

National Park Service
U.S. Department of the Interior

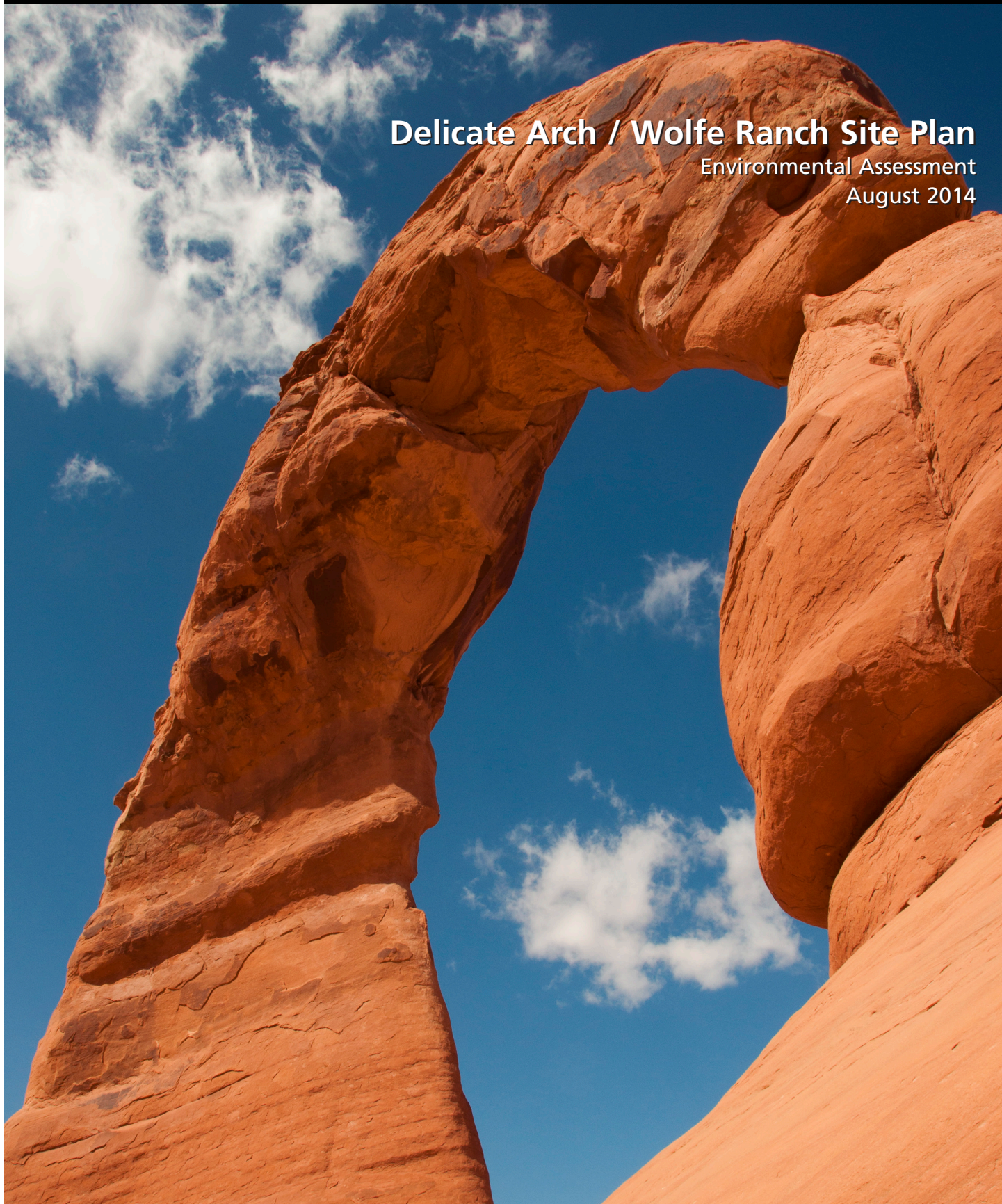
Arches National Park
Moab, Utah



Delicate Arch / Wolfe Ranch Site Plan

Environmental Assessment

August 2014



Delicate Arch/Wolfe Ranch Site Plan

Environmental Assessment

Summary

Arches National Park (Arches) proposes to implement congestion-management strategies to more efficiently manage visitor use in the Delicate Arch/ Wolfe Ranch parking area. Strategies proposed are to expand the existing parking lot at the Delicate Arch/Wolfe Ranch trailhead, eliminate roadside parking, implement a reservation system for parking at the Delicate Arch/Wolfe Ranch parking lot, and re-channelize Winter Camp Wash to reduce the frequency of road closures due to flooding and sediment deposition.

This Environmental Assessment (EA) evaluates three alternatives. One alternative (no action) describes expected conditions if no changes are made at the Delicate Arch/Wolfe Ranch area. Another alternative addresses the implementation of a reservation system in lieu of expanding the parking area and the third alternative outlines both expanding the parking area and implementing a reservation system to the site. Elimination of roadside parking, construction of a bike/pedestrian path along the road between Delicate Arch Viewpoint and the Delicate Arch/Wolfe Ranch parking lots, and re-channeling Winter Camp Wash are included in both “action” alternatives.

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet objectives of the proposal, 2) evaluates potential issues and impacts to the resources and values, and 3) identifies best management practices to lessen the degree or extent of these impacts.

This EA analyzes the following resource topics in detail because the resultant impacts would be noticeably measurable: Soils, Vegetation, Floodplains, Visitor Use and Experience and Park Operations. All other resource topics were dismissed because the project would result in little to no effect to those resources. No major effects are anticipated as a result of this project. Public scoping was conducted to assist with the development of this document and comments were received, mostly in support of the proposed project.

Public Comment

If you wish to comment on the EA, you may post comments online at <http://parkplanning.nps.gov/arch> or mail comments to: Planning and Compliance, Southeast Utah Group, National Park Service, 2282 S. West Resource Blvd, Moab, Utah 84532.

This EA will be on public review for 30 days. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. Comments will not be accepted by fax, email, or in any other way than those specified above. Bulk comments in any format (hard copy or electronic) submitted on behalf of others will not be accepted.

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PURPOSE AND NEED

Introduction

Arches National Park is in the heart of canyon country in southeastern Utah and is considered one of America's scenic wonders. The park preserves 76,679 acres of high desert on the Colorado Plateau, punctuated by rocky ridges, canyons, fins, towers, monoliths, pinnacles, and more than 2,000 arches. Delicate Arch has become an icon; it is the adopted symbol for the Utah license plate and is a "must see" for visitors from around the world. The nearby town of Moab is a major tourist destination that serves as a hub for a wide range of recreational activities in the surrounding region. Arches' extraordinary geological features are easily accessible, many by vehicle or short walking distances from trailhead parking areas making the park primarily known as a drive-through park.

The purpose of this Environmental Assessment (EA) is to examine the environmental impacts associated with implementing parking congestion management strategies for the Delicate Arch/Wolfe Ranch parking lot such as expand the existing parking lot to eliminating roadside parking and implementing a reservation system. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, regulations of the Council on Environmental Quality (CEQ) (40 CFR §1508.9), and NPS Director's Order (DO)-12 (*Conservation Planning, Environmental Impact Analysis, and Decision-Making*).

Background

The project area is the parking area for one of the most popular sites in Arches. The project area is the trailhead for Delicate Arch, a 65-foot (20 m) tall freestanding natural arch. It is the most widely-recognized landmark in Arches National Park and the state of Utah and as such is depicted on the Utah state license plates. The Olympic torch relay for the 2002 Winter Olympics passed through the arch as well. Visitors come from all over the world to see Delicate Arch which is touted as a "must see" and on many visitor's bucket list. The splendor of the arch can't be seen from the roadway and is only a moderate 3 mile round trip hike. There is also a Delicate Arch viewpoint area below the arch that can be viewed by visitors who are short on time or are restricted in their hiking abilities.

Historic Wolfe Ranch is also located near the project site off of the trail to Delicate Arch. Wolfe Ranch was settled in 1888 by Civil War Veteran John Wolfe and his son. The Wolfe's built a one-room cabin, a corral and a small dam across Salt Wash. This site was added to the National Register of Historic Places in 1975. An additional cultural resource, a Ute Indian rock art panel depicting bighorn sheep, horses and dogs on boulders, can be found near the trail to Delicate Arch as well.

Daily visitation to the site during the peak seasons is approximately 2,000 people per day and the parking lot is one of the smallest of the popular park sites. Current parking capacity of 73 parking spaces is not sufficient for today's visitation. Parking capacity was initially designed and limited through Visitor Experience and Resource Protection (VERP) analysis in the early 2000's. However demand for parking has exceeded available parking capacity ever since. According to park occupancy and duration data collected in 2010 and staff observations, the parking lot fills to capacity for most of the day starting at 9:30 a.m. and it has become the new norm to see more than 100 vehicles parked along the road shoulders.

Figure 1: Wolfe Ranch/Delicate Arch Road**145 vehicles parked along the road Saturday, May 25, 2013 at 11:45am**

Purpose and Need

The purpose of the proposal is to enhance the visitor experience at this site and to preserve and restore natural resources that have become damaged. When parking areas and trails become congested, visitor experience is diminished. Parking at Delicate Arch/Wolfe Ranch is frequently congested eight months out of the year, causing visitors to park outside of paved areas, damaging sensitive soils and vegetation. Flooding is another issue within the site since Winter Camp Wash bisects the road and during flood events the road must be closed. Congestion and inadequate parking along with road closures frustrates our visitors. The proposed project is being considered to address the following issues and needs:

- Delicate Arch is one of the primary locations park visitors visit. Daily visitation to Delicate Arch during the peak seasons is approximately 2,000 people and the parking lot is one of the smallest of the popular park sites. Current parking capacity of 73 parking spaces is not sufficient for current visitation and the parking lot fills to capacity for most of the day, almost every day of the week from March through September.

The parking area at Delicate Arch/Wolfe Ranch is frequently congested, causing visitors to park outside of paved areas, potentially damaging sensitive soils, vegetation. The need to create more parking without deteriorating from a visitor's experience is an opportunity park management would like to pursue.

