National Park Service
U.S. Department of the Interior

Death Valley National Park
California

Salt Creek Boardwalk Replacement Project Floodplain Statement of Findings

July 2024

MICHAEL REYNOLDS
Digitally signed by MICHAEL REYNOLDS
Date: 2024.07.31 17:11:28 -07'00'

Date: _____

Mike Reynolds, Superintendent,
Death Valley National Park
Recommended

FORREST HARVEY
Digitally signed by FORREST HARVEY
Date: 2024.08.01 14:10:31 -06'00'

Date: _____

Ed Harvey, Chief
Water Resources Division
Certification of Technical Accuracy and Service-wide Consistency

DAVID SZYMANSKI
Digitally signed by DAVID SZYMANSKI
Date: 2024.08.13 12:54:38 -07'00'

Date: _____

David Szymanski, Regional Director
Pacific West Region
Approved

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INTRODUCTION

The National Park Service (NPS) is proposing to reconstruct the Salt Creek boardwalk and related infrastructure in Death Valley National Park, which was damaged by flooding in 2022 and 2023 (Figures 1, 2, and 3). Design and construction of the project would be conducted by the Federal Highway Administration (FHWA), Central Federal Lands Highway Division, which is a cooperating agency in the National Environmental Policy Act (NEPA) process.

On August 5, 2022, unprecedented rains caused severe flash floods across the park, which destroyed the Salt Creek boardwalk and associated infrastructure (Figures 1–3). The floods swept away the boardwalk, leaving pieces of it scattered downstream, altered the overall topography of the area, and changed the course of Salt Creek. The floods also damaged the parking lot, access road, vault toilet, and interpretive waysides. The road and trail have been closed since this event. From August 19 to 21, 2023, for the second year in a row, extreme flooding associated with the remnants of Hurricane Hilary again severely flooded Salt Creek, further altering the stream channel.

Salt Creek is the only location where the Salt Creek pupfish (*Cyprinodon salinus salinus*) occur. This subspecies of pupfish is listed as "high concern" by the State of California (Moyle et al. 2015). Providing accessible viewing, interpretive, and educational opportunities while simultaneously protecting the species and its habitat requires infrastructure. Without appropriate infrastructure, visitors create social trails by walking around the creek and occasionally into the creek. These trails disturb the fish's habitat and life cycle, as well as that of other wildlife that use the creek, and they harden soil, damage vegetation, increase sedimentation, and limit suitable soil conditions for healthy vegetation, especially salt grass (*Distichlis spicata*) and pickleweed (*Allenrolfea occidentalis*). Loss of vegetation decreases shading along the creek, which is a critical component of the pupfish's habitat.

The purpose of the project is to restore viewing, interpretive, and educational opportunities for visitors, including those with limited mobility, to see and learn about the Salt Creek pupfish (*Cyprinodon salinus* ssp. *salinus*) and Salt Creek itself while protecting the species and its fragile habitat and maintaining the integrity of the surrounding wilderness area. There are no longer accessible viewing, interpretive, or educational opportunities at Salt Creek. The lack of infrastructure, previously present, leaves the pupfish and their sensitive habitat vulnerable to damage caused by visitors walking and creating informal trails around the area. In addition, the Salt Creek boardwalk was Death Valley's only ABA-compliant interpretive site, and there is a need to restore this accessible opportunity for visitors to closely interact with the park's landscape and natural features.

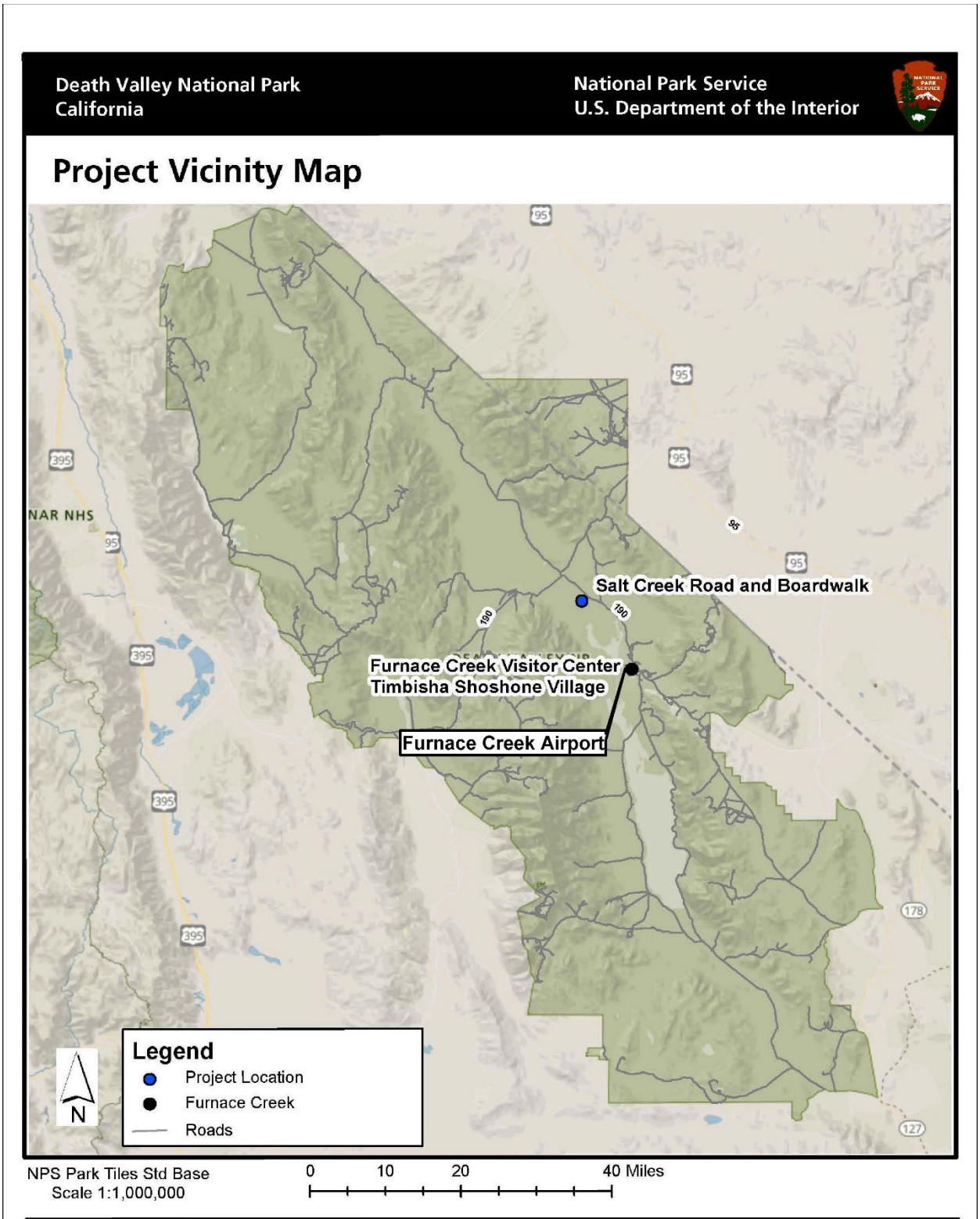
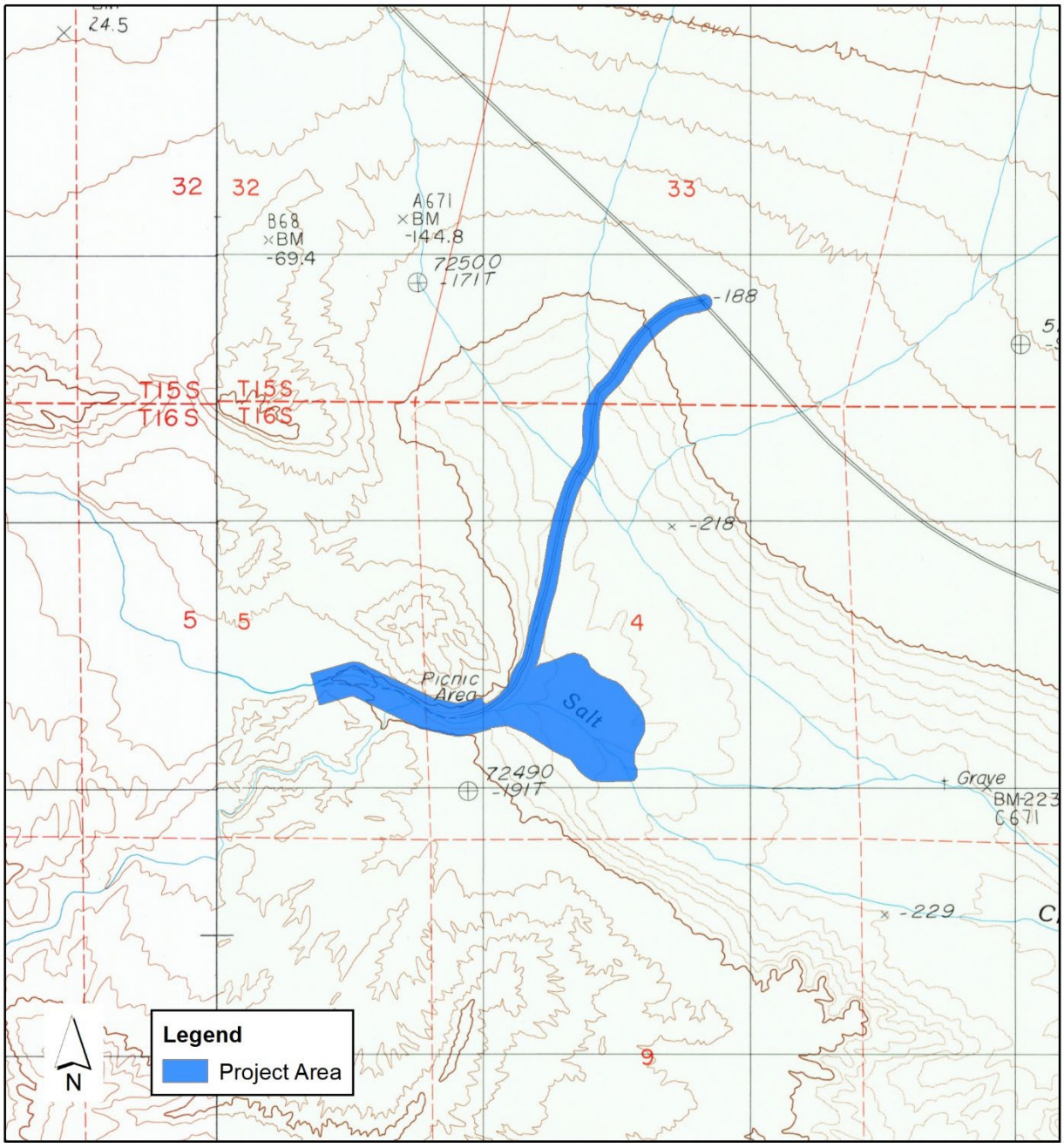


