring at Lake Mead NRA.

Conclusion: The no-action alternative would not result in any new impacts on wildlife. No construction work would be undertaken, and wildlife could continue to use the habitats within the project area. The no-action alternative would not contribute to cumulative impacts on wildlife.

Impacts of Alternative 2: Jumbo Wash Alternative

Under the Jumbo Wash alternative, construction activities have the potential to impact wildlife found in the project area through direct injury or mortality, loss of habitat, and construction noise. The road improvements under the Jumbo Wash alternative would occur largely in previously developed areas, rather than disturbing or fragmenting portions of continuous, undisturbed habitat. The habitat in the project area is not high quality, as it is already disturbed and fragmented from the existing road, but it is inhabited with species common to desert scrub shrub habitat.

The Jumbo Wash alternative would result in long-term adverse impacts on wildlife from the permanent loss of approximately 3.3 acres of desert scrub shrub habitat adjacent to the existing road and in the new alignment. Additionally, vegetation removal and soil disturbance could facilitate the spread of nonnative invasive plant species, ultimately degrading the habitat for wildlife. To minimize the risk of invasive species being introduced or spread, all construction vehicles would be washed and inspected prior to use in the project area, and restored areas would be monitored and managed for the control of invasive species following revegetation efforts.

The more mobile species, such as birds, reptiles, and larger mammals would be displaced upon the onset of vegetation removal and would likely avoid areas of active construction to avoid construction noise and equipment. These mobile species would also be able to avoid injury and mortality by fleeing the construction area. Less mobile species, such as some invertebrates or small mammals in burrows, could be injured or killed from construction activities. Although some individuals could be lost, the impacts are expected to be adverse but negligible, as the impacts are localized and would not have population-level effects. The portion of Willow Beach Road realigned through Jumbo Wash would be elevated to avoid potential flooding in Jumbo Wash. Although the habitat in Jumbo Wash is lower quality due to being previously developed and continually disturbed by visitor and vehicle activity, the elevated roadway could act as a barrier to some smaller wildlife species, reducing available habitat and access to resources. This loss of connectivity would constitute a small impact to some individuals but is not expected to result in population-level impacts.

After construction, all materials would be removed from the project area and the site would be prepared for revegetation. Desert habitats are generally slow to recover following disturbance, but to facilitate revegetation, soils and vegetation removed for construction would be salvaged and used for restoration efforts. The existing portion of Willow Beach Road between milepost 2.9 and the marina would be removed and revegetated, resulting in additional habitat for wildlife. Wildlife would be expected to begin to use the project area after construction activities are complete and the area has been replanted with vegetation.

When considering the adverse and beneficial impacts of the Jumbo Wash alternative, the loss of existing habitat would be approximately equal to the habitat that would be created by removing and rehabilitating a portion of the existing road.

Cumulative Impacts: The projects that allow for greater visitation to the Willow Beach area (upgrades to US Highway 93, the bridge on I-11 over the Hoover Dam, construction at the Willow Beach Marina, and low water conditions) cause a long-term adverse impact on wildlife from disturbance from the presence and noise of visitors and vehicles. Visitors have been using the Willow Beach area since the 1950s and wildlife that occur in habitats adjacent to Willow Beach Road are likely habituated to visitor traffic. The impacts on wildlife from the Jumbo Wash alternative would not make a substantial contribution to the impacts on wildlife that are already occurring from the other past and ongoing projects.

Conclusion: The Jumbo Wash alternative would involve construction activities that could cause disturbance to wildlife, including vegetation removal, noise impacts, the potential for harm from the use of heavy equipment in the project area, and loss of habitat connectivity in Jumbo Wash from construction of an elevated roadway. Construction activities would be localized and temporary, and best management practices and measures would be taken to ensure that impacts on wildlife are minimized. Implementation of the Jumbo Wash alternative would not result in population-level effects for wildlife in the project area. When considering the overall amount of desert scrub shrub habitat present in the park, the impacts would affect a small portion of this habitat. Overall, the Jumbo Wash alternative would not substantially contribute to the adverse cumulative impacts on wildlife.

Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative

Construction activities of the northern alignment alternative have the potential to impact wildlife through direct injury or mortality, loss of habitat, and construction noise.

Although portions of this alternative occur in previously developed areas (existing Willow Beach Road in the eastern portion of the alignment and the marina and campground in the western portion), the realignment portion of the road would occur in undisturbed desert scrub shrub habitat. The realignment of Willow Beach Road along a ridgeline would permanently remove approximately 9.0 acres of vegetation and would bisect previously undeveloped habitat. This habitat lies between US Highway 93 and the Willow Beach Marina and approximately 0.5 mile north of the existing Willow Beach Road, so although the habitat is undeveloped, it is influenced by surrounding human activity and wildlife species in this area are likely habituated to human noise and activity.

Impacts to wildlife within the project area would be similar to those discussed for the Jumbo Wash alternative. The road would fragment the habitat within the project area, but unlike the Jumbo Wash alternative, the roadway under the northern alignment alternative would not be elevated and would allow most species to cross and gain access to adjacent habitat. Since the habitats affected are the most common throughout the park, population-level impacts are not expected for any species.

Following construction of the new alignment, the asphalt of approximately 3.1 miles of the existing Willow Beach Road would be removed and the area (approximately 7.5 acres) restored to natural conditions, as discussed for the Jumbo Wash alternative, providing additional habitat for wildlife species. Currently bisected habitat within the project area would be connected by these efforts. Other mitigation efforts include abandoning the maintenance yard at Jumbo Wash and allowing it to naturally revegetate and washing and inspecting construction vehicles to reduce the opportunity for invasive species to become established in the project area, which could lead to altered habitat conditions. To reduce the potential for colonization and spread of invasive species, and thus habitat degradation, all construction vehicles would be washed and inspected prior to use in the project area, and restored areas would be monitored and managed for the control of invasive species following revegetation efforts.

The northern alignment alternative would have both adverse and beneficial impacts on wildlife. A portion of undisturbed habitat would be fragmented, and wildlife could be affected during construction; however, a previously developed portion of the project area would be restored to natural conditions. The amount of restored habitat (10.3 acres) would be greater than the amount of habitat removed (9.5 acres), resulting in an overall beneficial impact for wildlife.

Cumulative Impacts: As discussed under the no-action alternative, the projects that allow for greater visitation to the Willow Beach area (upgrades to US Highway 93, the bridge on I-11 over the Hoover Dam, construction at the Willow Beach Marina, and low water conditions) result in a long-term adverse impact on wildlife from disturbance from the presence and noise of visitors and vehicles. Visitors have

been using the Willow Beach area since the 1950s and wildlife that occur in habitats adjacent to Willow Beach Road are likely habituated to visitor traffic. The impacts on wildlife from the northern alignment alternative would not make a substantial contribution to the impacts on wildlife that are already occurring from the other past and ongoing projects.

Conclusion: The northern alignment alternative would result in both adverse and beneficial impacts on wildlife within the project area. Approximately 9.5 acres of habitat would be removed and replaced with asphalt for the new Willow Beach Road; a majority of this acreage would occur in an area that has not been previously developed, bisecting the habitat. In contrast, approximately 3.1 miles of the existing Willow Beach Road would be removed from the project area and the habitat would be restored (approximately 7.5 acres), connecting previously bisected habitat, and an additional 2.8 acres in the Jumbo Wash area would be allowed to naturally revegetate. The Willow Beach area has been a popular visitor destination for many decades, and wildlife in this area is likely habituated to typical human noise and activities. Although some wildlife would be affected during construction, the impacts from the northern alignment alternative would not result in population-level effects for wildlife in the project area, and the impacts would affect a small portion of desert scrub habitat compared to the extent of the habitat available in the park. When considered with other past and present projects that have an effect on wildlife, the northern alignment alternative would not contribute substantially to adverse impacts.

ARCHEOLOGICAL RESOURCES

A cultural resources survey was completed in December 2018 for the Jumbo Wash alignment area (PaleoWest Archaeology 2019). The survey relocated two previously recorded archeological sites, and three newly discovered isolated occurrences were identified and recorded. None of these sites or isolated occurrences were determined to be eligible for listing in the NRHP. A second cultural resources survey was conducted in August of 2020 on the proposed northern alignment area (PaleoWest, Addendum, 2020). This survey area comprised a 3.2 mile by 250-foot wide corridor, encompassing 99 acres. This survey identified two new archeological sites. One site is a prehistoric trail that is recommended eligible for listing in the NRHP. The trail likely indicates that the area was used by prehistoric/protohistoric groups as they traveled to and from the Colorado River. The other site is a cleared area with an artifact that is recommended as not eligible for inclusion in the NRHP.