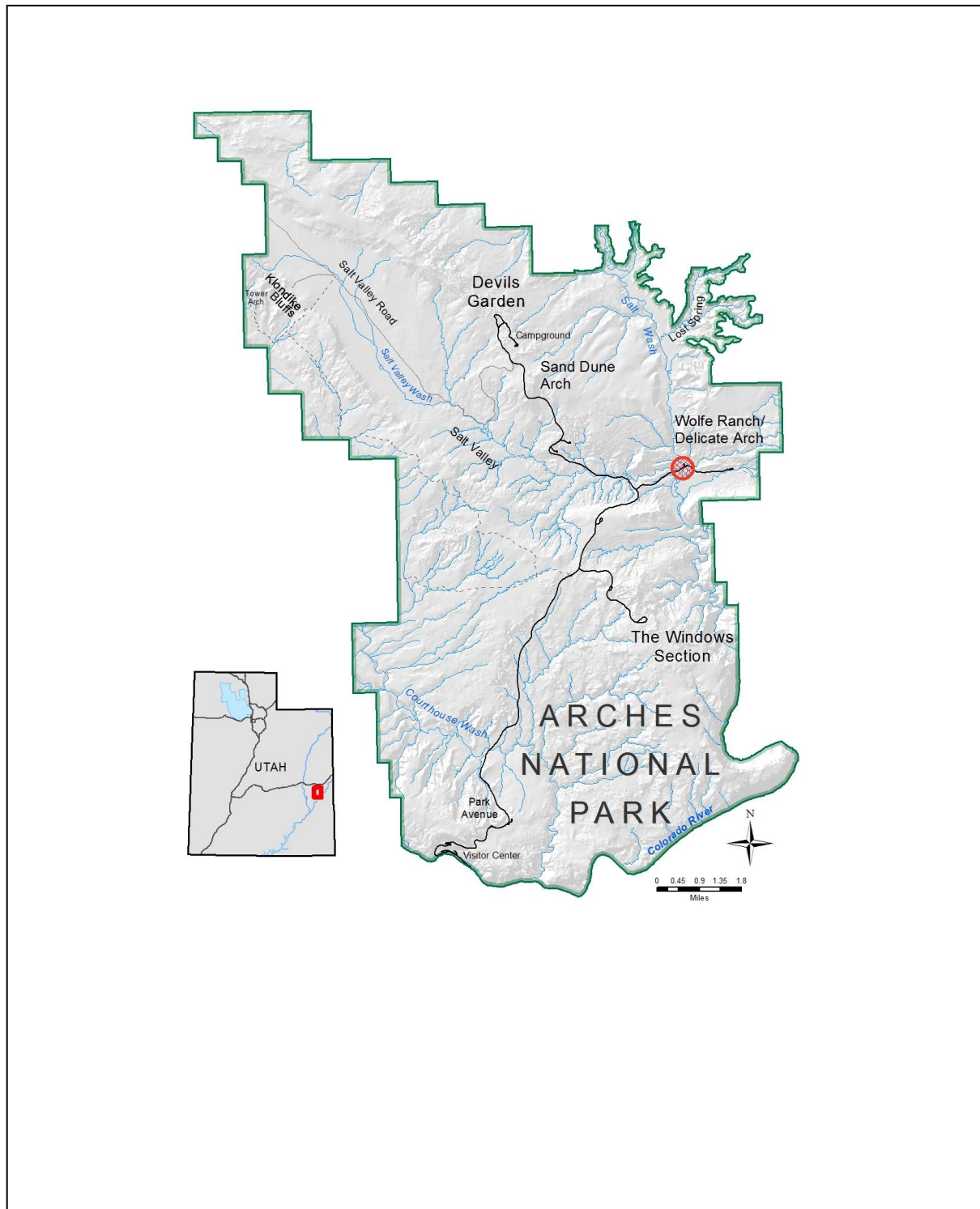
- The Delicate Arch Viewpoint parking lot has a total of 73 parking spaces (53 standard, 17 oversized and 3 accessible). Sample occupancy data and staff observations show that this parking lot is only occupied at 30% of its total capacity and could accommodate additional parking for both oversized and standard vehicles (Johnson, 2012). There is a need create opportunities for visitors to utilize this parking lot to an 85% capacity.

- Maneuvering a large 40 passenger tour bus through the current parking lot is not advised as the turn radius is narrow. Dropping off and picking up passengers at the trailhead at times causes congestion issues. There is a need to create a separate loading and unloading bus zone.
- Due to the main road being paved in 1994, sediment from Winter Camp Wash over the last 20 years has completely filled in the box culverts and now the wash is at the same grade with the road on both sides. The road itself has impeded the natural process of the wash system. The wash on the south side of the road is currently pooling water as water cannot flow freely down the wash. This pooling of water causes sediment and water to back up on the road. This section of road currently functions as a low water crossing. Most intermittent flood events cause the road to Delicate Arch Viewpoint to flood and traps visitors on the east side of the road until the water level recedes. Once the water recedes, the amount of sediment deposited on the road surface requires heavy equipment for removal prior to opening the road. There is a need to address the maintenance of the road and wash system.

Overall, the proposed improvements should protect park resources, improve traffic safety, facilitate maintenance, and provide a better visitor experience. The objectives of the proposed project are to:

1. Protect the park's natural and cultural resources from potential impacts attributable to vehicles and visitor use
2. Improve visitor experience in the project area
3. Improve parking and visitor safety;
4. Improve functioning of the Winter Camp Wash floodplain system;
5. Identify management options to continue to positively manage visitation in this high use area.

Figure 2: Location of Delicate Arch/Wolfe Ranch parking area



Impact Topics Retained For Further Analysis

The following Impact topics are carried forward for further analysis in this EA:

- Soils
- Vegetation
- Floodplains
- Visitor Use and Experience
- Park Operations

Impact Topics Dismissed From Further Analysis

Table 1 indicates which impact topics were dismissed from further analysis with a brief explanation why. The table also includes the law, regulation, and/or policy that governs the compliance for that particular impact topic and a brief description of the affected environment, or baseline conditions, in the project area.

Table 1: Impact Topics Dismissed From Further Analysis

Topic	Law, Regulation, Policy	Affected Environment / Reason Dismissed
Geologic Resources	NPS Management Policies; NPS Director's Order 77: Natural Resource Protection	Construction related activities would not involve additional cuts through bedrock. Fill material brought in would have negligible impacts on nearby geologic features. Additional components of the proposed action would also result in overall negligible adverse impacts to geologic and topographic features.
Paleontological Resources	NPS Management Policies; NPS Director's Order 77: Natural Resource Protection	The proposed sidewalk / bike path traverses an area of the park that has the potential to yield paleontological resources. However, past surveys of the project area have not located any such resources within the area to be impacted by sidewalk or parking lot construction.
Wildlife	NPS Director's Order 77: Natural Resource Protection	Several bird species, reptiles, amphibians, and mammals such as coyotes, rabbits, and kit foxes inhabit or are transient to the project area. Construction related activities and noise may noticeably, temporarily disturb wildlife to a minimal degree. In the long-term, wildlife habitat would be slightly reduced from the construction of a parking lot and path.
Special Status Species	Endangered Species Act; NPS Director's Order 77-8: Endangered Species	Correspondence from the U.S. Fish and Wildlife Service (USFWS) dated May 6, 2014 indicated that the proposed project area falls within 0.5 mi of potential nesting habitat for the federally-listed (threatened) Mexican spotted owl (<i>Strix occidentalis lucida</i>), which is not known to occur in the park. Locations of potential nesting habitat are based on a state-wide spatial predictive model developed by University of Montana researcher David Willey. The predicted nesting habitat in question occurs south of the project area in association with the prominent line of north-

Topic	Law, Regulation, Policy	Affected Environment / Reason Dismissed
		<p>facing cliffs formed by Wingate Sandstone along the southern rim of Cache Valley. The existing road through Cache Valley east of Winter Camp Wash is entirely located within 0.5 mi of predicted potential nesting habitat, as is the associated section of the proposed sidewalk / bike path. Because the proposed sidewalk would be constructed along an existing heavily used road, and the sidewalk would be on the north side of the road away from potential nesting habitat, it is unlikely that sidewalk construction or use would affect habitat conditions or the probability of habitat use by owls. Therefore, this project <i>may affect but not likely to adversely affect</i> Mexican spotted owls.</p> <p>Species of management concern such as nesting raptors and desert bighorn sheep generally avoid the existing road system or occur near roads in limited numbers in cases where individual animals have become habituated to certain human activities such as vehicle traffic. Construction related activities and noise may noticeably, temporarily disturb wildlife to a minimal degree.</p>
Wetlands	Executive Order 11990 Protection of Wetlands; Director's Order 77-1: Wetland Protection	A ponded wetland is located at Salt Wash and the road. Since the proposed action includes no disturbance of the road section in contact with the wetland, and includes no disturbance beyond the existing surface of adjoining asphalt road sections near the wetland, the project will not impact the wetland.
Water Resources	Clean Water Act; NPS Director's Order 77: Natural Resource Protection	Water quality, water quantity, and drinking water are not expected to be affected by the proposed actions. The project area includes surface waters associated with a persistent, ponded wetland where the Delicate Arch road crosses Salt Wash at Wolfe Ranch. But no work is proposed for this road segment. The proposed expansion of the Wolfe Ranch parking lot would increase the amount of impervious surface by approximately 33,600 square feet, increasing run-off and erosion potential. But run-off would be channeled by a trench to an existing drainage leading to Salt Wash, and overall effects on water resources would be negligible.
Air Quality	Clean Air Act; NPS Director's Order 77: Natural Resource Protection	Arches is designated as a Class I air quality area under the Clean Air Act. Construction related activities could result in localized, noticeable, temporary increases of vehicle exhaust, emissions, and fugitive dust. The project could result in negligible adverse effects on local air quality conditions, but such effects would be temporary, lasting only as long as construction. There would be no long term impacts to air quality.

Topic	Law, Regulation, Policy	Affected Environment / Reason Dismissed
Soundscapes	NPS Director's Order 47: Soundscape Preservation and Noise Management	Sounds in the project area are a mix of natural and man-made including those generated from wildlife, humans, vehicular traffic, and wind. Human-caused sounds would temporarily and noticeably increase during construction as a result of equipment, vehicular traffic, and construction crews. Long term changes to the soundscape would be minor, resulting from humans using the expanded parking area and new path.
Scenic Values	NPS Management Policies	The proposed expansion of the Wolfe Ranch parking lot and construction of a road-side path would result in long-term changes to the visual characteristics of the area, but the scenic values would be partially offset by positive impacts attributable to the elimination of road-side parking.
Wilderness	Wilderness Act, NPS Director's Order 41: Wilderness Stewardship	There is no wilderness in the project area.
Wild and Scenic Rivers	Wild and Scenic Rivers Act, NPS Director's Order 46: Wild and Scenic Rivers	There are no Wild and Scenic Rivers in the project area.
Historic Structures	National Historic Preservation Act; NPS Director's Order 28: Cultural Resources Management	There is one National Register eligible historic property adjacent to the project area: Wolfe Ranch Historic District. A recommendation that, because the site is outside the area of potential effect and will not be directly impacted by the project, there is No Adverse Effect to any of the structures associated with the historic district. The SHPO concurred with the park's recommendation on April 2, 2014 (Appendix A).
Archeological Resources	National Historic Preservation Act; NPS Director's Order 28: Cultural Resources Management	One archeological site near the project area was previously determined an eligible historic property. The park recommended to SHPO that there will be No Adverse Effect because the site is outside the area of potential effect and will not be directly impacted by the proposed undertaking. The SHPO concurred with the park's recommendation on April 2, 2014 (Appendix A).
Cultural Landscapes	National Historic Preservation Act; NPS Director's Order 28: Cultural Resources Management	A Cultural Landscape Inventory for Wolfe Ranch Historic District was completed in 2004 and it was determined through SHPO concurrence to lack sufficient integrity to be considered eligible for the National Register as a cultural landscape (Maureen 2005). The proposed project would not affect cultural landscapes.