FIGURE 1. PROJECT VICINITY MAP



Beatty Junction, CA
USGS 7.5' Quadrangle
Contour Interval = 40 feet
Scale 1:24,000

0 1,300 2,600 5,200 Feet

FIGURE 2. PROJECT AREA MAP

FIGURE 3. FLOOD-DAMAGED BOARDWALK

Executive Order 11988 "Floodplain Management" and Executive Order 13690 "Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input" require the National Park Service and other federal agencies to evaluate likely impacts of actions in floodplains and to improve the nation's resilience to flood risk. The objective of Executive Order 11988 is to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Executive Order 13690 was issued to establish a Federal Flood Risk Management Standard (FFRMS) for federally funded projects to improve the nation's resilience to floods and to ensure new federal infrastructure will last as long as intended. NPS procedures for complying with the floodplain executive orders are outlined in NPS Director's Order 77-2: *Floodplain Management* and Procedural Manual 77-2: *Floodplain Management* (NPS 2002).

It is NPS policy to preserve floodplain functions and values and minimize potentially hazardous conditions associated with flooding, including threats to human health/life, risk to capital investment, and impacts on natural and beneficial floodplain values. If a proposed action is found to be in an applicable regulatory floodplain, and relocating the action to a non-floodplain site is considered not to be a viable alternative, then a formal floodplain statement of findings must be prepared. The statement of findings must (a) quantify flood conditions and associated hazards as a basis for management decision making, (b) describe

the rationale for selection of a floodplain site, (c) disclose the resources and amount of risk associated with the chosen site, and (d) explain flood mitigation plans. The statement of findings must be available for public review and comment, generally by including it in an applicable NEPA compliance documentation.

NPS policy on watershed and stream processes (NPS 2006) states that, "*The Service will protect watershed and stream features primarily by avoiding impacts on watershed and riparian vegetation and by allowing natural fluvial processes to proceed unimpeded. When conflicts between infrastructure (such as bridges and pipeline crossings) and stream processes are unavoidable, NPS managers will first consider relocating or redesigning facilities rather than manipulating streams. Where stream manipulation is unavoidable, managers will use techniques that are visually nonobtrusive and that protect natural processes to the greatest extent practicable.*"

This floodplain statement of findings presents the rationale for the replacement and rehabilitation of park infrastructure within the 100-year floodplain of Salt Creek. This includes road repair, reconfiguration of a parking lot, sidewalks, picnic tables, a vault toilet, and replacement of a boardwalk. This floodplain statement of findings:

- quantifies the flood hazard associated with the proposed action;
- presents the rationale for the development of proposed facilities within the regulatory floodplain of Salt Creek in the park;
- documents the anticipated negative impacts of these improvements on human health/life, capital investment, and floodplain functions and values; and
- presents mitigations to these impacts.

PROPOSED ACTION

SUMMARY

Under the Proposed Action, the National Park Service would reconstruct facilities at Salt Creek, which were severely damaged in floods in 2022 and 2023 (Figures 1–6). The road, parking lot, vault toilet, and boardwalk would be reconstructed. The National Park Service would also remove damaged infrastructure from the creek channel, including from designated wilderness. Visitor vehicle access would be restored to the site. The boardwalk, vault toilet, and two parking spaces would be Architectural Barriers Act (ABA)–compliant and flood-resilient to the extent possible within the constraints of the purpose of and need for the project. The site, which is currently closed to vehicle access due to the damage, would also be closed to pedestrian access during construction, which is estimated to occur from approximately fall 2024 through spring 2025.

As described above, the objective of Executive Order 11988 is to avoid, ***to the extent possible***, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain

development ***wherever there is a practicable alternative***. As described below, adverse impacts from modification of the floodplain, would be avoided ***to the extent possible*** with design improvements over the previous boardwalk. There is ***no practicable alternative*** that would include a boardwalk resilient to significantly larger flood events than the proposed design. The purpose of rebuilding the boardwalk and associated infrastructure is for visitors to be able to view a 1.5-inch fish and to protect the fish from the visitors. If the boardwalk were constructed farther back or higher up from the creek, visitors would not be able to see the fish and would walk on the creek banks in order to view it. As described above in the Introduction, visitors walking on the creek bank damages the natural resources present, including the Salt Creek pupfish, which occurs nowhere else on earth. The National Park Service has documented visitors walking off the boardwalk and the damage it causes, which is why the boardwalk was present.

The location of the road and parking lot are also constrained by an adjacent wilderness boundary. Neither feature can be constructed in wilderness.

ROAD

The National Park Service would restore the road to its pre-flood condition — a dirt road accessible by low-clearance, two-wheel drive vehicles. The 1.2-mile-long road would follow the previous alignment, with minor adjustments at the end to connect to a new parking lot location (Figure 4). The road would be 24 feet wide with 1-foot shoulders. Rock embankment, rip-rap, or gabion baskets would be used to armor the road embankment against a new branch of the creek abutting the road alignment (Figure 5). This design would protect the road up to a 25-year flood event. The road cannot be shifted farther away from the creek because of the adjacent wilderness boundary.

The road surface would continue to consist of local, native materials of sand, soil, small rocks, and gravel. If any fill material is needed, it would be sourced from within the park. The road work would require use of a grader and an excavator within the limits of the road area, a roller for compaction, and dump trucks for moving material. An on-site water tank would be placed in the parking lot area, to be used for dust suppression during construction.