Archeological Resources Impacts Assessment

Impacts of Alternative 1: No-Action Alternative

Under the no-action alternative, the current roads at the park would remain unchanged. Operations and maintenance activities would continue. Archeological resources may be inadvertently unearthed, trampled, or removed. However, there would be no new impacts on archaeological resources.

Cumulative Impacts. Under the no-action alternative, there would be no direct or indirect impacts; therefore, there would be no cumulative impacts on historic properties.

Conclusion. The no-action alternative would not contribute to direct, indirect, or cumulative impacts on archaeological resources.

Impacts of Alternative 2: Jumbo Wash Alternative

Under the Jumbo Wash alternative, an analysis of the area of potential effects and evaluation of the project scope determined that there would be no adverse effect to archeological resources. The National Park Service sent a letter to the Arizona SHPO on August 9, 2019, initiating consultation with a request to

review the cultural resource report and provide concurrence on the NPS determination of no adverse effect. The SHPO provided concurrence on this determination on August 21, 2019. The National Park Service also sent letters to all affiliated tribes on August 12, 2019, requesting concurrence on the NPS determination. No responses were received from the tribes.

Cumulative Impacts. Past and present projects presented in table 1 that could have an effect on historic properties, particularly archeological resources include those that allow for increased visitation at the Willow Beach area and ground disturbing activities. The various road upgrades, improved circulation to the roads leading to the Willow Beach area, the facility upgrades at Willow Beach attracted visitors, and low water conditions at Temple Bar could cause visitors to use the water access at Willow Beach. This increase in visitation, and thus vehicles, could cause long-term adverse impacts on archeological resources from trampling along Willow Beach Road. Ground disturbance from construction could also damage or destroy archeological sites. Under the Jumbo Wash alternative, there would be no direct or indirect impacts; therefore, there would be no cumulative impacts on historic properties.

Conclusion. There are no known eligible archaeological resources within the area to be disturbed by this alternative. There would be no adverse effect on archaeological resources. Therefore, the Jumbo Wash alternative would not contribute to direct, indirect, or cumulative impacts on historic properties.

Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative

An analysis of the area of potential effects and evaluation of the northern alignment alternative determined that there would be an adverse effect to the archeological site. The proposed northern alignment would be constructed in the same alignment as the prehistoric trail. Avoidance would not be possible. The National Park Service will continue consultation with the Arizona SHPO and tribes under section 106 of the National Historic Preservation Act of 1966 for this alternative and adverse effects to the newly discovered archaeological site. Further, archeological monitoring during construction and data recovery for inadvertent discoveries would be conducted to ensure additional artifacts and information/data are not inadvertently impacted.

Cumulative Impacts. Past and present projects presented in Table 1 that could have an effect on archeological resources include those that allow for increased visitation at the Willow Beach area and ground disturbing activities. The various road upgrades, improved circulation to the roads leading to the Willow Beach area, the facility upgrades at Willow Beach attracted visitors, and low water conditions at Temple Bar could cause visitors to use the water access at Willow Beach. This increase in visitation, and thus vehicles, could cause long-term adverse impacts on archeological resources from trampling along Willow Beach Road. Ground disturbance from construction could also damage or destroy archeological sites. The northern alignment alternative would also result in adverse impacts on an archeological site. Overall, the incremental impacts of the northern alignment alternative would contribute, but not make a substantial contribution, to the impacts on archeological resources that are already occurring from the other past and ongoing projects.

Conclusion. Implementation of the northern alignment alternative would result in damage or destruction of an archeological site (a prehistoric trail). The loss of this archeological resource may be mitigated by recording and data recovery. This mitigation would contribute to the understanding and knowledge of the prehistoric environment and these types of archeological sites. Therefore, the impacts from the northern alignment alternative would be long-term and adverse but would not be substantial in the overall understanding of prehistoric populations in the region.

VIEWSHEDS

Willow Beach Road is a 20- to 21-foot wide asphalt road that extends 4.63 miles from US Highway 93 to the Willow Beach Marina and fish hatchery. The road takes visitors through an area dominated by sparsely vegetated shrublands covering low, rocky hills with views of the El Dorado Mountains in the background (figure 10). Because the desert vegetation tends to be low and sparse, and the air generally clear, the viewsheds for visitors should be long distances, but Willow Beach Road runs through the lower elevations of the hills and washes, thereby obstructing long vistas.



Figure 10. Typical View along Willow Beach Road

With narrow, graded shoulders, there are few opportunities for visitors to pull over to take in the views; however, Jumbo Wash Road, which intersects with Willow Beach Road, has both paved and unpaved portions that allow visitors to exit their vehicles. Willow Beach Road leads to the Willow Beach Marina, which is a developed area with parking lots, picnic pavilions, boat slips, and concessioner services (restaurant and gift shop). The blue waters of the Colorado River contrast with the surrounding desert landscape; however, the river is not visible until visitors arrive at the developed area due to the elevation of the hills surrounding Willow Beach Road.

There are two scenic viewing areas (Willow Beach Scenic View and Lake Mead Scenic View) along US Highway 93 approximately 1.5 miles north of the Willow Beach Road intersection, and approximately 2.2 miles “as the crow flies” to Willow Beach Marina. There is a very limited view of the lake and marina in the distant background from these viewpoints (figure 11).



Figure 11. View from Willow Beach Scenic Viewing Area toward Willow Beach Marina
(Source: Shutterstock.com)

Viewsheds Impacts Assessment

Parks present a landscape and ambiance generally associated with remoteness, natural beauty, setting, and tranquility. Human-related activities such as infrastructure development, while necessary, can introduce distraction for recreation users ranging from barely perceptible to inharmonious.

The visual character of the project area environment is a function of both the natural and manmade landscape features that make up a view and is influenced by geologic, hydrologic, botanical, wildlife, recreational, and cultural features. Impacts to the visual landscape could include change in size, area, and type of landform, vegetation patterns and density, waterbody characteristics, and culturally sensitive structures and features. This assessment considers visual disturbances and changes from project-related activities during and after construction to the viewshed from the road and the reservoir of the surrounding landscape. Mitigation measures to lessen visual impacts are provided in chapter 2.

Impacts of Alternative 1: No-Action Alternative

Views along Willow Beach Road would remain unchanged under the no-action alternative. There would be no new effects to views along the road or at the marina as a result of the no-action alternative, as no construction activities or re-alignment would occur.

Cumulative Impacts: Past upgrades of US Highway 93 and the ADOT culvert project increased the visibility of US Highway 93 and the culvert from Willow Beach Road by enlarging the already existing size of the man-made structures and disturbance to the viewshed. This has resulted in long-term, adverse effects to the viewsheds from Willow Beach Road. The improvements and construction at Willow Beach marina occurred in an area that already contained many man-made facilities. The topography obscures the view in many locations and the materials used for these projects blend with the natural colors; therefore, the impacts are minimal. Other cumulative projects are not visible or have no effect on the viewshed along Willow Beach Road. Since no construction activities or realignment would occur under this alternative, the no-action alternative would not contribute to cumulative impacts.

Conclusion: There would be no effects to the existing aesthetics in the Willow Beach Road or Marina area, as a result of the no-action alternative. The overall visual impacts from past, present, and reasonably foreseeable future actions would be long term and adverse; however, these changes would not represent a noticeable change to the traveling public. The no-action alternative would not contribute to the overall visual impacts.

Impacts of Alternative 2: Jumbo Wash Alternative

The project area is primarily used for access to the recreational facilities and the lake at the end of Willow Beach Road, not for its scenic viewshed along the travel route. During construction activities, views could be impacted by the presence and movement of construction equipment; however, visitors would continue to move through the active construction areas to reach the lake. Fugitive dust emissions from construction activities may also affect viewing by creating dust plumes; however, these emissions would be mitigated by spraying the affected areas with water during construction. Dust plumes, construction equipment, and associated sights (e.g., fencing, traffic cones) would also be able to be seen by visitors on and near the lake and in the picnic areas during certain times of the construction.