Topic	Law, Regulation, Policy	Affected Environment / Reason Dismissed
Ethnographic Resources	National Historic Preservation Act; NPS Director's Order 28: Cultural Resources Management; NPS Director's Order 71B: Indian Sacred Sites	There are no ethnographic resources in the project area, as confirmed during Native American consultation efforts for this project.
Museum Collections	NPS Director's Order 24 Museum Collections Management; NPS Director's Order 28: Cultural Resources Management	The proposed project would not affect museum collections nor does the project have the potential to add objects to the collection.
Socioeconomics	NPS Management Policies	The proposed actions would neither change local and regional land use nor appreciably impact local businesses or other agencies.
Prime and Unique Farmlands	Farmland Protection Policy Act	There are no prime or unique farmlands in the project area.
Environmental Justice	Executive Order 12898 General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Since the expanded parking area and bike/pedestrian trail would be available for use by all people regardless of race or income and the construction workforces would not be hired based on race or income, the proposed action would not have disproportionate health or environmental effects on minorities or low-income populations.

ALTERNATIVES

Alternatives Carried Forward

Alternative 1 – No Action - Continue Current Management Alternative

Alternative 1 presents the park's current management of the site. This alternative describes the day to day condition of a frequently congested parking area. Under this alternative, congestion management site strategies would not occur. The parking lot would remain at a 73 car capacity and would not be expanded (Figure 3).

Parking

Visitors would continue to struggle to find parking at the trailhead or would continue to park along the road for most of the year. On average 60-100 vehicles are parked along the road shoulders. The parking area fills to capacity by 10 o'clock in the morning during the peak season from March through September. Visitors then park their vehicles in "no parking" areas and along the road sides. Parking vehicles in areas not designated for parking presents a host of management concerns specifically regarding visitor safety and resource damage. Currently visitors are walking in the road from their vehicles to the trailhead along the road or are trampling vegetation and soils as they walk along the shoulder of the road. Vehicles parked along the road, especially wide vehicles like RV's and trucks, impact access for other visitor's vehicles and emergency rescue vehicles. During peak visitation periods, park law enforcement spend a significant amount of time directing traffic, relieving congestion, issuing parking violations and responding to accidents.

Visitation

Currently, visitation to this site is approximately 2,000 visitors a day. Although, the park does not have current trail count data, the park does have vehicle counts collected through transportation studies. The park can calculate a visitor at one time number by using a person-per-vehicle multiplier of 2.7, a number the NPS uses to estimate annual visitation counts. Therefore, when the 73 parking spaces are occupied and 100 vehicles are parked along the road there are approximately 464 visitors at one time in the area. Another method the park used to estimate the daily number of visitors to the area was to use data compiled from a duration sample study conducted by Central Federal Highway Division in August 2010 over a weekend. This data demonstrated the average vehicle duration for Delicate Arch/Wolfe Ranch parking area was 1 hour and 45 min with a standard deviation of 49 minutes (CFLHWD 2010). Therefore, it is assumed that vehicles on average, park in the parking area, for up to 2 hours and 34 minutes. In a twelve hour day, parking turnover at this area could potentially be up to 4.8 times which could bring at least 2,000 visitors per day to the site.

Winter Camp Wash

Tamarisk (*Tamarix chinensis*) has flourished within the Winter Camp wash system and along with the road, has altered the wash. Flash floods have caused debris to accumulate around the base of the tamarisk causing sediment to dam up and change the historical flow of the wash. With no action, Law Enforcement would continue to respond to flooded road conditions and would frequently close the road during and prior to these events. Park maintenance staff would continue to clean up deposited sediment whenever Winter Camp Wash has flooded. Frequently, maintenance staff is called on five to ten times per year (Henry, 2014 and Lewis, 2014).

Figure 3: Alternative 1- No Action



The no action alternative provides a basis for comparison with the preferred alternative and the respective environmental consequences. Should the no action alternative be selected, the National Park Service would respond to future needs and conditions without major actions or changes in the present course.

Improvement Strategies Common to All Action Alternatives

While each of the action alternatives considers a unique approach to reducing traffic congestion, several improvement strategies, particularly related to safety and long-term management of the site, are common to the two action alternatives and are presented below.

Adaptive Management

The park would use adaptive management strategies to manage and operate Delicate Arch/Wolfe Ranch site under all action alternatives. Adaptive management is the process by which the park would closely monitor or test the effectiveness of initial improvements before any additional actions are taken. The park would evaluate the effectiveness of strategies toward meeting plan goals, adapt strategies as needed, and modify the timing or intensity of improvements as information and feedback is gathered and patterns are tracked. Adaptive management promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. The following table (Table 2) is provided to demonstrate indicators and standards to which management actions may be implemented to assess effectiveness of improvements.

Table 2: Indicators and Standards for Adaptive Management

Indicator Topic	Indicator	Standard	Management Strategies
Parking and traffic congestion	# of incidents of illegal parking (when parking lots are full)	No more than 5 incidents of illegal parking during peak days	<ul style="list-style-type: none"> • Education and signage to direct visitors elsewhere. • Enforce parking stall capacity and size • Communicate with large tour bus operators about taking turns (different days, or different locations) • Have parking attendants at congested areas to direct parking during peak times • Limit the number of commercial tour buses that are allowed to park in the area. • Vehicle size restrictions • Restrict parking access through a reservation system
	# of incidents of vehicles parking in spaces too small or too large (appropriate size) for the vehicle type	No more than 5 incidents of inappropriate size vehicle parking during peak days.	
Closure of road due to flooding	# of times Winter Camp Wash is flooded	No more than 5 times per year	<ul style="list-style-type: none"> • Improve the frequency of the maintenance of the wash • Conduct an intensive sediment transport study of washes along Delicate Arch road. • Reevaluate the idea of constructing a bridge over the wash

Reservation System

The park recognizes the fact that parking lots cannot be expanded indefinitely to accommodate increasing visitation and still adhere to NPS policies and federal requirements to protect park resources. At some point in the future, if and when other strategies included in each alternative fail to keep pace with increasing visitation, it may become necessary to explore other means of accommodating and managing visitor demand. Therefore, as a long-term strategy under all alternatives, the park may implement a reservation or time-based entry system to the Delicate Arch/Wolfe Ranch site or to the park overall to manage visitor demand.

It is important to note that any implementation of a reservation system would only occur as a future effort separate from this EA. At that time, the NPS staff would engage with partners, agencies, and the public to determine the best way to design and implement that kind of visitor use management system. Any visitor use management system or technique would be based on a reservation system study.

While details of a possible reservation system would be determined in the future, as appropriate, the following explanation provides some ideas for how the park and public may choose to design the system. For example, a reservation system may only apply to visitors in a private vehicle who may be allowed to enter the park or certain areas of the park during a designated time of day and/or limited only during period of peak visitation. A reservation could be in effect throughout the year or only during peak periods, and reservations could be allocated on a per day, per hour or other basis. Another option would be to make all reservation slots available in advance or to make a portion of the slots available in advance and the remainder available the same day. Specific techniques would be developed through a public process as discussed above.

Bus Load/Unload Area

A bus load/unload area would be created at the southern lot of the Wolfe Ranch/Delicate Arch parking area. This would require removing six standard parallel parking spaces. This area would be then signed as "Bus Loading and Unloading Only". Shade structures would also be constructed. Buses would not be able to park in this parking area but would be required to drop off visitors in the south lot and then proceed to the Delicate Arch Viewpoint parking area to park.

Bike/Pedestrian Path

A 1.1 mile six foot wide bike/pedestrian sidewalk would be constructed in a sustainable trail design to allow safe pedestrian passage for visitors to bike or walk from the Delicate Arch Viewpoint parking area to the main trailhead and to encourage the use of the viewpoint parking area. The sidewalk would be predominately separated from the road by delineated posts or concrete curbing.

Winter Camp Wash

The plan proposes to reconstruct Winter Camp Wash in an effort to recreate a natural channel shape by removing vegetation from within the wash and reshaping the channel to a new alignment (Figure 4). This would assist in creating an open passage for the flood waters which could increase the velocity of water flowing over the road and reduce sediment collection on the road and the need for continued road maintenance. Therefore, 0.3 acres of tamarisk within the channel would be removed using chainsaws and heavy equipment north of the road so the flood waters would flow unimpeded in the wash just above the road.

A bulldozer and backhoe would be used above and below the road within the wash to create a wide stream channel with the sediment distributed out from along the streambed sides (Figure 5). A Section 404 permit would be required for any channel in-stream work.