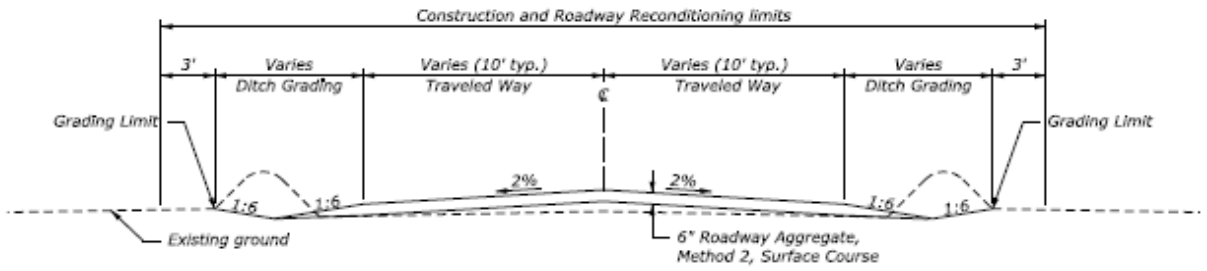


FIGURE 4. ROAD TYPICAL SECTION

FIGURE 5. ROAD PLAN WITH ARMORING

PARKING LOT

The National Park Service would reconstruct the parking lot to a similar capacity as the previous lot, though in a different location farther east due to the migration of the creek channel (Figure 6). The parking lot would consist of the same type of materials as the road described above. Although parking spots would not be delineated, capacity would be approximately 30 vehicles, including two designated ABA spots. Parking would be perpendicular to the flow of traffic on either side of a rectangular lot with a loop at the end of the lot to facilitate buses turning around. Buses would park along the entrance road. Adjacent to the ABA parking spots would be a concrete curb and ABA-compliant sidewalk that would connect to the vault toilet and the boardwalk. Concrete sitting areas with picnic tables would be located at the transition from the sidewalk to the boardwalk. A 4-foot-high wood-post-and-steel-cable fence would encircle the area. The parking lot would be constructed with heavy equipment to level it, including a grader and other equipment as needed. Exposed bedrock would be covered with native materials via grading.

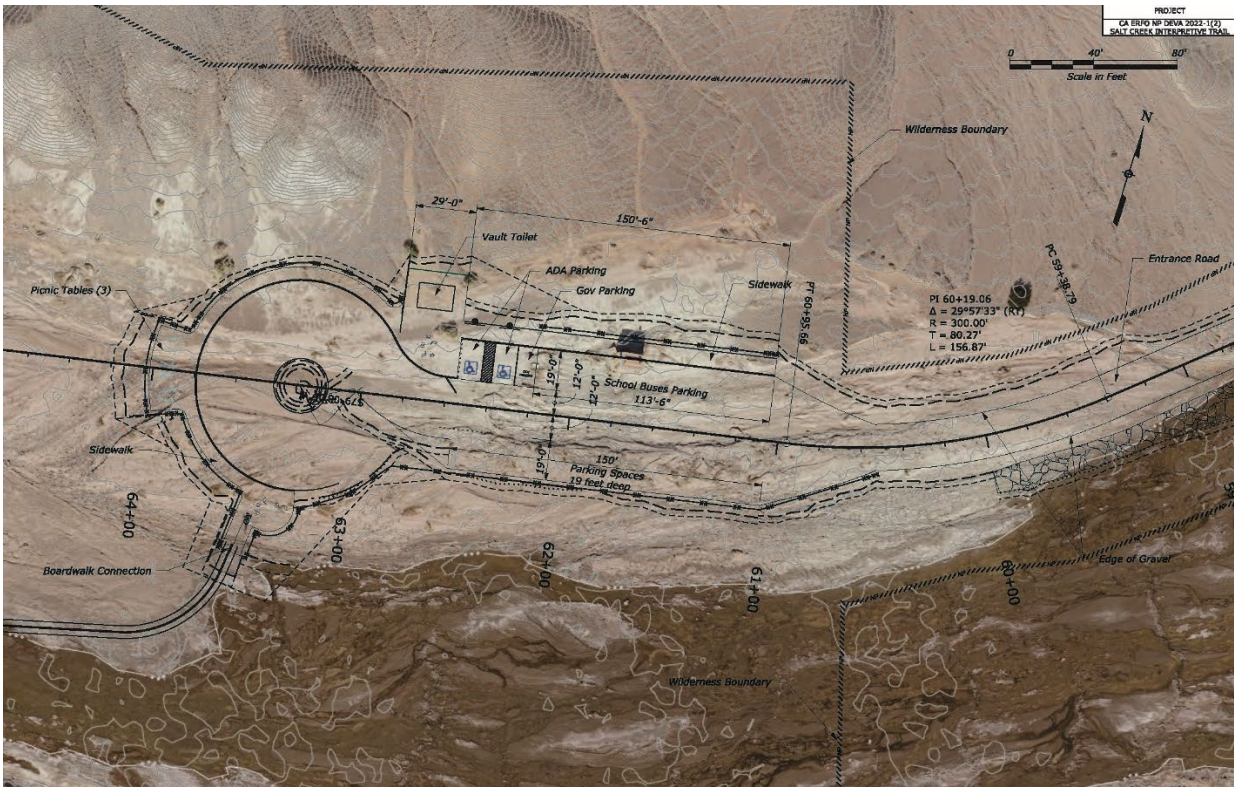


FIGURE 6. PARKING LOT CONCEPTUAL DESIGN

VAULT TOILET

The National Park Service would install an ABA-compliant double vault toilet adjacent to the parking lot (Figure 6). The unit would be prefabricated, approximately 14 feet wide by 9 feet deep by 10 feet tall, with a pitched roof and an underground 12-foot-deep vault. The building would be textured with aggregate and finished in a color to blend into the surroundings. The hole for the vault would be excavated with a backhoe or similar equipment at least 100 feet from the ordinary high-water mark and in an area of low paleontological sensitivity to the extent practicable, and the unit would be lowered into place with a crane.

BOARDWALK

The National Park Service would construct a boardwalk in a footprint similar to the original boardwalk location, with the proposed alignment sited based on the current creek channel alignment, elevations, and sensitive resources (Figure 7). The boardwalk would be flood-resilient, to the extent possible as described below, within the constraints of the purpose and need of the project, as described in the *Introduction*. The general alignment would be a spine-and-loop layout with wider "bump-outs" and benches at select viewing locations. The boardwalk would include interpretive signs, including the need for visitors to stay on the boardwalk to avoid soil compaction, erosion, and the loss of vegetation, associated with social trailing, which reduces the quality of Salt Creek pupfish habitat. The alignment would cross the creek and other sensitive resources at right angles to the extent practicable to minimize the crossing distance and associated disturbance. The boardwalk would be located

and designed to provide multiple opportunities to see pupfish and learn about them, including varied interpretive signs and waysides. The boardwalk would be approximately 6 feet wide (except wider at the bump-out viewing areas), 18 to 36 inches high, half a mile long, and ABA-compliant (Figures 7–10). Railings would be included in select locations as necessary for safety and resource protection. The deck would be thermally modified wood without any chemical treatments to last an estimated 25 years. The support structure and railings would be primarily wood with metal connecting hardware. The boardwalk would be anchored predominantly with steel helical piles drilled into the substrate (Figure 10). Individual piles would be sited to minimize sensitive resource damage, supplemented with floating piles that sit on the surface of bedrock where necessary and practicable.