Over the long term, the Jumbo Wash alternative would add two new bridges into the landscape and increase the width of the road. Although visible to most visitors traveling the road, the bridges and associated MSE retaining walls would be designed to blend with the natural surroundings, reducing their visual intrusion. The bridges would be visible to visitors recreating on land in the vicinity of Willow Beach Marina, Jumbo Wash Road, and from the lake; however, these areas already contain many man-made buildings and structures and do not represent a natural setting. New structures would be compatible in use, color, texture, scale, and materials with the existing environment. The visual impacts from construction and the installation of the bridges would persist as long as the bridges exist, and therefore, long term. However, from the scenic view area along US Highway 93, changes to the landscape at this distance would not alter the overall visual quality. The landscape would remain dominant.

Cumulative Impacts: As, stated above, past upgrades of US Highway 93, construction at the Willow Beach Marina, and the ADOT culvert project resulted in long-term and adverse effects to the viewsheds from Willow Beach Road. The Jumbo Wash alternative would contribute additional adverse impacts to the cumulative impacts but would not increase the overall cumulative impacts to the visual landscape.

Conclusion: The visual impacts from construction and the installation of bridges would be short and long term and adverse from the addition of new structures in the natural environment. The Jumbo Wash alternative would contribute to the overall cumulative impacts; however, this alternative would not substantially add to the cumulative impacts on viewsheds already occurring from past and ongoing projects.

Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative

During construction of this alternative, the existing Willow Beach Road would continue to be used for access to the marina and campground. The view near the new alignment would be impacted by the presence and movement of construction equipment; however, visitors would continue to move away from the active construction areas shortly after accessing the road. Fugitive dust from construction activities may affect viewing by creating dust plumes; however, these emissions would be mitigated by spraying the affected areas with water during construction. Dust plumes, construction equipment, and associated sights (e.g., fencing, traffic cones) would also be able to be seen by visitors on and near the lake and in the picnic areas during certain times of the construction.

After construction is complete, additional man-made structures would be established in the natural environment. However, the road would be designed to blend into the landscape as much as possible. New structures would be compatible in use, color, texture, scale, and materials with the existing environment. The new alignment would provide new opportunities for visitors to enjoy the views from a high vantage along the ridge. Pullouts would be provided so that visitors can take in the views of the surrounding desert landscape and river prior to reaching the developed area. Views at the marina would continue to be of the developed area with parking lots, picnic pavilions, boat slips, and concessioner services (restaurant and gift shop).



Figure 12. View of Marina from Northern Alignment

The new alignment, located on top of a ridge, would be more visible to the traveling public on Highway 93. However, changes to the landscape along Highway 93, at this distance, would not alter the overall visual quality. The visual impacts during construction would be short-term, direct, and would only be noticed close to the existing road or from dust plumes in the distance. In the long-term, the effects to the viewshed would be both adverse and beneficial. The landscape would remain dominant.

Cumulative Impacts: As, stated above, past upgrades of US Highway 93, construction at the Willow Beach Marina, and the ADOT culvert project resulted in long-term and adverse effects to the viewsheds from Willow Beach Road. The northern alignment alternative would contribute additional adverse impacts to the cumulative impacts but would not increase the overall cumulative impacts to the visual landscape.

Conclusion: The visual impacts from construction of the new alignment would be short and long term and adverse from the addition of new structures in the natural environment, and beneficial by allowing for additional viewing opportunities. The northern alignment alternative would contribute to the overall cumulative impacts; however, this alternative would not substantially add to the cumulative impacts on viewsheds already occurring from past and ongoing projects.

FLOODPLAINS

Natural values of floodplains contribute to ecosystem quality, including groundwater recharge, water quality maintenance, erosion control, biological productivity, fish and wildlife habitats, recreational opportunities, as well as societal resources, such as harvest of agricultural, aquacultural, and forest products, and scientific study (Wright 2007). In the park, floodplains serve to slow and store water during flooding and washes serve as a recharge route to the underground aquifer.

A formal floodplain delineation has not been performed in the Willow Beach area; however, for purposes of this analysis, the 100-year floodplain was delineated from a two-dimensional hydraulic model. In the project area, the area subject to a 1% or greater annual chance of flooding in any given year is associated with Jumbo Wash, a large ephemeral wash that flows into the Colorado River, and the narrow canyon through which Willow Beach Road currently passes (figure 13). The floodplain within the project area associated with Willow Beach Road encompasses approximately 250 acres, and Willow Beach Road currently represents approximately 10 acres of impervious surface within the floodplain. Also present within the floodplains are the lands adjacent to Willow Beach Road, Jumbo Wash Road (a dirt road), and the area associated with the abandoned campground, which are previously disturbed, mostly devoid of vegetation, and compacted from vehicle use.

Floodplains Impacts Assessment

Executive Order 11990 “Protection of Wetlands” and Executive Order 11988, “Floodplain Management” direct all federal agencies to avoid, to the extent possible, both long- and short-term adverse impacts to wetlands and floodplains, respectively. All federal agencies are required to avoid building permanent structures within the 100-year floodplain unless no other practical alternative exists. In the absence of such alternatives, agencies must modify actions to preserve and enhance floodplain and wetland values and minimize degradation. The project area is located within the 100-year floodplain associated with Jumbo Wash and the narrow canyon through which Willow Beach Road travels, both of which flow into the Colorado River. A draft floodplains statement of findings has been prepared for this project and is included as appendix A.

Impacts of Alternative 1: No-Action Alternative

Under the no-action alternative, Willow Beach Road would continue to be used by visitors in its current location with no planned management changes. The impacts on floodplains from the road under the no-action alternative would continue; however, the floodplain would continue to slow and retain floodwaters and to recharge the underlying aquifer.

Cumulative Impacts: Jumbo Wash Road would continue to have adverse effects on floodplains as visitors would continue to use the road for 4-wheel drive recreation and access to other areas. This use continues to compact the soils of Jumbo Wash, reducing the potential for water infiltration and therefore increasing run-off into streams and rivers. Portions of the improvement and construction at the Willow Beach Marina occurred within the floodplain. The expansion of the marina resulted in adverse impacts from placement of footers in the Colorado River, but construction of the facilities occurred within a previously developed portion of Willow Beach. Under the no-action alternative, impacts on floodplains within the project area would remain unchanged and would not contribute to cumulative impacts when considered with past, present, and reasonably foreseeable future projects occurring at Lake Mead NRA.

Conclusion: There would be no additional adverse effect to the 100-year floodplain under the no-action alternative because existing conditions would remain unchanged.