Figure 4: Winter Camp Wash Proposed Site Plan

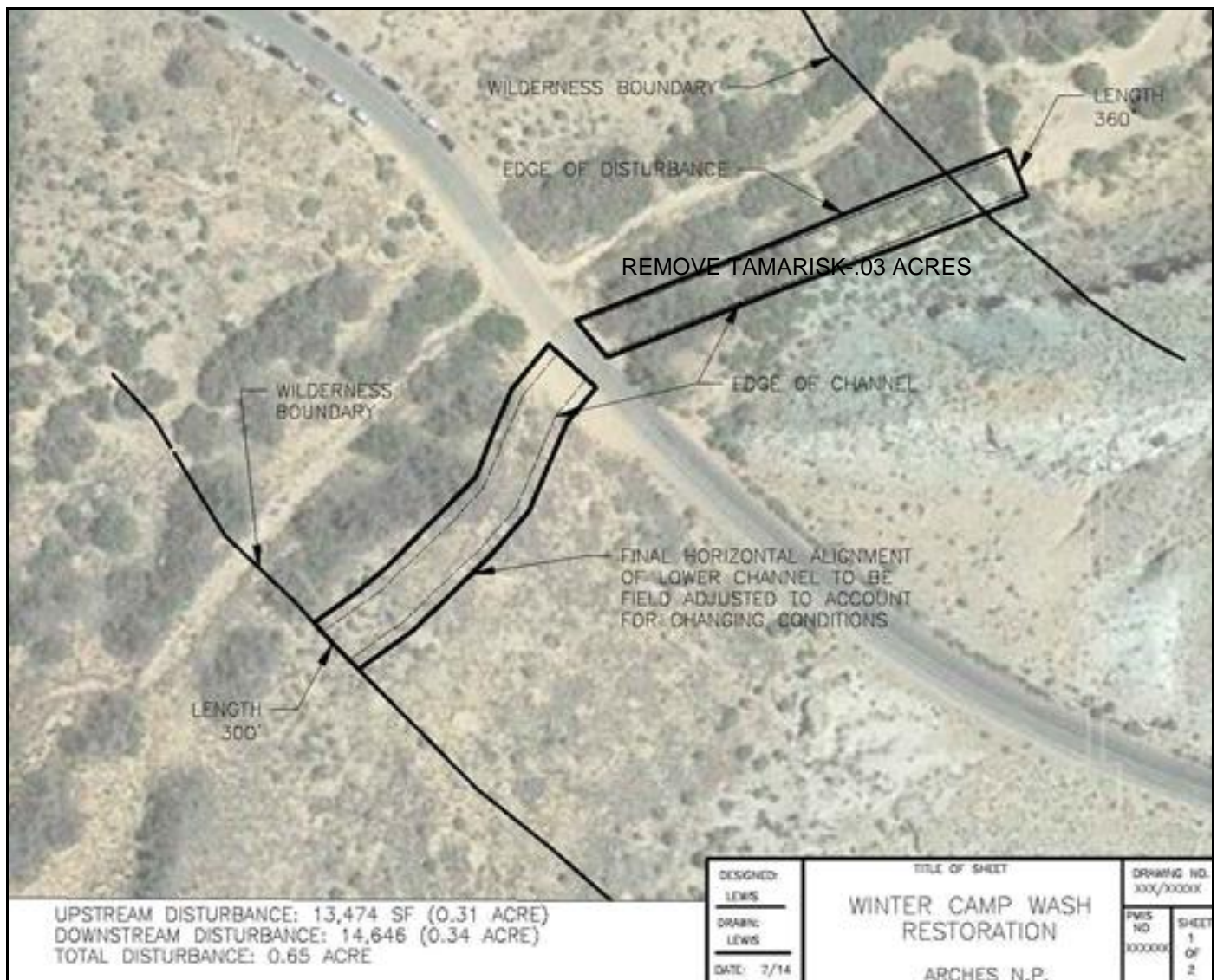
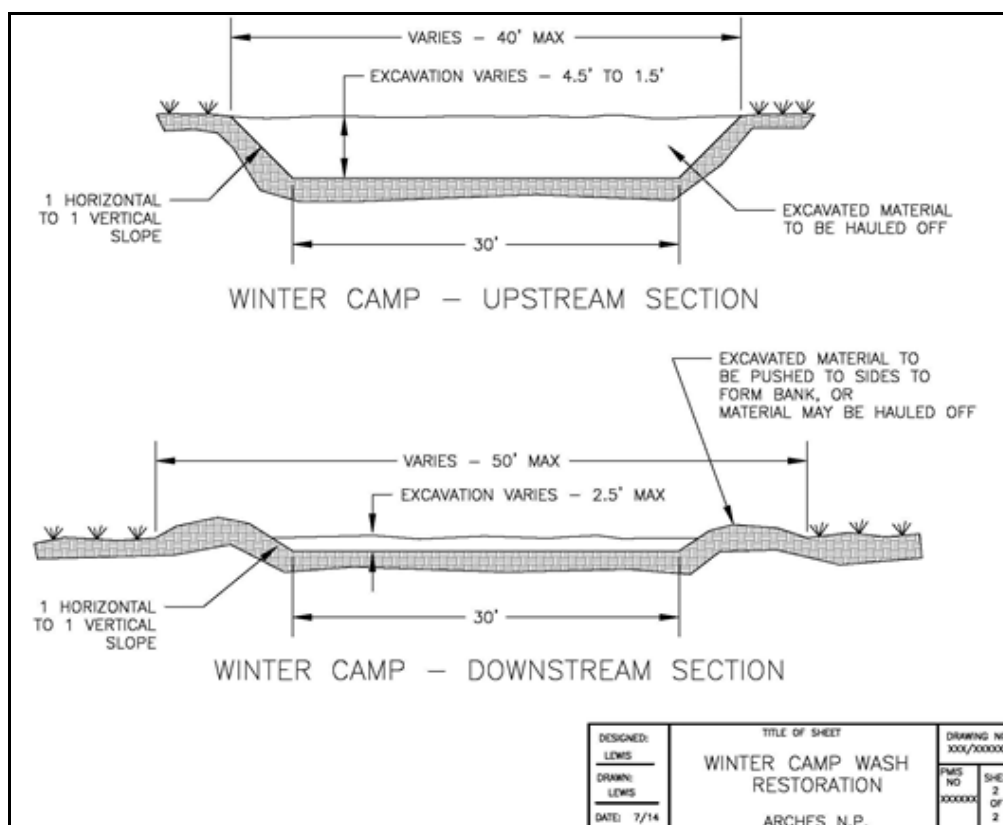


Figure 5: Winter Camp Wash Detail



Alternative 2 – No Expansion Alternative

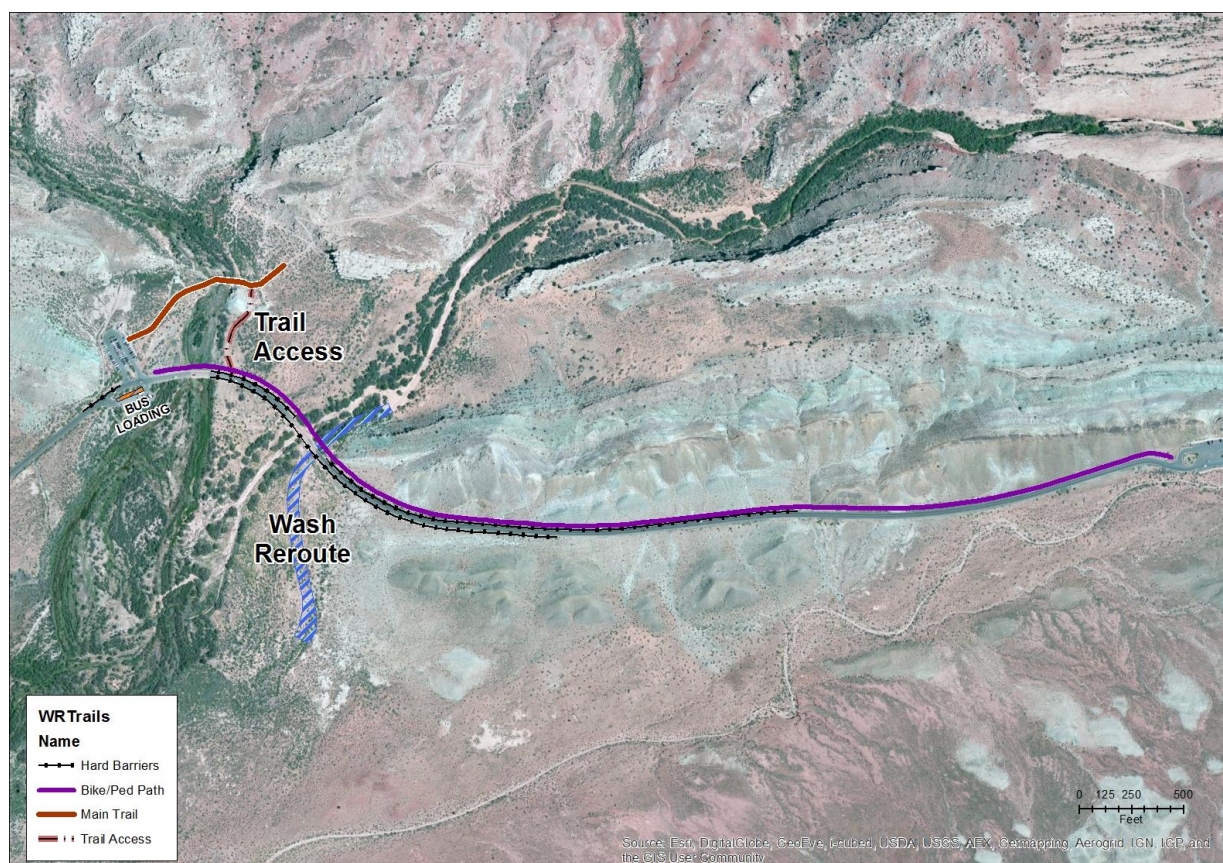
Alternative 2 is the low cost, no expansion, congestion management alternative that would produce substantial results in reducing parking congestion at this site.

Parking

Under Alternative 2, the existing parking area would not be expanded to accommodate typical overflow of vehicles. The parking area would remain at the current car capacity (Figure 6) with the loss of 6 spaces for bus loading/unloading area. Roadside parking would not be allowed to occur and in order to prevent vehicles from parking along the road shoulders, hard barriers, such as large boulders and/or two rail fencing would be installed along both sides of the road where the topography does not naturally prevent roadside parking. Strict enforcement with posted signs, ticketing and potential booting of vehicles to enforce no roadside parking policy would also occur.

Delicate Arch Viewpoint parking lot would be used for oversized vehicles and as overflow parking when capacity has been reached at the Delicate Arch/Wolfe Ranch parking lot. Delicate Arch Viewpoint parking lot has a total of 73 parking spaces (53 standard, 17 oversized and 3 accessible). Sample occupancy data and staff observations show that this parking lot is only occupied at 30% of its total capacity and could accommodate additional parking for both oversized and standard vehicles (Johnson, 2011). Visitors would still have the opportunity to park at the Delicate Arch Viewpoint parking area.

Figure 6: Alternative 2- No Expansion



Visitation

By not expanding the parking area and by not allowing roadside parking, only 320 vehicles per day would be accommodated under this alternative. The average duration at the Wolfe Ranch/Delicate Arch parking area is approximately 2.5 hours (Table 3) with a turnover rate of 4.8 times. Using the 2.7 multiplier for visitor per vehicle, a total of 868 visitors per day would be able to visit the area. Due to the restriction on roadside parking, approximately 320 roadside vehicles per day would not be accommodated under this alternative.