FIGURE 7. BOARDWALK CONCEPTUAL ALIGNMENT

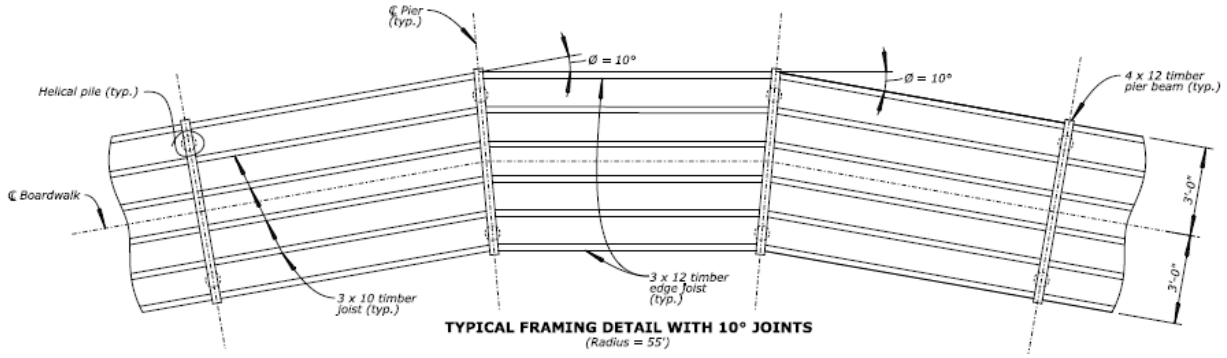
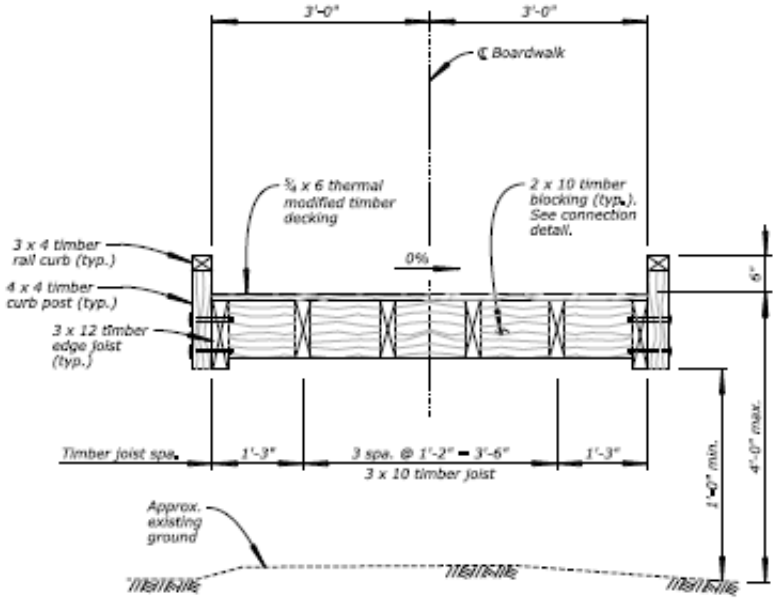
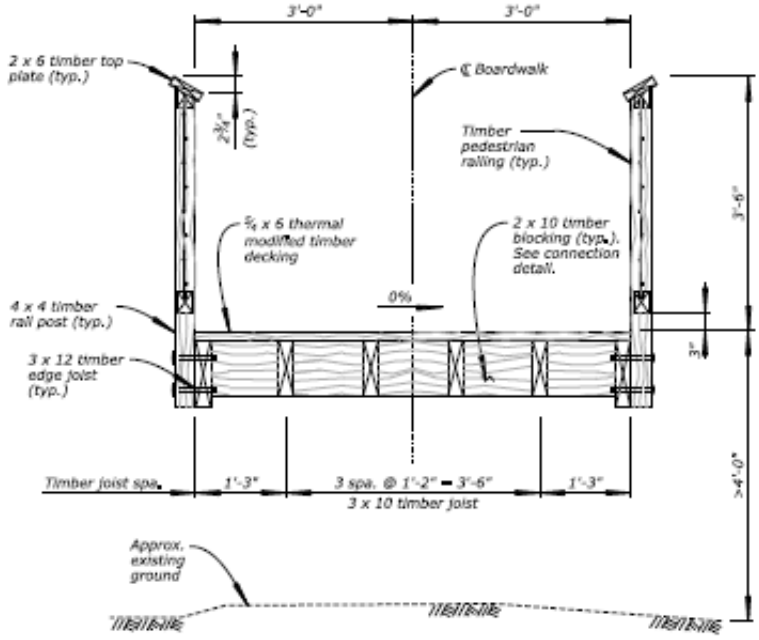


FIGURE 8. BOARDWALK CONCEPTUAL TYPICAL DECKING



TYPICAL SECTION WITH RAIL CURB



TYPICAL SECTION WITH PEDESTRIAN RAILING

FIGURE 9. BOARDWALK TYPICAL SECTIONS

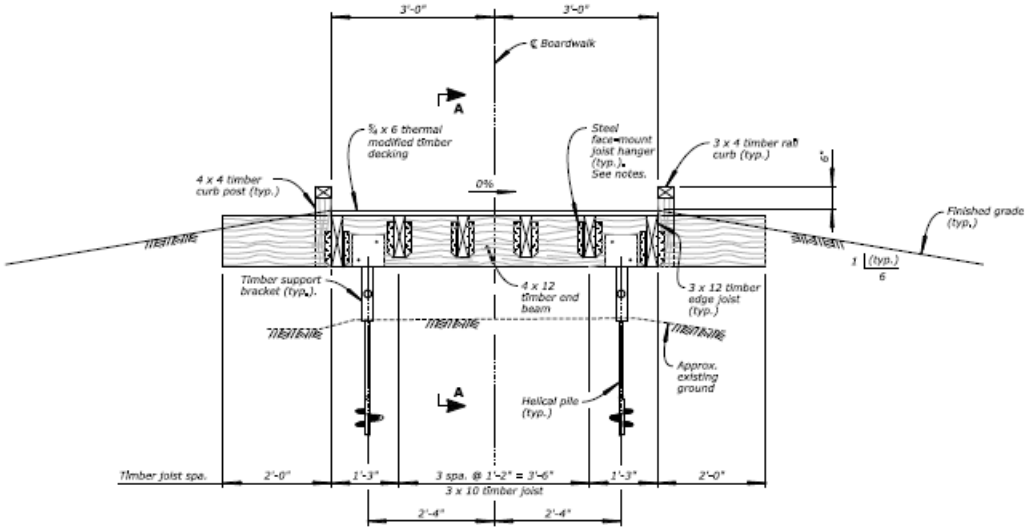


FIGURE 10. BOARDWALK CONCEPTUAL ABUTMENTS

Although no boardwalk that would fully withstand the floods of 2022 and 2023 could be feasibly constructed, the proposed boardwalk would be constructed to be resilient to smaller flooding events. For example, the proposed helical piles are less likely to be compromised by flooding than the previous concrete supports. Helical piles are also quicker to install and disturb less soil than concrete supports. The proposed boardwalk elevation has been designed to pass the 25-year (4% annual exceedance probability [AEP]) flood event. Raising the boardwalk higher above the creek would likely negatively impact visitor experience by moving the viewing platform farther from the pupfish habitat and making it more difficult to view the 1.5-inch fish, which would likely adversely impact resource protection by encouraging visitors to exit the boardwalk to get closer to the creek.

The proposed boardwalk foundations would be designed with a scour design flood of the 50-year flood (2% AEP) and scour check flood of the 100-year flood (1% AEP). The boardwalk would be stable up to and including the 100-year flood event (1% AEP) for scour.

The boardwalk would be constructed during daylight hours using a variety of heavy equipment (e.g., skid steer) and hand and power tools (e.g., saws and drills). Heavy equipment would be restricted to the minimum size needed to complete the work and operated in a manner to traverse the minimum amount of area as few times as possible, reducing potential soil and vegetation impacts to the extent possible.

REVEGETATION

The National Park Service would qualitatively monitor the progress of plant regrowth following the floods and construction with a focus on bank-stabilizing vegetation. If banks are substantially eroding to an extent that would adversely impact pupfish, the park would implement a revegetation plan to replace vegetation. Steps would likely include monitoring; invasive plant control; seed collection, purchase, cleaning, and storage; plant salvage and plant grow-out in a nursery; planting; watering; and monitoring. Key species would include pickleweed (*Allenrolfea occidentalis*) and salt grass (*Distichlis spicata*).

DEBRIS REMOVAL

Under Alternative B, the National Park Service or FHWA would remove large, visible, easily removed pieces of infrastructure debris from the creek channel and floodplain at and downstream from the site with the minimum motorized equipment necessary, consistent with the authorizing minimum requirements analysis (Figure 11). Most buried debris would be left in place to minimize resource damage associated with extracting it. Materials to be extracted include primarily wood, metal, and concrete. Smaller, lightweight debris would be removed by hand. Larger, heavier debris would be removed with the least-damaging methods and equipment practicable, including the use of helicopters. Helicopters would facilitate removal of debris without heavy equipment traversing the surface of the creek channel and floodplain. Helicopters would likely take off from the Furnace Creek Airport and would drop debris either at a construction staging area on the site's parking lot or at the airport.