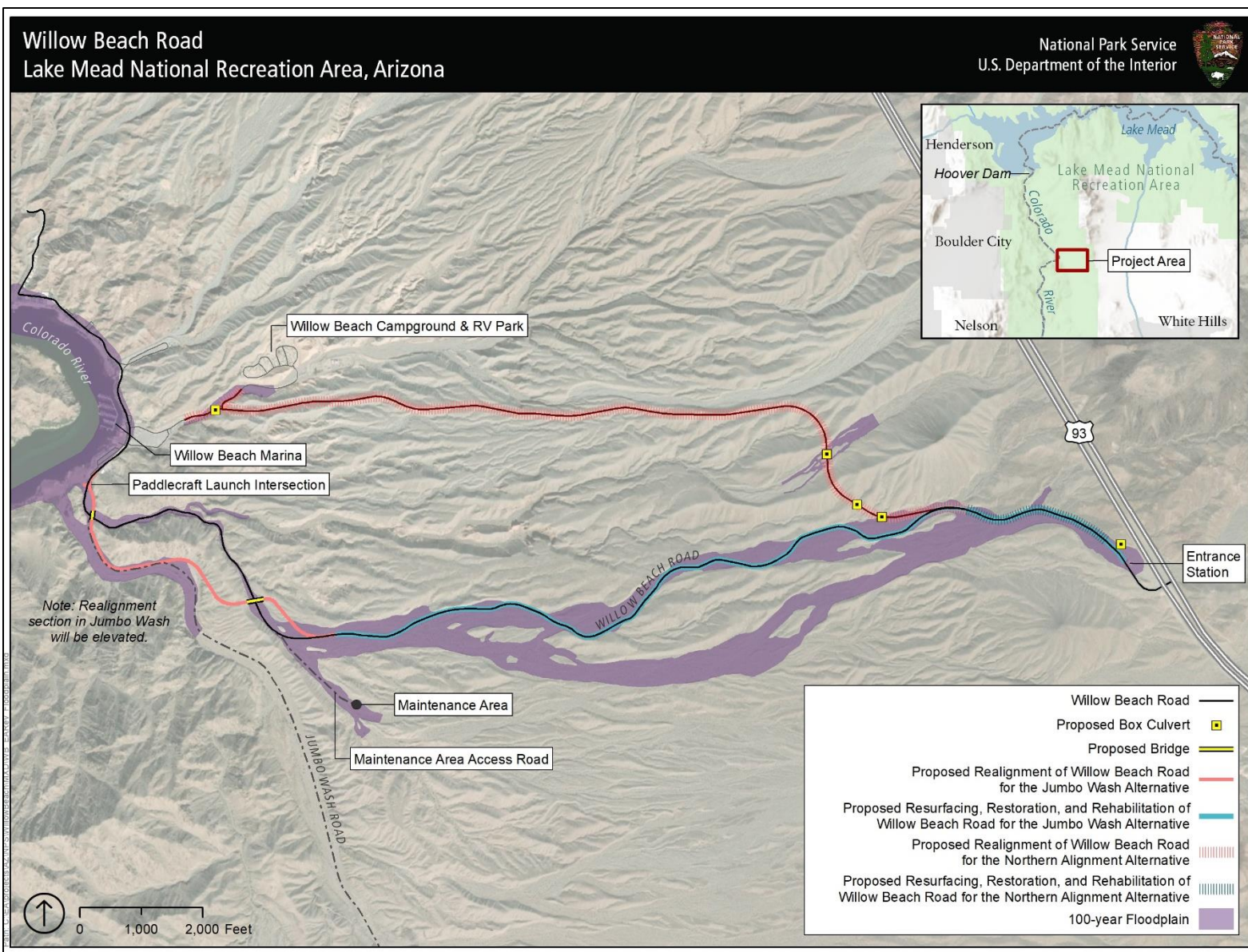


Figure 13. Floodplain in the Project Area

Impacts of Alternative 2: Jumbo Wash Alternative

The Jumbo Wash alternative would require construction within the floodplain in the project area. Improvement of the existing road would require widening the road to 26-feet wide for approximately 2.7 miles in the floodplain, increasing impervious surface in this area by approximately 2.0 acres and representing a long-term adverse impact on floodplains. Assuming a 50-foot buffer on either side of the road in this area, the Jumbo Wash alternative would result in approximately 26.9 acres of additional temporary impacts on floodplains due to trampling of vegetation and soil compaction from use of construction equipment; however, following construction, the area within the construction buffer would be de-compacted and revegetated, and would not result in long-term impacts on the floodplain.

Approximately 0.2 mile of the realignment portion of the road would be in floodplain associated with the narrow canyon prior to the first bridge; this portion of the realignment would occur in an area that has not been previously disturbed. The first bridge would span the narrow canyon where Willow Beach Road currently lies but would require some cuts into rock material and placement of footings for structural support within the floodplain. The footings would replace soil with fill and increase impervious surface in the floodplain. Beyond the bridge, approximately 0.4 mile of the realignment portion of the Jumbo Wash alternative would be in the floodplain within Jumbo Wash. However, Jumbo Wash has been previously disturbed from the previous campground that was located there and continued vehicular use by park staff and visitors. The second bridge would also span the narrow canyon with footings, and therefore fill, in the floodplain; rock cuts would also be required for this bridge. The road would extend beyond the bridge to connect to the parking lot and developed area at the Willow Beach Marina; this portion represents an additional 0.1 mile in the floodplain. The new road alignment would result in approximately 6.8 acres of direct impacts on the floodplain in the project area; approximately 2.0 acres would be from the addition of impervious surface in the form of a 26-foot wide road and the remaining 4.8 acres would result from cut and fill needed to construct the road and bridges. Most work for the road realignment portion of the Jumbo Wash alternative would occur within the direct limit of disturbance; however, a buffer of 20 feet beyond the cut and fill of the road was used to account for any indirect impacts from use of construction equipment. An additional 2.6 acres of indirect impacts on the floodplain would occur from the buffer on either side of the road for construction.

Construction of the realigned portion of Willow Beach Road would require cut and fill within the floodplain. The cut and fill required for construction could alter the natural characteristics and functions of the floodplain, such as providing areas of floodwater storage, reducing flood velocities, and promoting infiltration and recharge of the aquifer. The placement of fill for bridge footings and the asphalt road would obstruct floodflows and reduce floodwater storage and conveyance. However, as mentioned, the majority of the road would be placed in previously disturbed areas where the floodplain is currently being impacted by soil compaction from continuous vehicle use. Approximately 0.6 acre of direct impacts and 0.4 acre of indirect impacts would occur in an area where the floodplain has not been previously disturbed by placement of impervious surface or compacted earth from vehicle use; this is in the area between the improvement portion of the road and the first bridge. Placement of an elevated road within the floodplain would create minor restrictions to floodflows; however, the design of the realigned roadway works with the natural flow channel and minimizes disruption of the natural drainage.

The elevations for 5-year, 10-year, 25-year, 100-year and 500-year storm events were estimated using a two-dimensional hydraulic model to determine potential risk of roadway flooding. For the smaller, more frequent storms (5-year and 10-year storm events), the flood elevations would not reach the limit of the new road alignment through Jumbo Wash. By incorporating some additional improvements along the berm through Jumbo Wash, water from a 25-year flood event would also be contained below the elevation of the road. For 100-year and 500-year storm events, the elevation of Willow Beach Road

through Jumbo Wash would be higher than the estimated flood elevations for the majority of the alignment; however, there would be a short distance of less than 0.1 mile that would be approximately 1.4 to 4.8 feet below the estimated 100-year flood elevation and 2.8 to 5.9 feet below the 500-year flood elevation. This portion of the road is along the last curve prior to the second bridge (see figure 13). During heavy rain or flood events, this portion of the road could be impassible by visitor or staff vehicles, and floodwaters could deposit debris on the roadway, making driving this portion of the road unsafe. However, the section of road susceptible to becoming inundated by floodwaters would be small (less than 0.1 mile) when compared to the length of the current alignment of Willow Beach Road that travels through the narrow wash (approximately 1.1 mile). The Jumbo Wash alternative would reduce the risks to visitors from flood conditions and becoming stranded at Willow Beach due to unsafe conditions on the road. The Jumbo Wash alternative would also greatly reduce the park resources required to maintain the roadway. In addition to the reduced area of roadway subject to floodwaters, the road would be designed with a consistent crown, which would help drain the road once floodwaters recede and would reduce the amount of debris accumulation on the road.

Connected actions that would also result in long-term adverse impacts on the floodplain involves moving the utility lines and poles and relocating main power transformers in Jumbo Wash to accommodate the placement of the road. These features currently require fill in the floodplain and moving them would result in a net zero impact on the floodplain, as they would not constitute additional fill. The area in Jumbo Wash that could be used for parking would not require additional impervious surface or fill but would retain the current conditions of compacted earth that has an adverse impact on the floodplain. The Jumbo Wash alternative would require staging areas for construction equipment, vehicles, and materials during construction. The staging areas would be a total of approximately 3.0 acres, but they would be sited in previously developed areas within Jumbo Wash and would not have an additional impact on the floodplain. Additionally, the drainage improvements near the entrance station would be conducted within the floodplain. These modifications would affect less than 0.1 acre of the floodplain from channelization of the drainage area and installation of a U-shaped box culvert.

The use of construction equipment would result in short-term impacts within the floodplain due to soil compaction beyond the areas of cut and fill for the road, which could result in decreased infiltration and increased erosion and sedimentation. The impacts are expected to be slight because the construction would occur in previously disturbed areas and most work would be confined to the limits of disturbance from cut and fill. To minimize adverse impacts on floodplain values, appropriate stormwater management techniques would be used during construction activities, and disturbed areas would be de-compacted and revegetated after construction with native plants salvaged from the project area.

Rehabilitation and realignment of Willow Beach Road would result in long-term impacts from construction of an asphalt road in the floodplain. Removing vegetation for construction of the road could increase the potential for localized erosion and increase sedimentation impacts downstream during flood events. Vegetation helps to reduce floodflow velocities, thus reducing erosion potential, and causes water to spread higher on the floodplain. Currently, little vegetation exists in the footprint of the road alignment and the soil in a large portion of the footprint has been continually compacted due to vehicle use. Although the fill and impervious surface for the new road would slightly obstruct floodflows, reduce floodwater storage, and conveyance, the existing portion of the road between milepost 2.9 and the marina would be removed, and the area would be rehabilitated after construction of the realigned road is complete. This would result in removal of 3.0 acres of roadway in the floodplain thus resulting in a net increase of approximately 1 acre of impervious surface in the floodplain.