Table 3: Average Duration at Delicate Arch/Wolfe Ranch Parking Area (August 2010)

	Average Duration
Friday 8/6/2010	2 Hours 15 minutes
Saturday 8/7/2010	56 minutes
Two-Day Average	1 hour 45 minutes
Standard Deviation	49 minutes
2-day avg. plus Stand Dev	2 hours 34 minutes

Alternative 3 – Expansion Alternative

Alternative 3 proposes to expand existing infrastructure in addition to implementing congestion management strategies to manage current visitation to the site.

Parking

Alternative 3 proposes to expand the existing parking area to a size that would only accommodate current roadside parking overflow. The parking lot would be expanded by an additional 82 standard vehicle spaces and eight oversized spaces (i.e. RV's, SUV's, truck's) for a total of 156 parking spaces at the trailhead (116- standard, 38- oversized, 2- accessible). The design of the expansion would fit the current design of the existing parking area and would be located on the northern end (Figures 7 and 8). A total area of ground disturbance for this expansion would be 37,200 square feet or 0.85 acres. The area proposed for the expansion would require fill dirt to be brought in to bring the site to grade with the existing lot.

Two-rail fence would be constructed on the eastern side of the expanded parking area to prevent visitors from short cutting to the trail from their vehicles.

A new cut-off trench would be constructed to channel run-off water from the new expanded parking area and existing topography. Total ground disturbance for the new cut off trench would be 4,723 square feet (0.1 acres).

Just like Alternative 2, Alternative 3 proposes no roadside parking. Hard barriers, such as large boulders and/or two rail fencing, would be installed along both sides of the road where the natural topography does not naturally prevent roadside parking. Strict enforcement with posted signs, ticketing and potential booting of vehicles would also occur.

The oversize parking area to the south of the trailhead or the Delicate Arch Viewpoint parking area would not be expanded. Delicate Arch Viewpoint parking area would be used as parking for oversized vehicles and as overflow parking when capacity has been reached at the Delicate Arch/Wolfe Ranch parking area. Delicate Arch Viewpoint parking area has 73 parking spaces (53 standard, 17 oversized and 3 accessible).

Visitation

As stated under Alternative 2, the average duration at the Wolfe Ranch/Delicate Arch parking area is approximately 2.5 hours (Table 3) with a turnover rate of 4.8 times. Using the 2.7 multiplier for visitor per vehicle, under this alternative, this new parking lot of 156 parking spaces would accommodate 749 vehicles and approximately 2,021 visitors a day. Due to the restriction on roadside parking, there would be no vehicles parked along the roadway.

Figure 7: Alternative 3- Expansion

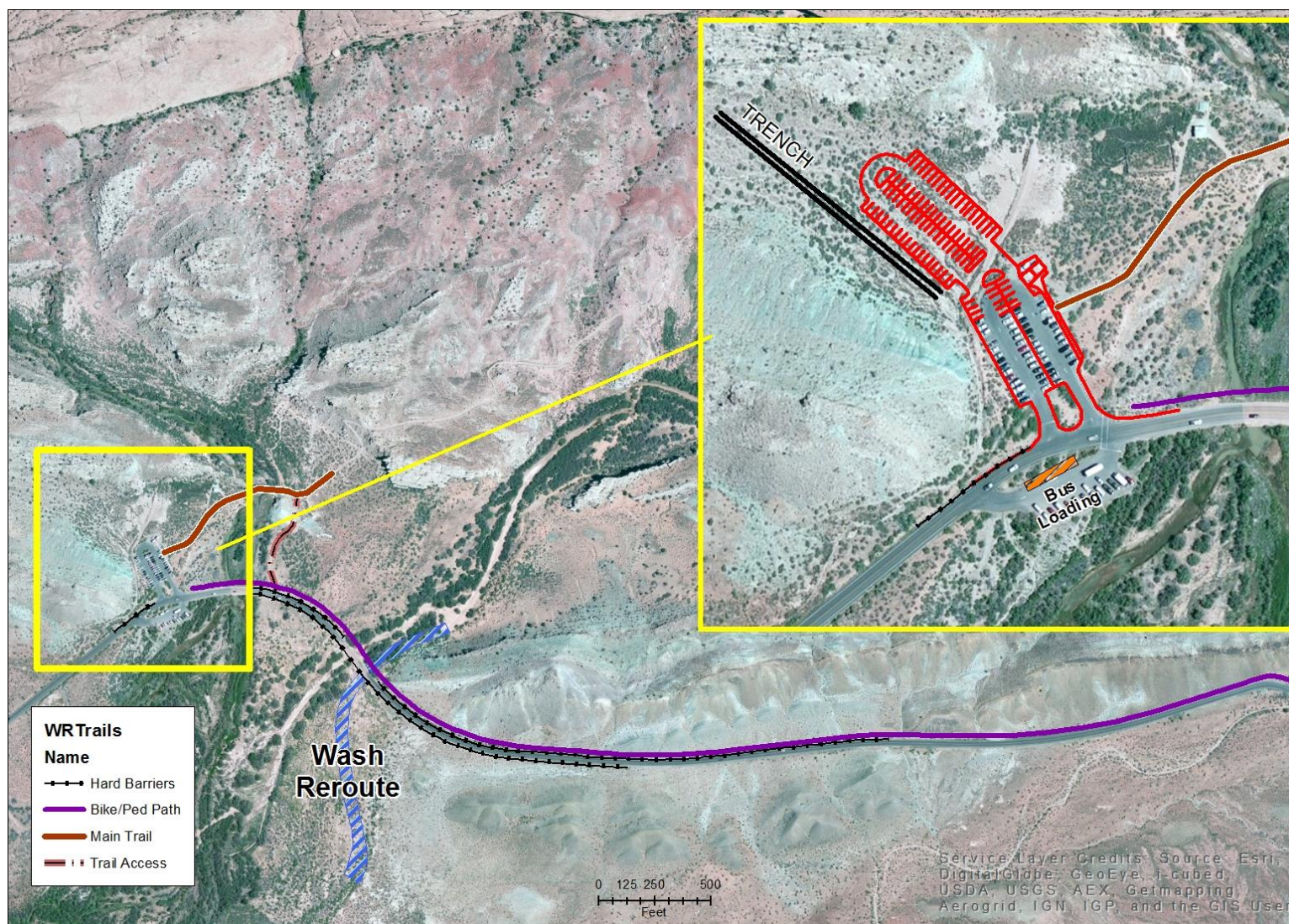
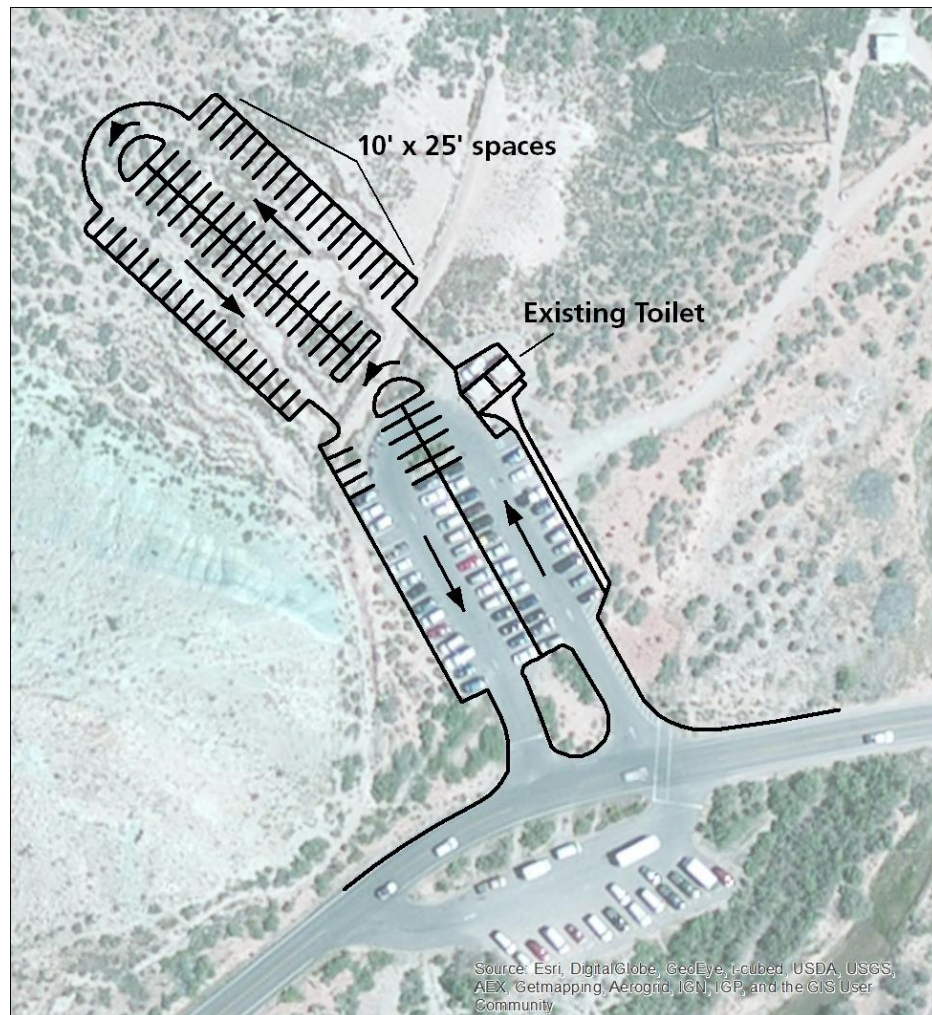


Figure 8: Conceptual Plan of Parking Expansion

Best Management Practices

The following best management practices were developed to minimize the degree and/or severity of adverse effects and would be implemented during construction of the action alternative, as needed:

General:

- The National Park Service would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging paleontological materials, archeological sites, or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown paleontological or archeological resources are uncovered during construction.
- Construction workers and supervisors would be informed about the special sensitivity of park's values, regulations, and appropriate housekeeping.

Soil/Vegetation:

- To minimize the amount of ground disturbance, staging and stockpiling areas would be in previously disturbed sites, within the construction zone (area to be disturbed) and away from visitor use areas to the extent possible. All staging and stockpiling areas would be returned to pre-construction conditions following construction.
- Disturbance to existing native vegetation shall primarily be contained in previously disturbed areas or within narrow construction limits. Whenever practicable, soils and plants affected by construction shall be salvaged for reuse in site restoration.
- Revegetation and recontouring of disturbed areas would take place following construction and would be designed to minimize the visual intrusion of the parking lot and paved bike path. Revegetation efforts would strive to reconstruct the natural spacing, abundance, and diversity of native plant species using native species. All disturbed areas would be restored as nearly as possible to pre-construction conditions shortly after construction activities are completed. Weed control methods would be implemented to minimize the introduction of noxious weeds.
- Sources of fill will be inspected for weed species and approved by NPS vegetation staff prior to transport to site, and all equipment will be cleaned and free of residual soil prior to construction. Similarly, all equipment must be carefully monitored and cleaned to prevent moving on-site weed seed to other areas post construction.
- Because disturbed soils are susceptible to erosion until revegetation takes place, standard erosion control measures such as silt fences and/or sand bags would be used to minimize any potential soil erosion.
- Fugitive dust generated by construction would be controlled by spraying water on the construction site, if necessary.