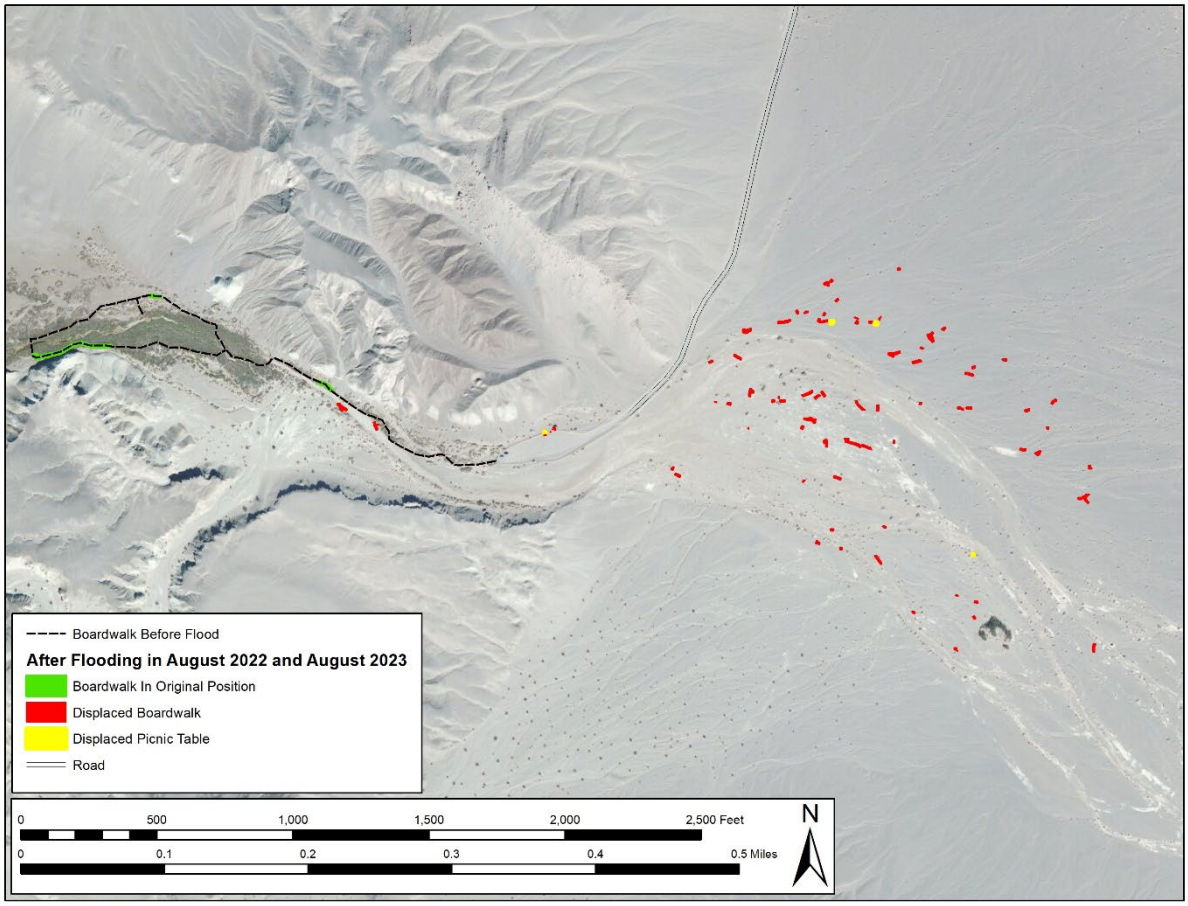


FIGURE 11. SALT CREEK BOARDWALK DEBRIS FIELD, OCTOBER 2023

Approximately 399 linear feet (2,699 square feet), in three segments, remain in the original pre-flood alignment. Approximately 49% of the original 2,892-linear-foot boardwalk is displaced and visible in aerial photography (Figure 10). The majority of the visible displaced material is in wilderness. Most of this material is partially buried. The rest of the material is likely buried.

STIPULATIONS AND MITIGATIONS

The National Park Service places strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources and the quality of the visitor experience, the park would implement stipulations and mitigations as part of the Action Alternative. The following measures are relevant to floodplain considerations.

General Construction Best Management Practices. The following best management practices would be implemented:

- Construction in and adjacent to the creek would be limited to October through March to minimize work during pupfish spawning periods. Construction boundaries would be established based on pupfish activity.
- Construction zones would be identified and flagged with construction tape, silt fencing, or a similar material prior to any construction activity. Flagging would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications, and workers would be instructed to avoid conducting activities beyond the construction zone, defined by construction zone fencing and flagging.
- The FHWA inspection staff would be responsible for ensuring the project remains within the construction area limits.
- Fugitive dust generated by construction would be controlled by water spraying at the construction site, if necessary. Any water used for dust control would be taken from a source approved by the park and applied at a rate that prevents soil erosion.
- To minimize possible petrochemical leaks from construction equipment, the contractor would regularly monitor and check construction equipment to identify and repair any leaks. A spill kit would be always kept on-site.
- Fuel would be stored in fuel trucks or aboveground storage tanks, and all fuel storage would be in staging areas. NPS-approved containment best management practices would be established in case of a spill.
- Tools, equipment, barricades, signs, demolition debris, and rubbish would be removed from the project work limits upon project completion.

Soils. The following measures would be implemented:

- Soil conservation measures would be employed. Soil would be replaced where present and affected to enhance revegetation following the construction phase.

- Disturbed soils are more susceptible to erosion, and until revegetation takes place, standard erosion control measures such as silt fences and/or sandbags would be used to minimize any potential soil erosion.

Vegetation. The following measures would be implemented:

- Disturbance to existing vegetation would be avoided to the greatest extent possible.
- During construction, native vegetation would be flagged for avoidance to the greatest extent possible.
- Vehicles, equipment, and storage and staging for materials would occur within the project footprint.
- Equipment used would be cleaned prior to arrival on-site to reduce the introduction of nonnative plant species.
- All equipment and materials would be staged on hardened surfaces, such as roadways and parking areas, to avoid damage to vegetation.

SITE DESCRIPTION

The site is approximately 14 miles northwest of Furnace Creek in Death Valley National Park, Inyo County, California (Figures 1 and 2). The legal description includes Sections 4 and 5, Township 16S, and Range 46E. Elevations average 208 feet below mean sea level (bmsl). A 1.2-mile dirt road leads from Highway 190 to the Salt Creek site (Figures 1 and 2).

FLOODPLAINS

The perennial flow of Salt Creek begins at McLean Springs. The creek flows within a broad floodplain with a meandering, braided channel. Salt Creek is a closed basin; it does not flow into another creek. It may flow for approximately 3.1 miles (5 km) in the winter, but it dries to approximately 0.9 miles (1.5 km) in summer (Moyle 2002). Salt Creek is a meandering, mud-bottomed, braided, saline stream. Before flooding, the creek was deepest near the headwaters and shallowest in the lower drainage, where the water only flows seasonally, and it includes pools, runs, and marshes (Sada and Deacon 1995; Dzul et al. 2012). Salt grass (*Distichlis spicata*), pickleweed (*Allenrolfea occidentalis*), and saltbrush (*Atriplex canescens*) bordered the creek. Heavy growths of wiregrass (*Juncus* sp.), hornwort (*Ceratophyllum demersum*), and algae were present. Since flooding, the stream is more channelized, the braiding pattern has been altered, and vegetation cover is substantially reduced.

The past and proposed boardwalk, parking lot, and most of the access road are in the floodplain (Flood Insurance Rate Map: 0600732425D, Zone A) (Federal Emergency Management Agency [FEMA] 2023) (Figure 12). FEMA defines Zone A as “areas without base flood elevation” for the 1% annual chance flood (100-year floodplain). The western portion of the site is within the 0.2% chance annual flood (500-year floodplain). The FFRMS regulatory floodplain in the project area ranges from 201 (downstream) to 193 feet below

mean sea level (upstream), and the existing land surface elevation ranges from 205 (downstream) to 200.5 feet below mean sea level (upstream) (using the 500-year floodplain method) (Figures 12 and 13). The proposed boardwalk would be 18 to 36 inches higher than the surface elevation, with the maximum heights occurring where the boardwalk crosses the creek. During a 500-year flood event, the project site would be inundated by 4 to 7 feet of water, with the deepest flood waters located upstream where the floodplain is more constricted.