Cumulative Impacts: As stated above, the use of Jumbo Wash Road for recreational vehicle use continues to have an impact on floodplains from compaction of soils, and portions of the floodplain were impacted by the upgrades at the Willow Beach marina. The Jumbo Wash alternative would result in

additional adverse impacts on the floodplain. This alternative would result in a small net increase in impervious surface, and there would be adverse impacts on floodplains from the cut and fill required for construction; however, the impacts to the floodplain would be concentrated in Jumbo Wash, which has been previously disturbed. Although the Jumbo Wash alternative would also result in adverse impacts on the floodplain within the project area, the incremental impacts of this alternative would not make a substantial contribution to the impacts on the floodplain that are already occurring.

Conclusion: Under the Jumbo Wash alternative, the 100-year floodplain would be negatively impacted. Short-term adverse impacts on the floodplain are anticipated due to vegetation removal and soil compaction during construction activities. Long-term adverse impacts on the floodplain would occur from cuts within the floodplain and placement of fill. The Jumbo Wash alternative would lead to new impervious surface (approximately 4.0 acres) along the existing Willow Beach Road and within Jumbo Wash. With the removal and rehabilitation of the existing roadway in the narrow canyon, the Jumbo Wash alternative would result in an overall net increase in impervious surface of approximately 1 acre. Overall, construction activities would cause some increased erosion, obstruction of flood flows, and reduction in floodwater storage and drainage, but the natural floodplain values would not be altered, as the floodplain would continue to slow and retain floodwaters. The Jumbo Wash alternative would not substantially contribute to cumulative adverse impacts on floodplains.

Impacts of Alternative 3: Northern Alignment Alternative / Preferred Alternative

The northern alignment alternative would have long-term adverse and beneficial impacts on the floodplain within the project area. The widening of the existing Willow Beach Road from mileposts 0.2 to 0.8 would increase impervious surface in the floodplain by 0.6 acre. This would increase the total impervious surface in this area from 1.4 to 2.0 acres. From milepost 0.8 to approximately milepost 3.0 of the new alignment, the northern alignment alternative would be constructed in a previously undisturbed area; however, this portion of the road would be constructed largely outside of the floodplain. Between approximately mileposts 0.8 and 1.3, the northern alignment alternative would cross the floodplain associated with the Willow Beach Road wash and an unnamed wash. There would be approximately 0.6 acre of impact on the floodplain from placement of the new road; however, two 4-foot by 4-foot and two 10-foot by 10-foot drainage culverts would be installed along this portion of the road to ensure flow would not be impeded during rain events. The western portion of the northern alignment alternative would also occur in a previously developed area, as it would tie the new alignment into the campground and marina. Realignment in this area would result in an additional 0.09 acre of impact to the floodplain from placement of the road. Three 10-foot by 10-foot box culverts would be installed in this area to direct water into the existing concrete channel. Drainage improvements near the entrance station would also be conducted within the floodplain. Channelization of the drainage area and installation of a U-shaped box culvert would affect less than 0.1 acre of the floodplain. The northern alignment alternative would require placement of a total of 1.4 acres of new impervious surface within the project area.

Construction of the northern alignment alternative would require cut and fill within the floodplain. As described for the Jumbo Wash alignment, cut and fill could alter the natural characteristics and functions of the floodplain, as vegetation would be removed, cuts would be made into rock, and fill would be placed. The northern alignment alternative would result in an additional 3.7 acres of direct impact from cut and fill; approximately 1.2 acres of this would be in areas that have not been previously disturbed. A buffer of 20 feet beyond the cut and fill extent would account for direct impacts within the floodplain during construction from construction vehicles and equipment. Within this area (3.6 acres), vegetation would be trampled, and soils would be compacted, affecting the capacity of this land to store rainfall. To minimize adverse impacts on floodplain values, appropriate stormwater management techniques would be used during construction activities.

Following construction of the northern alignment, the asphalt of the existing Willow Beach Road between mileposts 0.8 and 3.9 would be pulverized and removed. The entire length of the road lies within the floodplain, resulting in the removal of approximately 7.5 acres of impervious surface from the floodplain. Areas disturbed during construction would be de-compacted and revegetated after construction with native plants salvaged from the project area. Additionally, the maintenance area near Jumbo Wash would be abandoned in place and allowed to naturally revegetate. The existing concrete storage bins would be left in place but would have holes punched in them for drainage. A portion of this maintenance area lies within the floodplain and discontinuing its use would result in approximately 1.7 acres that would no longer be repeatedly affected by compaction from storage and vehicle use.

Construction of Willow Beach Road under the northern alignment alternative would result in long-term adverse impacts from the placement of fill and adding pavement within the floodplain; however, this alignment was designed to reduce the amount of the road within the floodplain. Whereas the entirety of the no-action alternative and the majority of the Jumbo Wash alternative would remain in the floodplain, the northern alignment would be constructed along a ridgeline to avoid impacts to the floodplain and potential dangers to visitors, park staff, and concessioners from flash flooding. Long- and short-term impacts from construction could affect the natural characteristics and functions of the floodplain as discussed previously, including potentially obstructing floodflows, reducing floodwater storage, and reducing conveyance; however, restoring 3.1 miles of the existing Willow Beach Road would result in a net decrease of approximately 6.1 acres of impervious surface within the project area. Overall, the northern alignment alternative would have an overall beneficial impact on the floodplains in the project area.

Cumulative Impacts: As stated for the no-action alternative, the use of Jumbo Wash Road for recreational vehicle use continues to have an impact on the floodplain from compaction of soils and portions of the floodplain were impacted by the upgrades at the Willow Beach marina. However, the northern alignment alternative would result in beneficial impacts on the floodplain. Although the construction of this alignment would have a slight adverse impact on the natural characteristics and functions of the floodplain, restoration of the existing road in a floodplain would result in overall beneficial impacts. The northern alignment alternative would not contribute to the adverse cumulative impacts on floodplains in the project area since this alignment would result in a substantial beneficial impact to the floodplain.

Conclusion: Construction of the northern alignment alternative would have an adverse impact on the 100-year floodplain within the project area. Long-term adverse impacts on the floodplain would occur from cuts within the floodplain, placement of fill, and placement of new impervious surface. Short-term adverse impacts on the floodplain are anticipated due to vegetation removal and soil compaction during construction activities. Construction could cause increased erosion, obstruction of flood flows, and reduction in floodwater storage and drainage; however, the natural floodplain values would not be altered, as the floodplain would continue to slow and retain floodwaters. Further, with the removal and rehabilitation of 3.1 miles of the existing Willow Beach Road in the floodplain, this alternative would result in an overall net decrease (approximately 6.1 acres) in impervious surface and in beneficial impacts to the floodplain. The northern alignment alternative would contribute to the adverse cumulative impacts on the floodplain in the project area.

CHAPTER 4: CONSULTATION AND COORDINATION

The following Native American tribes, agencies, and organizations were initially contacted in 2019 and were invited to participate in the planning process. Consultation is on-going:

Native American Tribes

- Ak-Chin Indian Community
- Chemehuevi Tribal Council
- Colorado River Indian Tribes
- Fort Mojave Tribal Council
- Fort Yuma Quechan Tribe
- Gila River Indian Community Council
- Havasupai Tribal Council
- Hopi Tribal Council
- Hualapai Tribe
- Kaibab Paiute Tribal Council
- Las Vegas Paiute Tribal Council
- Moapa Band of Paiutes
- Navajo Nation
- Paiute Indian Tribe of Utah
- Pueblo of Zuni
- Salt River Pima-Maricopa Indian
- Shivwits Band of Paiutes
- Yavapai-Prescott Indian Tribe

Federal Agencies

- Advisory Council on Historic Preservation
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Death Valley National Park
- Environmental Protection Agency
- Federal Highway Administration
- Grand Canyon National Park
- Grand Canyon-Parashant National Monument
- Natural Resources Conservation Service
- Toiyabe National Forest
- US Army Corps of Engineers
- US Fish and Wildlife Service
- US Geological Survey
- Western Area Power Administration