Water Resources:

- To minimize possible petrochemical leaks from construction equipment, the project leader would regularly monitor and check construction equipment to identify and repair any leaks.

Special Status Species:

- Contract provisions would require the cessation of construction activities if a species were discovered in the project area, until park staff re-evaluates the project. This would allow modification of the contract for any protection measures determined necessary to protect the discovery.

Cultural Resources:

- Although there is no surface evidence of archeological resources, clearance to proceed is recommended with the condition that if concealed archeological resources are encountered during project activities, all necessary steps will be taken to protect them and the Park Cultural Resources Manager will be notified immediately.
- Should construction unearth previously undiscovered cultural resources, work would be stopped in the area of any discovery and the park would consult with the State Historic Preservation Officer and the Advisory Council on Historic Preservation, as necessary, according to §36 CFR 800.13, *Post Review Discoveries*. In the unlikely event that human remains are

discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed.

Visitor Use and Experience:

- Visitors shall be informed of construction activities by posting information at the visitor center, trailhead, or park website. The project leader shall work with the Public Information Office (PIO) to determine the best methods of informing the public.
- Provide the Public Information Officer with the project schedule as soon as it is known and provide periodic updates of project work.
- To protect park resources and alleviate vehicle congestion, visitor access to the park may be restricted during the construction of the parking lot.
- Half of the current parking lot may be closed during construction for the week (Monday-Thursday).
- To reduce noise and emissions, construction equipment would not be permitted to idle for long periods of time.

Safety:

- Construction zones would be identified and fenced with construction tape, snow fencing, or cones prior to any construction activity. The fencing/cones 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 as defined by the construction zone fencing.

Alternatives Considered and Dismissed

The following alternatives were considered for project implementation, but were ultimately dismissed from further analysis, as described below.

Shuttle System – This alternative was suggested by a majority of public commenters as the ideal solution to manage the congestion problems the park faces.

As part of its long-term transportation planning efforts, Arches National Park initiated an Alternative Transportation System and Congestion Management Study in 2011 to find a means to reduce traffic congestion, air and noise pollution, greenhouse gas emissions, and the impacts of transportation on Arches' valuable resources. The study aimed to achieve this reduction by decreasing the number of automobiles within the park while maintaining and improving public access and visitor experience. The study included both a shuttle alternative and non-shuttle alternatives to meet these goals.

Based on results of the study, NPS has determined that a shuttle system is not a cost-effective means of resolving the congestion issue. Although it may seem that the shuttle would be the solution, the length of the park's road system, a total of 52 miles, and the distance between several key areas in the park, planners concluded that in the best-case scenario it would result in a reduction of 23-28% of cars, require one way travel times up to one hour and 20 minutes, and would require \$3 million to operate during a 5 month season under a service contract. This cost does not include purchasing and maintaining the 14 buses required to provide the service. Arches also looked at the shuttle operations at Zion, Bryce and Rocky Mountain National Parks and noted

that although visitors enjoyed this option, the pulses of 40 plus visitors who were dropped off on a trail at one time was causing resource damage and more crowding on the trails.

Therefore, the park has dismissed this alternative from consideration in this EA and has begun to explore non shuttle congestion management strategies. The entire Alternative Transportation System and Congestion Management Study can be accessed online at www.nps.gov/arch.

Widen the road to accommodate safe roadside parking – This alternative was considered but dismissed because it would not meet objectives 1 and 3: *Protect the park's natural and cultural resources from potential impacts attributable to vehicles and visitor use and improve parking and visitor safety* as identified in the *Purpose and Need* section. Expanding the shoulders of the road would require approximately 28,980 square feet (0.7 acres) of disturbance along both sides of the road, only 0.1 acre less disturbance than expanding the existing parking lot as identified in Alternative 3. Large and established vegetation including trees would need to be removed to accommodate parked vehicles along the road outside of the main travel way. Visitors would still be required to walk along the busy road from their vehicles to the trailhead. This alternative does not provide a solution to improve a visitor's safety, both identified as needs in this plan and therefore was dismissed in the EA.

Create a new trail from Delicate Arch View point parking area to Delicate Arch trail– This alternative was considered but dismissed since this action would not meet objective number 1: *Protect the park's natural and cultural resources from potential impacts attributable to vehicles and visitor use*. This alternative would create greater impact to the park's natural resources, including wilderness resources, where visitor use is currently limited to the current established durable trail. Creating a new trail would spread visitors to a new area where more resource damage may occur due to new social trailing and the potential to create more search and rescue operations in the area.

Constructing a new trail would also be in conflict with the minimum requirement analysis as required for the management of wilderness within which such a trail would lie. According to 2006 NPS Management Policies all management decisions affecting wilderness must be consistent with the minimum requirement concept. This concept is a documented process used to determine if administrative actions, projects or programs undertaken by the NPS are necessary. When determining minimum requirements, the NPS must consider the potential disruption of wilderness character and resources before economic efficiency and convenience. Due to the fact a trail already exists within wilderness boundaries to Delicate Arch, another trail to the same destination is not a minimum requirement and for this reason and the ones mentioned above this alternative was dismissed in the EA.

Construct a bridge over Winter Camp Wash– An initial hydrologic study was conducted in the fall of 2013 to provide the park with solutions for increased level of service regarding the closure of the road during and after flood events. The best solution, provided by a Federal Lands Highway hydraulic engineer, would be to raise the road roughly 12' on a 75' bridge over the wash. The cost of this option would be approximately \$750K to \$1M and would have quite a bit of impact due to fill slopes on the approaches and the overall visual aesthetics of a bridge at the site. Even with this option, the park would still need to maintain the wash under the bridge to prevent sediment build-up that would once again have the potential to overtop the roadway as well as constrict the channel causing overflow into the Salt Wash, the adjacent wash channel. This would require sufficient clearance under this bridge to allow a small dozer or bobcat-like piece of equipment to occasionally clear the deposited sediment without disrupting traffic. The engineer did conclude that it is beyond the scope of the initial study to determine whether the suggested grade rise and bridge structure is sufficient to allow a natural outlet to form across or around the delta with the available information. An extensive sediment transport study is recommended prior to a final determination

(Bergendahl, 2013). Due to the high cost of constructing a 75' long bridge which would create greater adverse impact to the resources of the area, and would still require additional study and annual maintenance within the wash, this alternative was dismissed in the EA.

Alternative Summaries

Table 4 summarizes the major components of Alternatives 1, 2 and 3, and compares the ability of these alternatives to meet the project objectives (the objectives for this project are identified in the *Purpose and Need* chapter). As shown in the following table, Alternative 2 and 3 meets each of the objectives identified for this project, while the No Action Alternative does not address all of the objectives.

Table 4: Summary of Alternatives and How Each Alternative Meets Project Objectives

Alternative Elements	Alternative 1 – No Action	Alternative 2 – No Expansion	Alternative 3 – Expansion
Parking/ roadside parking/ paved path	The current parking lot would not be expanded. Parking would be limited to the existing parking lot of 73 spaces. Roadside parking would still occur. No paved bike/pedestrian path would be constructed.	The current parking lot would not be expanded. Parking would be limited to the existing parking lot of 73 spaces and would accommodate 350 vehicles and 945 visitors per day. Roadside parking would not be allowed. A bike/pedestrian path would be constructed to allow visitor to safely access the trailhead from Delicate Arch Viewpoint parking area.	The current parking lot would be expanding by an additional 82 spaces which would allow current visitors to safely park in a parking lot and not along the roadsides. This alternative would accommodate 749 vehicles and 2,021 visitors per day. Roadside parking would not be allowed. A bike/pedestrian path would be constructed to allow visitor to safely access the trailhead from Delicate Arch Viewpoint parking area.
Winter Camp Wash	The current wash configuration does not function as a wash system. Sediment piles up on the road during every flood event which requires the road to close and maintenance to clear.	The wash would be rechanneled in an attempt to reduce the sediment deposition and the need for continued maintenance in order to clear the road crossing and provide a positive outlet for water to move over the road.	The wash would be rechanneled in an attempt to reduce the sediment deposition and the need for continued maintenance in order to clear the road crossing and provide a positive outlet for water to move over the road.
Project Objectives	Meets Project Objectives?	Meets Project Objectives?	Meets Project Objectives?
Protect the park's natural and cultural resources from potential impacts attributable to vehicles	No. The existing parking lot is too small causing visitors to park vehicles along the road shoulders and as a result damage sensitive soils and vegetation. Visitors parked along the	Yes. This alternative proposes to restrict roadside parking by installing hard barriers along the road. By preventing roadside parking resources along the road will be better protected from	Yes. Although this alternative proposes to expand the current parking lot which would require removing current vegetation within the expanded parking lot footprint and compact soils, by no longer allowing

and visitor use	road then walk over and continually trample sensitive soils and vegetation.	vehicles and visitor use.	roadside parking, park resources along the road would be better protected from vehicles and visitor use in the long term and would have a zero net effect on impacts to park resources.
Improve visitor experience in the project area	No. The size of the current parking lot is not sufficient in accommodating current visitation to the site. Visitors are frequently trying to find a parking place or are parking along the road and forced to walk through vegetation or within the roadway where their safety is compromised.	Yes and No. By not expanding the parking lot and implementing a reservation system the number of visitors to the site would be reduced. This reduction in visitation would however reduce congestion and improve a visitors experience at the site. However, a future reservation system may be a burden to those visitors who have not pre-planned their trip to the park or only have a limited time to visit the park. Overflow vehicles also have the opportunity to park at the Delicate Arch viewpoint parking lot and walk or bike safely to the Delicate Arch trailhead along a separate paved pathway.	Yes and No. By expanding the current parking lot size to accommodate vehicles that are currently parking along the road a visitors experience would be greatly improved. This alternative would still accommodate current visitation to the site but visitors no longer would need to walk within a roadway to the trailhead. Overflow vehicles also have the opportunity to park at the Delicate Arch viewpoint parking lot and walk or bike safely to the Delicate Arch trailhead along a separate paved pathway. A future reservation system may be a burden to those visitors who have not pre-planned their trip to the park or only have a limited time to visit the park.
Improve parking and visitor safety	No. The existing parking lot is too small causing visitors to park vehicles along the road shoulders. Visitors parked along the road and walk through vegetation or within the roadway where their safety is compromised.	Yes. Eliminating roadside parking a visitor's safety would be greatly improved. A future reservation system would improve parking by providing visitor access to the site evenly over a day. By not expanding the current size of the parking lot, implementation of a reservation system and preventing roadside parking a visitor would still have the opportunity to visit the site and park within parking lots. A bike/pedestrian path would allow safe travel from one parking area to the other.	Yes. By expanding the current parking lot size to accommodate vehicles that are currently parking along the road a visitor's safety would be greatly improved. Visitors no longer would need to walk within a roadway to the trailhead. Overflow vehicles also have the opportunity to park at the Delicate Arch viewpoint parking lot and walk or bike safely to the Delicate Arch trailhead along a separate paved pathway.