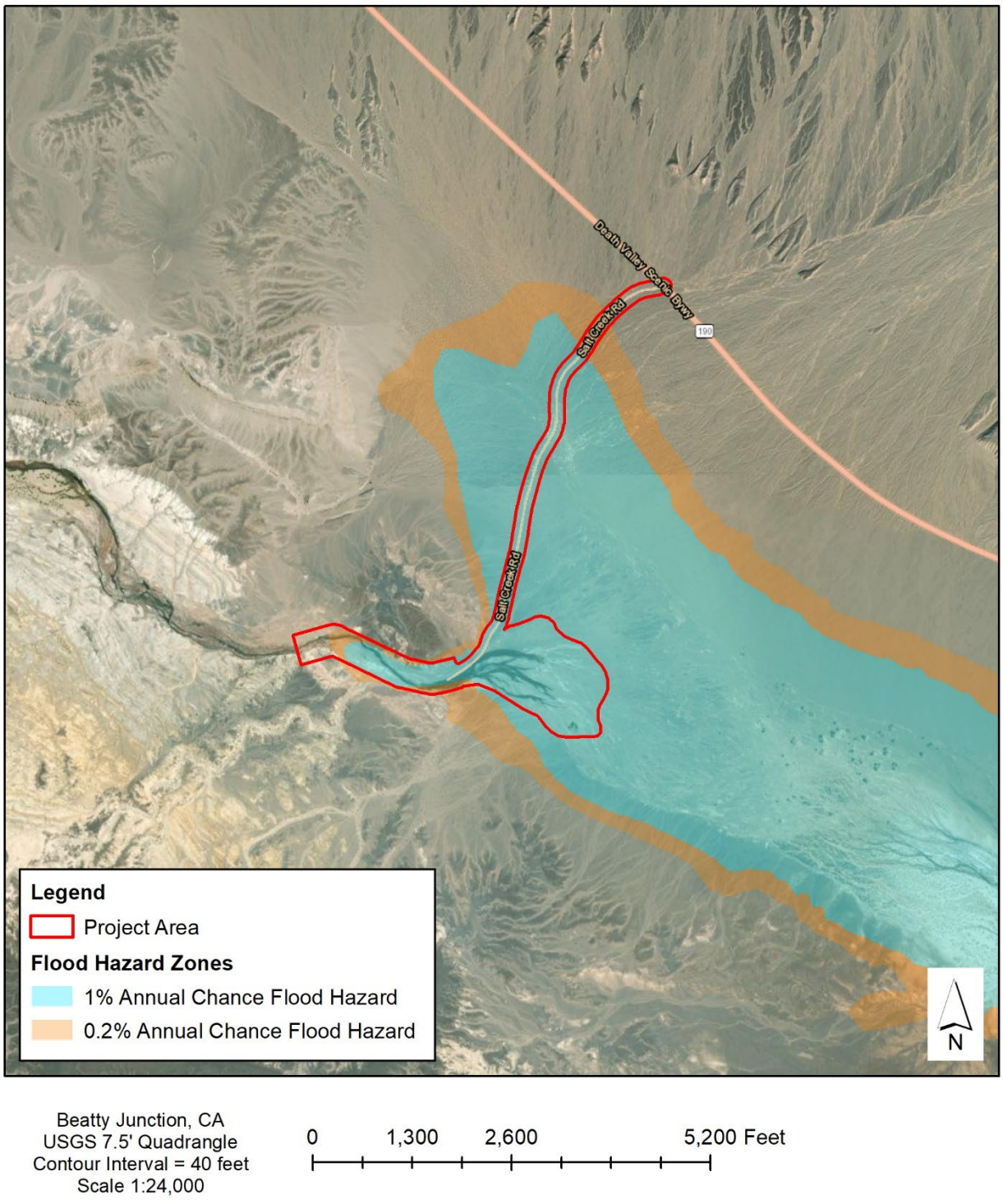


FIGURE 12. FEMA NATIONAL FLOOD HAZARD LAYER FIRMETTE

The site is approximately 16 acres within the floodplain of the creek, which has been used as an NPS interpretive facility since the 1970s. All of the actions associated with the proposed alternative are Class I actions (NPS 2002), which "include location or construction of administrative, residential, warehouse, and maintenance buildings; non-excepted parking

lots; or other man-made features which by their nature entice or require individuals to occupy the site, are prone to flood damage, or result in impacts to natural floodplain values. Class I Actions are subject to the floodplain policies and procedures if they lie within the 100-year floodplain (the Base Floodplain)."

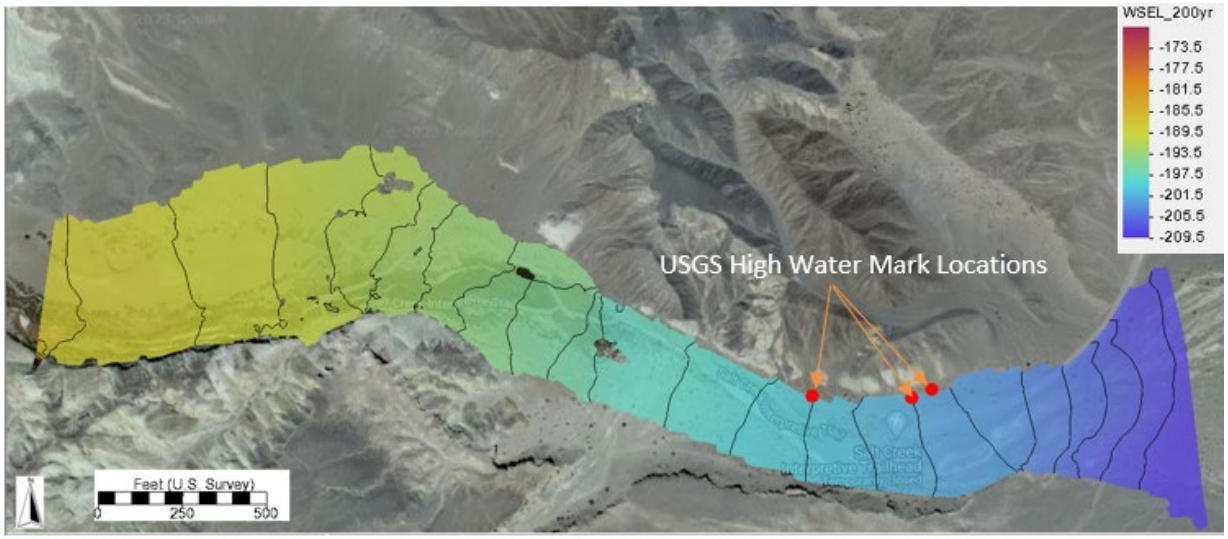
The site is and has been susceptible to flooding during 100-year flood events. On August 5, 2022, unprecedented rains caused severe flash floods across the park, which destroyed the boardwalk. The floods swept away the boardwalk, leaving pieces of it scattered downstream, altered the overall topography of the area and changed the course of the creek. The floods also damaged the parking lot, access road, vault toilet, and interpretive waysides. On August 20, 2023, for the second year in a row, extreme flooding (associated with the remnants of Hurricane Hilary) again severely flooded Salt Creek, further altering the stream channel.

Both floods are believed to have been between a 200-year and 500-year flood event based on site observations and Surface-Water Modeling System (SMS) modeling and LIDAR (Figure 13). FHWA used SMS to model the base flood elevation (Figure 14) and determined the site hydrology using available gage data (station number 10251100) in the project vicinity and conducting a flood frequency analysis using the available data.

Mitigation efforts have been taken to protect the structure. These include designing the boardwalk profile to pass the 25-yr flood event (4% AEP) without pressure flow and designing boardwalk foundations with a scour design flood of the 50-year flood (2% AEP) and scour check flood of the 100-yr flood (1% AEP). The scour design of the boardwalk was completed by creating sediment transport models as well as analyzing local scour at pier locations to ensure the effects of scour were captured. The model assessed vertical erosion and deposition and not lateral migration or other planform changes. The model was used to evaluate potential erosion throughout the system to aid in determining scour depths for the scour design flood (50-year event) and scour check flood (100-year event). Pier scour equations were used to compute the local effects of the helical piles and ensure that their embedment was adequate for the design events.

The installation of the new boardwalk will not pose any risk to life or property and will be significantly more resilient than the previous boardwalk that was in place. In addition, significantly raising the boardwalk would take away the visitor experience that is vital to the purpose of the boardwalk.