State, City, and County Agencies

- Arizona Game and Fish Department
- Arizona State Historic Preservation Office
- Boulder City Chamber of Commerce
- Bullhead Regional Economic Development Authority
- City of Boulder City
- City of Bullhead City
- City of Henderson
- City of Kingman
- City of Las Vegas
- City of North Las Vegas
- Clark County
- Clark County Commissioners
- Clark County Museum
- Colorado River Commission
- Commission on Tourism
- Community Association of Meadview
- Las Vegas Chamber of Commerce
- Las Vegas Historic Preservation Office
- Meadview Civic Association
- Mesquite Chamber of Commerce
- Moapa Valley Chamber of Commerce
- Mohave County
- Nevada Division of Environmental Protection
- Nevada State Historic Preservation Office
- Nevada State Museum and Historical Society
- Regional Transportation Commission
- State of Nevada
- State of Utah
- Valley of Fire State Park

Non-Governmental Organizations

- Archaeo-Nevada Society
- Arizona Preservation Foundation
- Arizona Wilderness Coalition
- Arizona Wildlife Federation
- Boulder City Museum & Historical Association
- Defenders of Wildlife
- Desert Bighorn Council
- Desert Research Institute
- Desert Tortoise Council
- East Las Vegas Citizen's Advisory Council
- Environmental Defense Fund
- Fraternity of the Desert Bighorn
- Friends of Classic Las Vegas
- Friends of Nevada Wilderness
- Get Outdoors Nevada
- Grand Canyon Trust
- Las Vegas Jeep Club
- Maricopa Audubon Society
- Metropolitan Water District
- Nevada Archaeological Association
- Nevada Wilderness Project
- Nevada Wildlife Federation
- Partners in Conservation
- Partners in Parks
- Preservation Association of Clark County
- Preserve Nevada
- Red Rock Audubon Society
- Sierra Club
- Southern Nevada Environmental Forum
- Southern Nevada Water Authority
- Southern Utah Wilderness Alliance
- The Nature Conservancy
- The Wilderness Society
- Wilderness Watch
- Wyoming Game & Fish Department

Lake Mead NRA Concessioners

- AccessPark Wi-Fi
- Black Canyon/ Willow Beach River Adv.
- Callville Bay Resort
- Cottonwood Cove Resort
- Echo Bay RV Village
- Katherine Landing Recreation Co.
- Lake Mead Cruises
- Lake Mead RV Village
- Las Vegas Boat Harbor / Lake Mead Marina
- Temple Bar Marina

REFERENCES

Arizona Department of Environmental Quality (ADEQ)

- 2018a “Arizona’s 2018 303(d) List of Impaired Waters.” Available online: https://static.azdeq.gov/pn/pn_303d_2018draft.pdf. Accessed December 24, 2019.
- 2018b “2018 Delist Report: Delisting Reports Justifying the Removal of Waterbodies from the 2018 Impaired Waters List.” Available online: https://static.azdeq.gov/pn/pn_303d_2018DelistReport.pdf. Accessed December 24, 2019.
- 2019 “Air Quality, Nonattainment Areas.” Available online: https://azdeq.gov/nonattainment_areas. Accessed July 25, 2019.

Arizona Game and Fish Department (AGFD)

- 2019 “Species Listed in the Heritage Data Management System, Updated April 8, 2019.” Available online: https://s3-us-west-2.amazonaws.com/azgfd-portal-wordpress-pantheon/wp-content/uploads/archive/SSS_By_County_20190705.pdf. Accessed June 24, 2019.

Cornell Lab of Ornithology (Cornell)

- 2019 “eBird, Hotspot Map: Lake Mead NRA--Willow Beach.” Available online: <https://ebird.org/hotspot/L387795>. Accessed August 5, 2019.

Historic American Building Survey (HABS)

- 2008 *Willow Beach Ranger Station (Ranger Office & Equipment Storage Building)*. HABS AZ-220. Historic American Building Survey Intermountain Regional Office. US Department of the Interior, National Park Service, Denver.

National Park Service (NPS)

- 1984 *Park Road Standards*. July.
- 2006 *NPS Management Policies 2006*. Available online: <http://www.nps.gov/policy/mp2006.pdf>.
- 2011 Director’s Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-Making*. Approved October 5, 2011.
- 2015 *National Park Service NEPA Handbook*. September 2015.
- 2019a “Traffic Counts, Lake Mead National Recreation Area.” Available online: <https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Traffic%20Counts?Park=LAKE>. Accessed July 19, 2019.
- 2019b “NPSpecies: Lake Mead National Recreation Area.” NPSpecies-1.9.0.15575_20180914. Available online: <https://irma.nps.gov/NPSpecies/Search/SpeciesList/LAKE>. Accessed August 5, 2019.

PaleoWest Archeology (PaleoWest)

- 2019 *Class III Cultural Resources Survey of 48.48 Acres for the Proposed realignment of Willow Beach Road, Lake Mead National Recreation Area, Northwest of Kingman, Mohave County, Arizona*. Technical Report 19-24. March.
- 2020 *Addendum Report: Class III Cultural Resources Survey of 48.48 Acres for the Proposed Realignment of Willow Beach Road, Lake Mead National Recreation Area, Northwest of Kingman, Mohave County, Arizona (Additional 99 Acres Surveyed)*. Technical Report 20-570. September.

Salas, D.E., J. Stevens, J. Evens, D. Cogan, J. S. Ratchford, and D. Hastings

- 2016 *Vegetation mapping of Lake Mead National Recreation Area*. Natural Resource Report NPS/MOJN/NRR—2016/1344. National Park Service, Fort Collins, Colorado.

United States Department of Agriculture (USDA)

- 1996 “Soil Quality Resource Concerns: Soil Erosion.” Available online: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051278.pdf. Accessed August 22, 2013.

United States Environmental Protection Agency (USEPA)

- 2018 “The EPA Review of Arizona’s 2018 303(d) List, Final Submission Received August 20, 2018.” Available online: https://www.epa.gov/sites/production/files/2018-09/documents/az_2018_303d_list_partial_approval_enclosure.pdf. Accessed December 24, 2019.

United States Fish and Wildlife Service (USFWS)

- 2019 “Species by County Report: Mohave County, Arizona.” Available online: <https://ecos.fws.gov/ecp0/reports/species-by-current-range-county?fips=04015>. Accessed July 21, 2019.

United States National Vegetation Classification (USNVC)

- 2019 United States National Vegetation Classification Database, V2.03. “G295 *Larrea tridentata* - *Ambrosia dumosa* - *Encelia farinosa* Desert Scrub Group.” Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. Available online: <https://www1.usgs.gov/csas/nvcs/nvcsGetUnitDetails?elementGlobalId=833231>. Accessed September 24, 2020.

University of Minnesota (UM)

- 2018 “Soil compaction: causes, effects and control.” Available online: <https://extension.umn.edu/soil-management-and-health/soil-compaction>. Accessed September 3, 2019.

World Rangeland Learning Experience (Wrangle)

- 2019 “North American Desert Shrubland.” Available online: <https://wrangle.org/ecotype/north-american-desert-shrubland>. Accessed August 5, 2019.

Wright, James

- 2007 *Floodplain Management Principles and Current Practices*.

APPENDIX A

Floodplains Statement of Findings

**Statement of Findings for
NPS Director's Order 77-2, "Floodplain Management"**

**Willow Beach Road Improvement Project
Environmental Assessment**

Lake Mead National Recreation Area

Recommended:

Superintendent

Lake Mead National Recreation Area
National Park Service

Date

Certified for Technical Adequacy and Servicewide Consistency

Chief

National Park Service, Water Resources Division

Date

Concurred:

Safety Officer

National Park Service, IR 8, 9, 10, 12

Date

Approved:

Regional Director

National Park Service, IR 8, 9, 10, 12

Date

FLOODPLAINS STATEMENT OF FINDINGS

Pursuant to Executive Order 11988, “Floodplain Management” and Director’s Order 77-2: Floodplain Management, flooding hazards have been evaluated related to the proposed alternatives for the project. It is National Park Service (NPS) policy to preserve floodplain values and to minimize potentially hazardous conditions associated with flooding. This statement of findings (SOF) describes the proposed project, project site, floodplain determination, use of floodplain, investigation of alternatives, flood risks, and mitigation for the continued use of facilities within the floodplain.

PROJECT AREA

The National Park Service is preparing an environmental assessment to consider the environmental consequences related to improving Willow Beach Road at Lake Mead National Recreation Area (Lake Mead NRA). The Willow Beach area, a fee area located in Arizona and associated with the Colorado River, is a popular destination for visitors for launching canoes, kayaks, and boats, as well as picnicking and fishing. Willow Beach also offers boat rentals and concessions.