Improve the Winter Camp Wash floodplain system	No. The current wash configuration does not function as a wash system. Sediment piles up on the road during every flood event which requires the road to close to visitors and time for maintenance to clear.	Yes. The wash would be re-channelized in an attempt to reduce the sediment deposition and the need for continued maintenance in order to clear the road crossing and provide a positive outlet for water to move over the road and through the wash system. Periodic maintenance would be required to ensure the wash continues to function.	Yes. The wash would be rechanneled in an attempt to reduce the sediment deposition and the need for continued maintenance in order to clear the road crossing and provide a positive outlet for water to move over the road and through the wash system. Periodic maintenance would be required to ensure the wash continues to function.
Identify management options to continue to positively manage visitation in this high use area.	No. The No Action alternative does not propose any management options to positively manage visitation at this site.	Yes. This alternative identifies the need to prevent roadside parking to alleviate congestion and safety concerns along the road as well as a reservation system to allow for visitor use but would limit or distribute use throughout the day to prevent congestion within the current size of the parking lot.	Yes. This alternative identifies the need to prevent roadside parking to alleviate congestion and safety concerns along the road. A proposed reservation system would allow for visitor access but would limit or distribute use throughout the day to prevent congestion in the future when the new expansion of the parking lot can no longer accommodate increased visitation to the park.

Table 5 summarizes the anticipated environmental impacts for Alternatives 1, 2 and 3. Only those impact topics that have been carried forward for further analysis are included in this table. The *Environmental Consequences* chapter provides a more detailed explanation of these impacts.

Table 5: Environmental Impact Summary by Alternative

Impact Topic	Alternative 1 – No Action	Alternative 2 – No Expansion	Alternative 3 – Expansion-Preferred Alternative
Soils	With no new construction activities, there would be no new effect to soils. There would be continued erosion from vehicles which would continue to drive and park on unpaved roadside	Construction activities would adversely affect soils in the project area as a result of grading, compacting, paving over soils, and removing soils. This alternative would disturb a total of approximately 0.8 acres of soils. Installation of barriers to prevent	Construction activities would adversely affect soils in the project area as a result of grading, compacting, paving over soils, and removing soils. This alternative would disturb a total of approximately 1.65 acres of soils. Installation of barriers to prevent roadside parking would

Impact Topic	Alternative 1 – No Action	Alternative 2 – No Expansion	Alternative 3 – Expansion-Preferred Alternative
	areas for overflow parking, directly impacting soil resources by compaction and destabilization, both of which can facilitate soil erosion and loss.	roadside parking would reduce adverse soil impacts along a 0.5 mile segment of the road corridor.	reduce adverse soil impacts along a 0.5 mile segment of the road corridor.
Vegetation	With no new construction activities, there would be no new effect to vegetation. There would be continued trampling of vegetation from social trailing and parking.	Expansion of the parking lot, construction of the bike/pedestrian path and installation of hard barriers has a beneficial effect on vegetation in that it reduces vegetation trampling by eliminating social trails and parking in undesignated areas and along the roadside. It also improves Winter Camp Wash channel by removing nonnative plant species that are inhibiting the water flow of the channel to create a more natural hydrologic system. This alternative would result in the permanent loss of approximately 0.8 acres of predominately non-native vegetation. Installation of barriers to prevent roadside parking would reduce adverse vegetation impacts along a 0.5 mile segment of the road corridor.	Expansion of the parking lot, construction of the bike/pedestrian path and installation of hard barriers has a beneficial effect on vegetation in that it reduces vegetation trampling by eliminating social trails and parking in undesignated areas and along the roadside. It also improves Winter Camp Wash channel by removing nonnative plant species that are inhibiting the water flow of the channel to create a more natural hydrologic flow regime. This alternative would result in the permanent loss of approximately 2.3 acres of predominately non-native vegetation. Installation of barriers to prevent roadside parking would reduce adverse vegetation impacts along a 0.5 mile segment of the road corridor.
Floodplains	With no new construction activities, there would be no new effect to floodplains. The road would be frequently closed due to sediment accumulation from flooding.	Removal of floodplain vegetation upstream of the road crossing, and channel excavation and reconfiguration upstream and downstream of the road crossing would result in localized beneficial impacts to the characteristics and functioning of the Winter Camp Wash floodplain.	Removal of floodplain vegetation upstream of the road crossing, and channel excavation and reconfiguration upstream and downstream of the road crossing would result in localized beneficial impacts to the characteristics and functioning of the Winter Camp Wash floodplain.
Visitor Use and Experience	With no new construction activities, which would result in	Visitor's would be impacted by construction activities required to construct the	Construction activities would cause temporary adverse effects on visitor use and

Impact Topic	Alternative 1 – No Action	Alternative 2 – No Expansion	Alternative 3 – Expansion-Preferred Alternative
	the visitor use and experience in the area remaining the same. Congestion and safety issues in the existing parking lot and along the road would continue to occur due to lack of additional parking spaces. The frequent closures of the road due to the flooding of Winter Camp Wash would continue to occur.	bike/pedestrian path along the Delicate Arch road, but the new path would improve the quality of the visitor experience over the long term. Installation of hard barriers would restrict roadside parking and visitors would be adversely affected as these actions would limit access to the site to approximately 320 vehicles and 868 visitors per day. With the re-channelization of Winter Camp wash, flooding and closures of the road would be greatly reduced further improving a visitors experience at the site.	experience from increased noise, decreased air quality (dust and fumes), and traffic disruptions. In the long term, proposed activities would benefit visitor use and experience. Proposed actions would accommodate visitors who use current roadside parking within an established safe parking area. Visitation to the site would be expected to be the same as current use; approximately 749 vehicles and 2,021 visitors per day. With the re-channelization of Winter Camp wash, flooding and closures of the road would be greatly reduced further improving a visitors experience at the site.
Park Operations	With no construction related activities, ground disturbance, or new features introduced into the landscape, there would be no change to how the park manages the project area.	The construction and maintenance associated with the proposed barriers and bike/pedestrian pathway would result in short-term adverse impacts to park operations as compared to existing levels due to the construction and improvement costs. Beneficial impacts on park operations would result from easier routine maintenance of Winter Camp Wash. The re-channelization would reduce the need for emergency calls to deal with removal of flood sedimentation on the road as well as the LE staff time managing the closure of the road.	The expanded parking area and other improvements such as the new bike/pedestrian path, elimination of roadside parking due to the installations of hard barriers and re-channelization of Winter Camp Wash would result in greater beneficial effect on operations and operating costs by reducing staff time needed to address circulation, parking and flooding issues throughout the year. Maintenance operations and cost may increase in the future to repair and maintain the facilities over time.

Environmentally Preferable Alternative

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

Alternative 2 (No Expansion) would cause the least damage to the natural and cultural, biological and physical environment and would protect, preserves, and enhances historical, cultural, and natural resources of the site, therefore it is considered an environmentally preferable alternative. With only the construction of a paved path and installation of hard barriers along the disturbed road shoulders to prevent roadside parking, ongoing impacts to soil and vegetation resources would be reduced. Rechanneling Winter Camp wash would also enhance the natural hydrologic process of the floodplain within the site and help alleviate the frequent flooding of the road.

Alternative 3, (Expansion), is also an environmentally preferred alternative. The Expansion Alternative would provide the most efficient means of managing the high level of visitor use and protecting the elements of the biological and physical environment of the site. Given the relatively small footprint of the proposed expanded parking area and the nature of the soils and vegetation found there, adverse effects to natural resources would be minor. The expansion of the current parking area would accommodate the average number of vehicles parked along the roadsides and installation of hard barriers along the disturbed road shoulders would prevent roadside parking and reduce ongoing impacts to soil and vegetation resources. Expansion of the parking lot, construction of the bike/pedestrian path and installation of hard barriers has an overall beneficial effect on the natural environment because these actions would reduce impacts to soils and vegetation by trampling and parking in undesignated areas and along the roadside. Rechanneling Winter Camp wash would also enhance the natural hydrologic process of the floodplain within the site and help alleviate the frequent flooding of the road.

Preferred Alternative

No new information came forward from public scoping or consultation with other agencies to necessitate the development of any new alternatives, other than those described and evaluated in this document. Although Alternative 2 and 3 are both considered an environmentally preferable alternative which both meet the project objectives; Alternative 3 achieves a greater balance between visitor use and enjoyment and the conservation of park resources, and therefore, is considered the NPS preferred alternative. For the remainder of the document, Alternative 3 will be referred to as the preferred alternative.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing setting or baseline conditions) and analyzes the potential environmental consequences (impacts or effects) that would occur as a result of implementing the proposed project. Direct, indirect, and cumulative effects are analyzed for each resource topic carried forward. Impacts are analyzed based on whether they are significant or not significant, which requires considerations of impact type, context, duration, and intensity:

Type describes the classification of the impact as beneficial or adverse, direct or indirect:

- *Beneficial*: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
- *Adverse*: A change that moves the resource away from a desired condition or detracts from its appearance or condition.
- *Direct*: An effect that is caused by an action and occurs in the same time and place.
- *Indirect*: An effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.
- **Context** describes the area or location in which the impact would occur. Effects may be site-specific, local, regional, or even broader.
- **Duration** describes the length of time an effect would occur, either short-term or long-term:
 - *Short-term* impacts generally last only during construction, and the resources resume their pre-construction conditions following construction.
 - *Long-term* impacts last beyond the construction period, and the resources may not resume their pre-construction conditions for a longer period of time following construction.

Cumulative Impact Scenario

The CEQ regulations which implement NEPA require assessment of cumulative impacts in the decision-making process for federal projects. 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 non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are considered for both the no action and preferred alternatives.