200-yr Storm Event



500-yr Storm Event

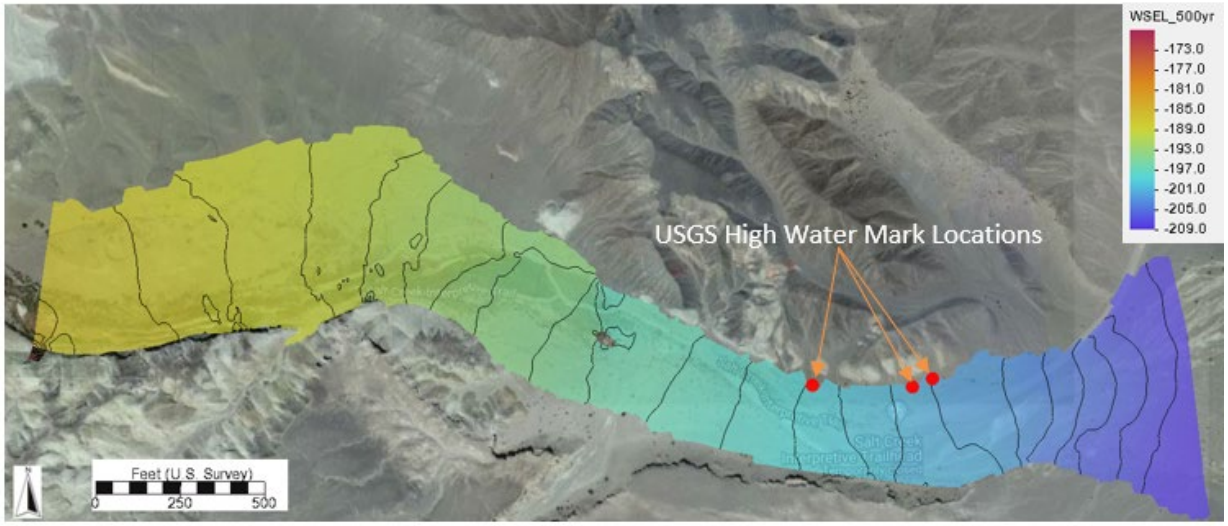


FIGURE 13. 2022 MODELED FLOOD MAPS

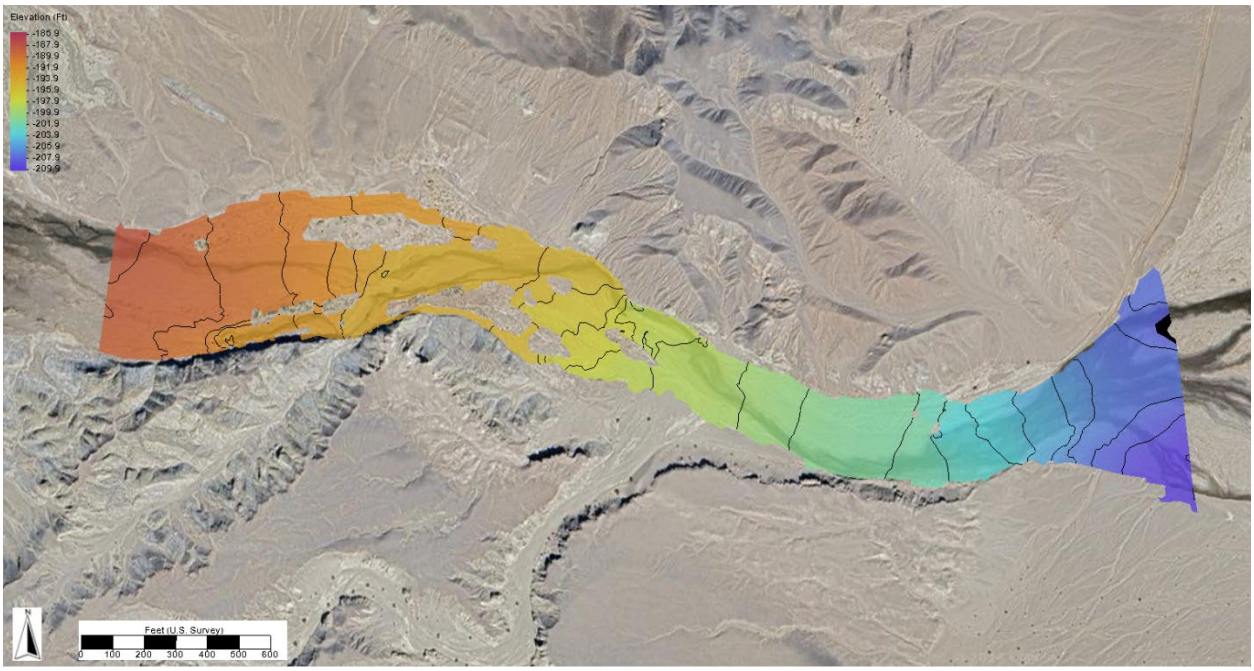


FIGURE 14. MODELED BASE FLOOD ELEVATION

WETLANDS

Wetlands, as defined by US Army Corps of Engineers criteria and the wetland definition used for Section 404 of the Clean Water Act permitting (33 CFR 328.3), were present in pockets along the creek where silty wetland soils and hydric vegetation were present (US Fish and Wildlife Service [USFWS] 2023). These wetlands were palustrine, emergent, persistent, and seasonally flooded, under the Cowardin et al. (1979) classification system (USFWS 2023). These wetlands were scoured away by the 2022 and 2023 floods and are not currently present.

The FHWA (2024) completed an aquatic resources delineation survey in December 2023 to document conditions after the second flooding event. Methodology followed the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0* (USACE 2008), *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008), the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar 2010), and the OHWM Regulatory Guidance Letter No. 05-05 (USACE 2005). Wetland indicator statuses for plants were taken from *The National Wetland Plant List, version 3.5* (USACE 2020).

Approximately 6 acres (4,768 linear feet) of potential Waters of the US, in the form of an intermittent stream, are currently present within the approximately 16-acre site, but no wetlands, according to US Army Corps of Engineers criteria and the wetland definition used for Section 404 of the Clean Water Act permitting (33 CFR 328.3), are currently present in the boardwalk area (FHWA 2024).

Salt Creek is riverine, intermittent, streambed, and seasonally flooded, under the Cowardin et al. (1979) classification (FHWA 2024; USFWS 2023). The National Park Service (2016) uses the Federal Geographic Data Committee (2013) definition of wetlands so that the stream is managed as a wetland even if the US Army Corps of Engineers definition is not met.

This proposed action would have no impact on existing riverine wetland function. The total new wetland impacts (permanent and temporary) from construction would affect less than 0.1 acres, in the form of helical and floating piles to support the boardwalk. The action is listed in section 4.2.1 of *Procedural Manual #77-1* (NPS 2016) as an exempt action under, "**Maintenance, repair, or renovation** (but not full reconstruction[1] or expansion) of currently serviceable[2] facilities or structures:

. . .This exception allows for **minor** (0.1 acre or less) deviations in the structure's configuration or fill footprint in wetlands due to changes in construction codes, methods, or safety standards (e.g., handicap [sic] accessibility), but does not apply to other types of reconstruction/expansion (e.g., road widening to increase capacity, road re-routing) or conversion to other uses that cause new adverse impacts on wetlands."

Therefore, this project is exempt from an NPS Wetland Statement of Findings and compensation requirements. The National Park Service will coordinate with the US Army Corps of Engineers to ensure that the work is authorized under Section 404 of the Clean Water Act.

JUSTIFICATION FOR USE OF THE FLOODPLAIN

No practicable alternatives exist for locating the project outside of the regulatory floodplain because:

- Salt Creek is the only location in the world where Salt Creek pupfish occur. The site, which is entirely in the 100-year floodplain, provides accessible viewing, interpretive, and educational opportunities. Pupfish are small and cannot be viewed from a distance. Therefore, the functions of the site cannot be moved to another location.
- Protecting the pupfish species and its habitat requires infrastructure. Without appropriate infrastructure, visitors walking around the creek would disturb the fish's habitat and life cycle, as well as that of other wildlife that use the creek. Social trails would be created, which would harden soil, damage vegetation, increase sedimentation, and limit suitable soil conditions for healthy vegetation, especially salt grass (*Distichlis spicata*) and pickleweed (*Allenrolfea occidentalis*). Loss of vegetation decreases shading along the creek, which is a critical component of the pupfish's

[1] Full reconstruction of instream diversions, water intake or outfall structures, or similar, legal and permitted instream structures that are damaged or destroyed by storms, floods or similar events may be allowed under this exception.

[2] "Currently serviceable" means usable as is or with maintenance or renovation, but not so degraded as to require full reconstruction.

habitat. Therefore, not replacing infrastructure in the floodplain would have more adverse impacts on sensitive resources than replacing the infrastructure.

INVESTIGATION OF ALTERNATIVE SITES

No alternative sites were identified that would entirely avoid locating project facilities in the floodplain. As described above under "Justification for Use of the Floodplain," the purpose of constructing infrastructure in the floodplain is to allow interpretation and protection of the Salt Creek pupfish, which only occurs in Salt Creek. The fish are too small to view from any substantial distance, and infrastructure is needed to provide the public with up-close viewing opportunities. Without the infrastructure, visitors would walk along the creek, compacting the soil and trampling vegetation, both of which would adversely impact the pupfish. Completely preventing visitation to the site is not practicable nor desirable due to the unique features that draw people to the area.

FLOOD RISKS

Flood risks associated with the proposed action include risk to capital investment resulting from damage to infrastructure and a slight risk to human health and life due to daytime floodplain occupancy. As described in the "Proposed Action" section above, virtually all existing and new infrastructure at the site would be subject to inundation during the regulatory flood. Infrastructure would be subject to flood depths sufficient to submerge all proposed infrastructure during the regulatory flood. No electricity or other utilities are proposed or currently located at the site. For the same reasons described above in "Justification for Use of the Floodplain" and "Investigation of Alternative Sites," opportunities for reducing the susceptibility of the infrastructure to flooding are limited.