Willow Beach Road is a two-lane asphalt surfaced roadway that provides access to the Willow Beach area. Willow Beach Road currently extends 4.63 miles from US Highway 93 on the east to the Willow Beach Marina on the west. The existing roadway is narrow (20- to 21-foot wide) with soft shoulders, and the curves are tight to navigate. There are no formal paved pullouts. Centerline markings are worn, and there are no edge markings to delineate the travel lanes. The road is currently built in a narrow canyon and experiences flash flooding and debris accumulation during storm events. The surface is cracked and contains many potholes. At the east end of the road near the entrance station, there are two 10-foot by 10-foot box culverts that carry flow (water) under US Highway 93. During storm events, flow from these box culverts brings debris onto Willow Beach Road. The roadway has an inverted crown in some areas, which makes clearing debris difficult for maintenance crews.

PROPOSED ACTION

The proposed action would resurface, restore, and rehabilitate one section of the road and realign and reconstruct another section of the road. Elements of the proposed action are described in the following paragraphs and presented in figure 1.

Roadway Improvement Section. Starting at approximately milepost 0.2 (near the entrance station) to milepost 0.8, the existing section of roadway would be widened to a consistent 30-foot width (12-foot travel lanes with 3-foot shoulders) to meet standards identified in Park Road Standards (NPS 1984). The widened shoulders would allow for an improved clear zone, the unobstructed area beyond the road where a vehicle leaving the road can travel without issue. The shoulders would also allow law enforcement to safely conduct traffic stops. Curves may be widened to improve sight distance and allow for more consistent speeds. Centerline and edge line pavement markings would be added, and centerline rumble strips would be included in this section of the road. Some sections of the road may need edge protection, such as cut-off walls, to minimize the potential for erosion. The roadway would keep a consistent crown section for the entire length.

New Northern Alignment. A new road would be constructed from approximately milepost 0.8 of the existing Willow Beach Road to the road that leads from the marina parking lot to the Willow Beach campground. This road would be constructed along a ridgeline located north of the existing Willow Beach Road. The new alignment would reduce the amount of road located within the floodplain. Beyond the conjunction with the existing road, the new alignment would cross one wash spanned with two 10-foot by 10-foot box culverts. Two smaller 4-foot by 4-foot box culverts would be installed at approximately

mileposts 1.0 and 1.1 for additional drainage. The new roadway would be approximately 2.6-miles long and constructed to a consistent 30-foot width (12-foot travel lanes with 3-foot shoulders) to meet standards identified in Park Road Standards (NPS 1984). The design speed would be 45 miles per hour.

The roadway would also have three formal paved pullouts that would be 14-feet wide located at approximately mileposts 1.1, 1.6, and 2.2. At approximately milepost 2.0, a scenic overlook would be constructed to provide views of the river bend. The overlook would have 10 parking spaces and a vault toilet.

The new alignment would tie into the existing Willow Beach campground access road located southwest of the campground. A new turn off to the campground access road would be constructed. The existing low-water crossing would be replaced with three 10-foot by 10-foot box culverts that would direct the water into the existing concrete channel.

Existing Willow Beach Road. The existing Willow Beach Road would be obliterated from milepost 0.8 to 3.9. The section of the road from milepost 3.9 to the Willow Beach Marina parking lot (mile post 4.2) would be retained to provide access to Jumbo Wash Road.

Drainage Crossing Near the Entrance Station. Currently, two 10-foot by 10-foot box culverts carry flow (water) under US Highway 93 at the east end of the road near the entrance (between mile posts 0.2 and 0.3). Under the proposed action, the drainage area would be channelized from the existing box culverts to a newly installed U-shaped box culvert at the utility road crossing. The flow out the box culvert would exit via an outlet into the existing flow path to the right of the roadway. The U-shaped box culvert would have a removable grate under the utility road crossing, which would aid park maintenance staff in cleaning debris from the box culvert.

Accessibility. In conformance with applicable laws and regulations, specifically the Architectural Barriers Act of 1968 (Public Law 90-480), the Rehabilitation Act of 1973 (Public Law 93-112), and the 1984 Uniform Federal Accessibility Standards (49 CFR 31528), specific parking areas in parking lots, curb cuts, sidewalks, and all other facilities associated with this project would be physically accessible.

Other Connected Actions. Other connected road actions include:

- Staging areas would be created to store equipment and materials. Staging areas would be located near milepost 0.8 where the new alignment begins and possibly within the parking areas of the marina. A staging area near milepost 0.8 would affect previously undisturbed area and would be restored at the end of the project. Staging of materials in the parking areas would be placed to avoid impacts to traffic flow.
- The maintenance area at approximately milepost 3.2 of the existing Willow Beach Road would be largely abandoned in place. This unpaved maintenance area, approximately 600 feet by 200 feet (2.8 acres), is no longer in use. Concrete storage bins at the site would have holes punched in them for drainage, and any vertical walls would be collapsed and buried. The fencing would be removed. There may be some light scarifying of the soil.
- Asphalt removed from the existing Willow Beach Road would be pulverized and reused to the extent possible in the new road surfaces or to shore up Jumbo Wash dike. Any materials not used would be disposed of off-site at an appropriate facility.
- The current parking lot in the developed area would be re-striped and the islands may be reconfigured to change vehicle circulation.
- Conduit may be installed along the alignment in the disturbed area to allow for future utility upgrades.

SITE AND FLOOD HAZARD DESCRIPTION

A formal floodplain delineation has not been performed in the Willow Beach area; however, for purposes of this analysis, the 100-year floodplain was delineated from a two-dimensional hydraulic model. In the project area, the area subject to a 1% or greater annual chance of flooding in any given year is associated with several unnamed washes and the narrow canyon through which Willow Beach Road currently passes, all of which flow into the Colorado River (figure 1). Willow Beach Road currently represents approximately 10 acres of impervious surface within the floodplain. Also present within the floodplains are the lands adjacent to Willow Beach Road and the area associated with Willow Beach Marina, which contain impervious surfaces and previously disturbed land, mostly devoid of vegetation and compacted from vehicle use. However, the ridgeline where most of the road would be located is undeveloped.

JUSTIFICATION FOR THE USE OF THE FLOODPLAIN

The Willow Beach area is a popular destination where visitation is tied to development on the Colorado River, including the Willow Beach Marina, a launch site for paddlecraft, boat rentals, and concessions. The Willow Beach area has been in continuous use since the mid-1950s when development at Willow Beach included visitor facilities, a ranger station, and the US Fish and Wildlife fish hatchery. Willow Beach continues to be a popular visitor destination with annual visitation over 80,000 people between 2016 and 2018 (NPS 2019).

The proposed action plans to improve Willow Beach Road. The entirety of the existing Willow Beach Road is within the floodplain and is affected by heavy rains and flooding, which creates unsafe conditions for visitors, concessionaires, and park staff. These rain events also cause damage to the road itself. The improvements are needed to address deterioration of the roadway and human safety. Improving part of the existing road and reconstructing the remaining portion of the road to remove it from the narrow canyon and reduce the amount of the road within the floodplain would address these issues.

FLOOD RISKS

Heavy rains can result in flood conditions in Lake Mead NRA, and specifically, within the project area. Although sparse, the natural vegetation communities that grow alongside Willow Beach Road help to reduce floodflow velocities, thus reducing erosion potential.

Construction within the Floodplain: Implementation of the proposed action would include improving and widening the portion of Willow Beach Road from the entrance station to milepost 0.8, realigning the remainder of Willow Beach Road along a ridgeline north of the existing Willow Beach Road, installing drainage culverts along the road to convey waters during rain events, removing and rehabilitating the existing part of Willow Beach Road between mileposts 0.8 and 3.9, taking steps to abandon-in-place the existing maintenance area near Jumbo Wash, and improving drainage around the entrance station. Adverse impacts on natural floodplain values include removal of some vegetation, making cuts into rock material and placing fill, and construction of new permanent features. These actions could have a small adverse impact on floodplain values – previously vegetated areas would have less capacity to store rainfall, new impervious surfaces may result in a reduction of water storage and infiltration of water into the ground. However, these impacts would be slight and would not cause an increase in flooding at the park. Further, the removal of impervious surface in the narrow canyon would restore natural floodplain functions in that part of the floodplain. Overall, the proposed action would result in 3.7 acres of impacts from cut and fill necessary for construction within the floodplain, but it would also result in a net decrease of impervious surfaces by approximately 6.1 acres. The new alignment would be located largely outside of the floodplain, but the portion in the existing Willow Beach Road that would be removed and restored lies entirely within the floodplain.

Willow Beach Road
Lake Mead National Recreation Area, Arizona

National Park Service
U.S. Department of the Interior

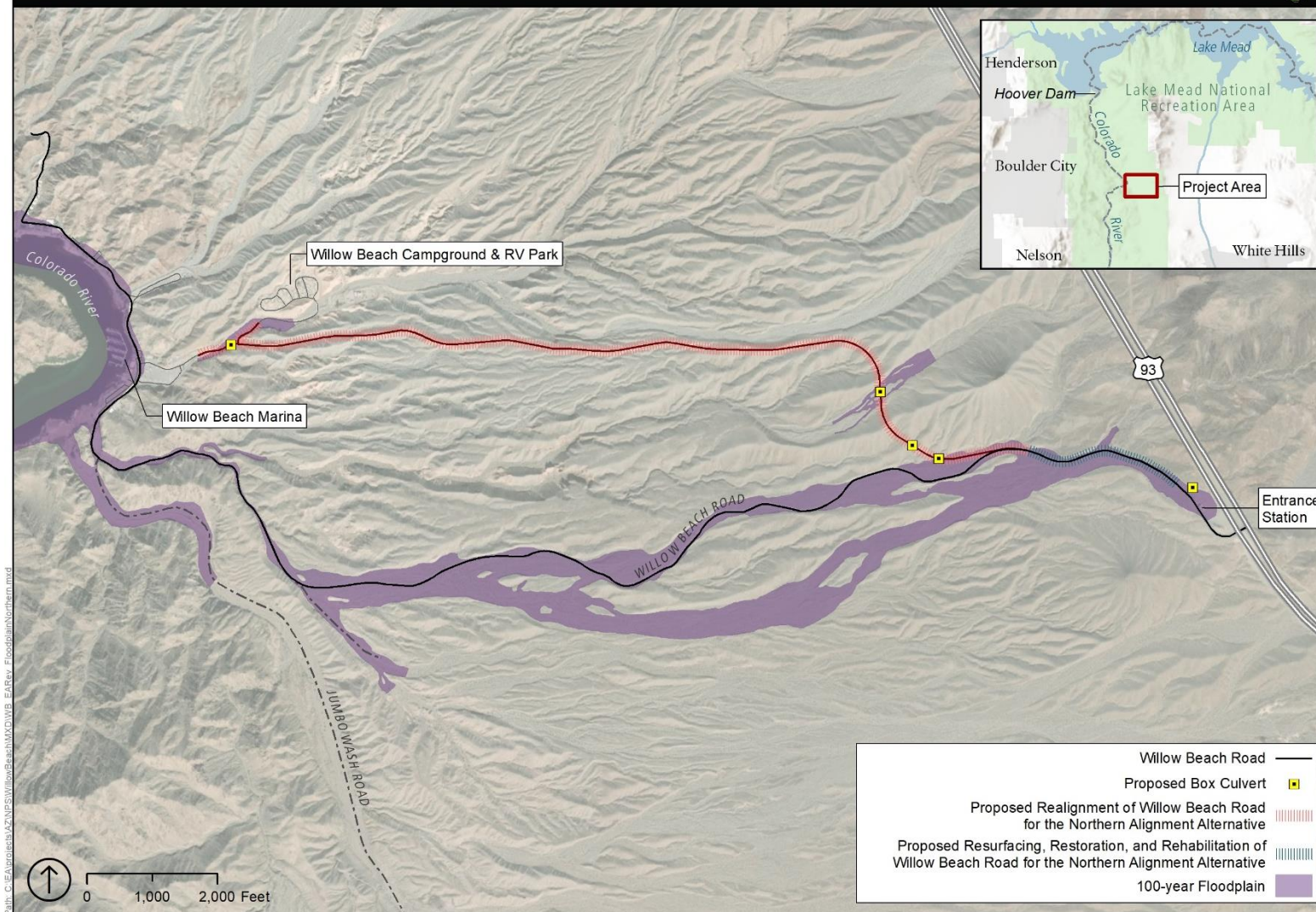


Figure 1. Floodplain in the Project Area

Capital Investment: The existing Willow Beach Road is badly deteriorated and has reached the end of its serviceable life. By moving Willow Beach Road out of the narrow canyon and largely out of the floodplain and using drainage culverts to convey flood waters, the National Park Service will create a road that will be easier and more cost efficient to maintain. Although heavy rains and flash flooding could still occur, the design of the improved Willow Beach Road would address safety issues, including worn or absent road markings, tight curves, narrow lanes, absence of shoulders, a cracked and potholed surface, and drainage that deposits flooding debris on the road. The impact to capital investment would be minimal.

Human Health and Safety: Willow Beach Marina and the surrounding developed areas, including concessions, are located along the Colorado River and are at risk from heavy rains and flash floods. As such, there would be potential impacts to human health and safety of the visitors and employees under the proposed action. Flood events could occur while visitors are recreating at Willow Beach, resulting in risks to life and property. By removing Willow Beach Road out of the narrow canyon and improving the design of the road along a ridgeline and mostly out of the floodplain, the National Park Service would reduce the potential for risks to visitors from flood conditions and becoming stranded at Willow Beach due to unsafe conditions on the road.

FLOOD MITIGATION MEASURES

Mitigation measures would reduce hazards to human life and health, protection of capital investment, and protection of natural and beneficial floodplain values. Although the proposed action would result in new construction in the floodplain (approximately 1.4 acres total of new impervious surface, plus an additional 3.7 acres of impacts from cuts and placement of fill for construction of the road and bridge footings), a portion of the existing roadway will be removed, resulting in removal of approximately 7.5 acres of impervious surface. The net impervious surface area within the floodplain would be a decrease of 6.1 acres of asphalt road.

The improvements to Willow Beach Road would represent a new investment venture at the Willow Beach area; however, the existing road has reached the end of its serviceable life. By realigning Willow Beach Road to remove it from the narrow canyon and reduce the length of the road in the floodplain, the National Park Service is creating a safer road that would be more cost effective to maintain over the long term.

The greatest potential for impacts occurs during heavy rain and flood events that affect the safety of the visitors and employees within the project area. Lake Mead NRA would continue to close Willow Beach Road during flash flood events and when debris in the roadway presents a safety hazard, although these events would be greatly reduced from the proposed roadway improvements.

SUMMARY

The National Park Service has determined that there are no practicable alternate routes in Lake Mead NRA for an access road to the Willow Beach area that would eliminate crossing a portion of the floodplain. The alignment of the Willow Beach Road under the proposed action was chosen because it minimizes the amount of road in the floodplain and allows for removal of existing impervious surface from the floodplain, thus reducing impacts on floodplains and human health and safety. The improved Willow Beach Road would require construction in the floodplain, but development would be minimal and ultimately the project would result in a net decrease of 6.1 acres of impervious road surface in the floodplain and an additional 3.7 acres of impacts from cut and fill in the floodplain. Overall, the natural functions of the floodplain within the project area would not be adversely affected. Although there would be adverse impacts on other natural and cultural resources, the impacts would be minimized through mitigation measures and best management practices to the extent possible.

Because Willow Beach is a popular visitor destination, the National Park Service must provide an access road that provides safe access that is also practical to maintain. The proposed action would reduce safety concerns by removing the roadway from the narrow canyon and reducing the potential for road closures from flooding and debris. Flood warning signs and evacuation plans would remain in place.

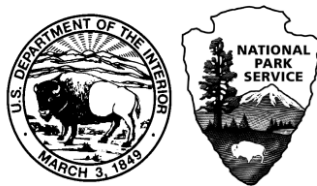
Finally, the improvements to Willow Beach Road would protect the NPS capital investment. The road has reached the end of its serviceable life and the park has a limited budget for road maintenance. The improvements would create a road that is less susceptible to flooding and debris accumulation, protecting the road from weather-related damage and reducing the cost and effort to maintain it.

REFERENCES

National Park Service (NPS)

1984 *Park Road Standards*. July.

2019 “Traffic Counts, Lake Mead National Recreation Area.” Available online:
<https://irma.nps.gov/Stats/SSRSReports/Park%20Specific%20Reports/Traffic%20Counts?Park=LAKE>. Accessed July 19, 2019



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, 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. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for the public lands and promoting 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 US administration.

LAKE: 602/165302