Proposed construction activities would occur in areas of the site that previously had similar infrastructure. Although specifications differ and resilience against the 100-year flood event (1% AEP) would be greatly increased, the extent of new construction is similar to previous infrastructure. Impacts on property and to floodplain functions and values would be similar to the previous infrastructure. The boardwalk, access road, and parking lot would be of similar size as the previous features. The proposed concrete sidewalk adjacent to the gravel parking lot would be a new feature. The boardwalk is designed to be more resilient to flooding than the previous boardwalk and as resilient as possible within the constraints of the purpose of the project. The proposed boardwalk foundations are designed with a scour design flood for the 50-year flood (2% AEP) and scour check flood for the 100-year flood (1% AEP). The boardwalk structure would be stable up to and including the 100-year flood event (1% AEP) in terms of scour and for all smaller events as well.

The additional concrete for the sidewalk is unlikely to negatively affect flood storage or groundwater recharge to a measurable degree or degrade overall riparian services because the concrete footprint (approximately 6,000 square feet) would be small relative to the area of the floodplain. The redesigned boardwalk and reconfigured gravel parking lot are unlikely to negatively affect flood storage or groundwater recharge to a measurable degree or degrade

overall riparian services because the impervious surface footprint would remain approximately the same after construction as in the pre-flood conditions.

Because the floodplain contains little vegetation, limited rock, or developed soils, the sand, gravel, and silt present are highly susceptible to erosion, sediment deposition, and channel adjustments. The floods in the last two years have substantially altered the locations of the channels, eroded banks, and deposited sediments. Until vegetation has been reestablished, future minor flood events are likely to continue to alter the morphology of the floodplain. Floods of the size of the 2022 and 2023 floods would alter morphology regardless of vegetation presence.

The proposed boardwalk structure would be founded on helical piles 2-7/8" and 5-1/2" in diameter, which would have significantly less potential to induce flow constrictions and bed scour than the previous boardwalk foundation consisting of concrete footings (approximately) 12" in diameter (Figure 10). The proposed boardwalk is designed with a scour design flood of the 50-year flood event and a scour check flood of the 100-year flood event, meaning that the structure would be stable (in terms of scour) for events up to and including the 100-year flood. The helical piles proposed for installation (Figure 10) would have minimum impact on the streambed. However local scour would occur around the helical piles, and this is being accounted for in foundation design. The boardwalk itself is not expected to constrict the channel, as the stream is able to flow around all supports and is not constrained by abutments or embankments. The boardwalk's presence would have minor impacts on the course and trajectory of the stream by altering what is more erodible versus erosion resistant. It would deflect and translate erosive energy and influence where erosion occurs. The proposed boardwalk would be able to pass the 25-year flood event (4% AEP) without any pressure flow.

FLOOD MITIGATION PLAN

The park would continue to maintain an active floodplain evacuation protocol. This protocol entails monitoring communications during floods and conducting rescue and salvage operations if necessary. This protocol has proven effective in maintaining safety during floods, and it will continue to be reviewed and updated.

No proposed infrastructure could reasonably be moved. Facilities that cannot be moved would be subject to flood damage.

The design of new structures throughout the site would incorporate methods for minimizing flood damage as contained in the National Flood Insurance Program's Floodplain Management Criteria for Flood-Prone Areas (44 CFR 60.3) and in accordance with local, county, or state requirements for flood-prone areas. The boardwalk would be supported largely with helical piles, and the decking would be higher than the previous decking, increasing the level of flooding that the structure could withstand without significant damage.

Ample notice of significant, widespread storms, such as hurricanes and atmospheric rivers, is provided by the National Weather Service. In those cases, the park would have at least a day of notice and would lock the gate to the Salt Creek access road.

However, intense localized storms are harder to predict with ample notice. The National Weather Service daily forecast might indicate a chance of rain somewhere within the park. As a storm cell develops, the National Weather Service is usually able to call the park with about an hour of warning to give the predicted storm path. Fortunately, Salt Creek is only a 15-minute drive from Cow Creek and Furnace Creek, where most NPS staff work. However, the National Weather Service has not provided a detailed, location-specific warning before all of the park's recent localized flood events. This means evacuating Salt Creek may be an option but is not guaranteed. Such localized, intense weather events are likely to cause people to retreat from the short trail before any flooding results. Signage would be installed indicating that the area is prone to flooding and visitors should exercise caution in stormy conditions.

SUMMARY

The National Park Service has determined that implementing the proposed action would not result in any additional disruption of floodplains. The risk to life, property, and natural resources from flooding can be partially mitigated. The proposed action would restore visitor experience while protecting natural resources. Additionally, the project would address compliance with the ABA. New structures would be designed for improved resilience against future flood events. Avoidance of floodplains is not possible due to the required location of project facilities in the floodplain to meet the project purpose and need. Necessary adverse floodplain impacts have been reduced to the greatest practicable extent while meeting the design requirements and operational needs of the site. With the proposed mitigations applied, the National Park Service finds that the proposed action would not have any additional adverse impacts on floodplains and their associated values.

LITERATURE CITED

Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe

1979 *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. Washington, DC: US Fish and Wildlife Service. https://www.fws.gov/wetlands/documents/classification-of-wetlands-and-deepwater-habitats-of-the-united-states.pdf

Curtis, K.E., and R.W. Lichvar

2010 *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States.* ERDC/CRREL TN-10-1. U. S. Army Engineer Research and Development Center. Hanover, NH.

Dzul, Maria C., D. Bailey Gaines, Jesse R. Fischer, Michael C. Quist, and Stephen J. Dinsmore
2012 "Evaluation of Otoliths of Salt Creek Pupfish (*Cyprinodon salinus*) for Use in Analyses of Age and Growth." *The Southwestern Naturalist* 57(4): 412–416. https://doi.org/10.1894/0038-4909-57.4.412

Environmental Laboratory
1987 *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. NTIS No. AD A176 912. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/4532/

Federal Emergency Management Agency
2023 National Flood Hazard Layer FIRMette. https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd

Federal Geographic Data Committee
2013 *Classification of Wetlands and Deepwater Habitats of the United States*. Adapted from Cowardin, Carter, Golet and LaRoe (1979). August 2013. Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States-2013.pdf (fgdc.gov)

Federal Highways Administration
2024 *Aquatic Resources Delineation Report, Salt Creek Interpretive Trail Boardwalk Project, CA ERFO NP DEVA 2022-1(2), Inyo County, California*. Prepared by Rachel Newton, Jacobs, for Federal Highway Administration, Central Federal Lands Highway Division.

Lichvar, Robert W., and Shawn M. McColley
2008 *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States*. ERDC/CRREL TR-08-12. U. S. Army Engineer Research and Development Center. Hanover, NH.

Moyle, Peter B.
2002 *Inland Fishes of California*. Berkeley: University of California Press.

National Park Service
2002 *Procedural Manual #77-2 National Park Service Floodplain Management*. October 2002. https://www.nps.gov/subjects/policy/upload/PM-77-2_10-2002_508.pdf

2006 *Management Policies 2006*. https://www.nps.gov/subjects/policy/upload/MP_2006.pdf

2016 *Procedural Manual #77-1: Wetland Protection*. https://www.nps.gov/subjects/policy/upload/PM-77-1_6-21-2016_508.pdf

Sada, Donald W. and James E. Deacon

1995 *Spatial and Temporal Variability of Pupfish (Genus Cyprinodon) Habitat, Populations, and Microhabitat Use at Salt Creek and Cottonball Marsh, Death Valley National Park, California.* Report to National Park Service, Death Valley National Park. Cooperative Agreement No. 8000-2-9003.

US Army Corps of Engineers

2005 RGL 05-05. *Ordinary High Water Mark (OHWM) Identification*. Regulatory Guidance Letter. December 7. http://www.nap.usace.army.mil/Portals/39/docs/regulatory/rgls/rgl05-05.pdf

2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0*. ERDC/EL TR-08-28. US Army Engineer Research and Development Center, Vicksburg, MS.

2020 *National Wetland Plant List*. https://cwbi-app.sec.usace.army.mil/nwpl_static/v34/home/home.html

US Fish and Wildlife Service

2023 National Wetlands Inventory. Accessed October 26, 2023. https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/

ACRONYMS AND ABBREVIATIONS

ABA	Architectural Barriers Act of 1968, as amended
AEP	annual exceedance probability
CFR	Code of Federal Regulations
e.g.	for example
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FHWA	Federal Highway Administration
NEPA	National Environmental Policy Act of 1969, as amended
NPS	National Park Service
SMS	Surface-Water Modeling System
USDOT	US Department of Transportation
USFWS	US Fish and Wildlife Service