Cumulative impacts were determined by combining the impacts of the preferred alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at Arches National Park and, if applicable, the surrounding region. Because the scope of this project is relatively small, the geographic and temporal scope of the cumulative analysis is similarly small. The geographic scope for this analysis includes actions within the park's boundaries, while the temporal scope includes projects within a range of approximately ten years. Given this, the following projects were identified for the purpose of conducting the cumulative effects analysis, listed from past to future:

- **Agricultural Practices**: Grazing of livestock, farming and irrigation have occurred within park boundaries in the past. Today, these practices no longer take place in the park but still

occur on neighboring lands. Resource impacts attributable to past livestock grazing and grazing-management activities persist in some areas of the park.

- **Park Infrastructure:** To facilitate park management and visitation by the public, NPS has constructed buildings, parking lots, roads, trails, and other facilities. Collectively, these cover 232.76 acres which is .3% the total area of the park.
- **Exotic Vegetation Management:** NPS manages an extensive program to control invasive exotic plants throughout the park primarily through the use of handsaws, chainsaws, and herbicide. Resulting piles of dead herbaceous and woody biomass often are burned under controlled conditions as a means of reducing hazardous fuel accumulations.
- **Recreation:** Recreation within the park occurs year-round and includes hiking, sightseeing, and backcountry camping. Over one million people visit Arches National Park a year. An average of 2.5 million people visit the Moab area each year to participate in various recreational opportunities that occur on public lands.
- **Transportation Planning Efforts:** Arches is currently implementing near-term strategies to alleviate traffic concerns and congestion issues that were outlined in the 2006 Transportation Implementation Plan and in a 2012 Alternative Transportation and Congestion Management Feasibility Study. Foreseeable actions that may occur within the next 5-10 years include expansion and/or reconfiguration of additional existing parking lots and existing road segments as well as limiting access utilizing park vehicle capacity.
- **Restoration of Salt Valley, Salt and Winter Camp Washes:** A future restoration project to improve the hydrological flow regimes within the Salt Wash basin by removing large acreages of tamarisk and sediment from each of the wash systems and rechannelize the three washes south of the Delicate Arch road.

Soil Resources

Affected Environment

For the purposes of this document, soil is defined as a surficial deposit of fine, unconsolidated material composed primarily of minerals weathered from rock, but also including organic matter and soil organisms. The concept of soil resources includes these components as well as mineral nutrients, soil moisture, associated natural processes such as nutrient cycling and water infiltration, and the soil properties necessary for sustaining these processes. NPS policy is to strive to understand and preserve soil resources of parks, and to prevent or minimize accelerated erosion or other impacts that degrade soil functions and contributions to park natural systems (NPS 2006).

A recent inventory documented the occurrence of 23 distinct types of soil in the park (Scott 2009). These soils differ from one another in numerous properties that affect soil functioning, soil capacity to support different types and amounts of vegetation, and soil responses to surface disturbance and management. Some of these properties include depth, mineral composition, and texture (particle size). Soils in the park can be grouped into three broad categories: aeolian (derived from wind-blown sediment), alluvial (derived from water-borne sediment), and residual (weathered in place; Scott 2009). The parking lot expansion is proposed for an area with a deep alluvial soil (Bowington soil series). The proposed sidewalk / bike path traverses an area that consists primarily of residual soils (Persayo soil series) formed in material that is weathered from the Cretaceous Mancos Shale and Cedar Mountain Formation.

An important soil-surface attribute in the park is the presence, composition, and structure of biological soil crust (biological crust hereafter). Biological crusts are soil-surface assemblages of

cyanobacteria, mosses, and lichens that are functionally significant for soil stabilization (Warren 2003), nutrient cycling (Evans and Lange 2003), hydrologic processes (Warren 2003), and mediation of vascular plant establishment (Belnap et al. 2003). Well-developed biological crusts characterized by a high degree of surface roughness and high cyanobacterial biomass confer greater soil stability than weakly developed biological crusts with less surface roughness and biomass (Belnap et al. 2008). Degree of development increases with duration of surface stability and also is affected by soil properties and site conditions. The functional significance of biological crust is countered by its high vulnerability to damage from surface disturbances that can result in long-term reductions of crust structure and functionality (Belnap and Eldridge 2003). In sparsely vegetated landscapes such as those found in the park, disturbance-induced declines in biological crust often are accompanied by accelerated soil erosion and persistent, long-term reductions in surface roughness and associated functions (Miller et al. 2011). Where well-developed biological crusts are lacking due to surface disturbance or other factors, soils may be stabilized by weakly developed biological crusts or by physical crusts. In the area of the proposed parking lot expansion, weakly developed cyanobacterial crusts are predominant. But the area also is characterized by significant patches of roughened crusts with mosses and lichens. In the area where the proposed sidewalk / bike path is to be located, biological crusts generally are absent due to human-caused disturbance along the road corridor and due to natural characteristics of residual soils formed from shale.

Impacts of Alternative 1 – No Action

There would be no project-related disturbance that would directly or indirectly affect soil resources. Vehicles would continue to drive and park on unpaved roadside areas for overflow parking, directly impacting soil resources by compaction and destabilization, both of which can facilitate soil erosion and loss.

Cumulative Effects- Past actions such as construction of roads, trails, parking lots and other facilities; as well as other past land-use activities such as livestock grazing have had adverse effects on soil resources. Ongoing recreational use and off-trail hiking also have localized effects on soil resources. Although the contribution of effect from Alternative 1 does increase the overall adverse cumulative effect to soils, the incremental addition of soil impact under Alternative 1 is nominal and does not contribute substantially to the overall effect. Therefore, considering the impacts to soils from Alternative 1 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to soils is adverse and less than significant.

Impacts of Alternative 2– No Expansion Alternative

The proposed construction of the sidewalk / bike path would result in localized but long-term (effectively permanent) adverse impacts to soil resources due to covering and paving approximately 0.85 acres of the soil surface. Due to the spatial extent of new pavement, the magnitude of the adverse impacts would be minor. Installation of barriers to prevent roadside parking would reduce adverse soil impacts along a 0.5-mi segment of the road corridor. This action would result in localized impacts to soil resources that would be beneficial and long-term.

Cumulative Effects- Past actions such as construction of roads, trails, parking lots and other facilities; as well as other past land-use activities such as livestock grazing have had adverse effects on soil resources. Ongoing recreational use and off-trail hiking also have localized effects on soil resources. Although the contribution of effect from Alternative 2 does increase the overall adverse cumulative effect to soils, the incremental addition of soil impact under Alternative 2 is minor and does not contribute substantially to the overall effect. Therefore, considering the impacts to soils from Alternative 2 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to geology and soils is adverse and less than significant.

Impacts of Alternative 3 – Expansion Alternative (Preferred Alternative)

The proposed expansion of the parking lot and construction of the sidewalk / bike path would result in localized but long-term (effectively permanent) adverse impacts to soil resources due to covering and paving approximately 1.65 acres of the soil surface. Due to the spatial extent of new pavement, the magnitude of the adverse impacts would be moderate. Installation of barriers to prevent roadside parking would reduce adverse soil impacts along a 0.5-mi segment of the road corridor.

Cumulative Effects- Past actions such as construction of roads, trails, parking lots and other facilities; as well as other past land-use activities such as livestock grazing have had adverse effects on soil resources. Ongoing recreational use and off-trail hiking also have localized effects on soil resources. Although the contribution of effect from Alternative 3 does increase the overall adverse cumulative effect to soils, the addition of soil impact under Alternative 2 is modest and does not contribute substantially to the overall effect. Therefore, considering the impacts to soils from Alternative 3 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to soils is adverse and less than significant.

Vegetation Resources

Affected Environment

According to NPS's 2006 Management Policies, NPS strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of plants (NPS 2006).

Vegetation communities in the park consist of varying assemblages of annual and perennial herbs including grasses and broad-leaved plants, numerous types of drought-tolerant shrubs and succulents, and dwarf trees. A recent inventory and mapping project identified 75 distinct vegetation types in the park (Coles et al. 2009). Here, as elsewhere on the Colorado Plateau, patterns in the distribution, composition, and productivity of vegetation communities are strongly controlled by soil properties, long-term climatic conditions, short-term weather fluctuations, and disturbances attributable to human activities or other factors.

Vegetation in the footprint of the proposed expanded parking lot, the hard barrier installation along the roadway, the 1.1 mile of the bike/pedestrian path adjacent to the road and the Winter Camp Wash channel consists primarily (50~67%) of non-native annual plants, with the highest percentage of invasives occurring in the proposed parking lot expansion footprint. These species include annual wheatgrass (*Eremopyrum triticeum*), notably abundant in the proposed parking area, and other annual exotic grasses (*Bromus tectorum*, *Hordeum murinum*), Russian thistle (*Salsola sp.*), burr buttercup (*Ranunculus testiculatus*), invasive mustards (*Malcolmia africana*, *Sisymbrium altissimum*), and halogeton (*Halogeton glomeratus*). Native vegetation consists of relatively common plants and includes seepweed (*Suaeda torreyana*), greasewood (*Sarcobatus vermiculatus*), globemallow (*Sphaeralcea parviflora*), tansy mustard (*Descurainia incana*), cryptanthus (*Cryptanthus sp.*) and a small number of alkali sacaton grasses (*Sporobolus airoides*) growing along a run-off ditch. The vegetation present in the proposed .65 acre Winter Camp Wash re-channelization includes primarily the non-native tamarisk (*Tamarix chinensis*), but also the common shrubs seepweed (*Suaeda torreyana*), rabbitbrush (*Chrysothamnus nauseosus*) and greasewood (*Sarcobatus vermiculatus*). Herbaceous vegetation consists of primarily non-native forbs including Russian thistle (*Salsola sp.*), burr buttercup (*Ranunculus testiculatus*) goosefoot (*Chenopodium album*), nonnative mustards (*Malcolmia africana*, *Sisymbrium altissimum*), and grasses (*Bromus tectorum*, *Hordeum murinum*), but with some occurrences of native forbes

including tansy mustard (*Descurainia incana*), curlycup gumweed (*Grindellia squarrosa*), veiny dock (*Rumex venosus*), and a native grass, Canada wildrye (*Elymus Canadensis*).

Impacts of Alternative 1 – No Action

There would be no project-related disturbance that would directly or indirectly affect vegetation under Alternative 1. Vehicles would continue to drive and park on unpaved roadside areas for overflow parking, directly impacting vegetation by crushing and indirectly impacting vegetation through compaction of roadside soils and introduction of non-native species via tires and footwear. Some trampling of vegetation would continue to occur near where visitors park along the road and walk among the vegetation to the road or trailhead.

Cumulative Effects- Past actions such as construction of roads, trails, parking lots and other facilities, introduction of non-native species and livestock grazing have had adverse effects on vegetation and have resulted in predominately non-native vegetation, especially along the roads and trail corridors. Ongoing recreational use and off-trail hiking also has local effects on vegetation. Overall, these activities have disturbed the vegetation in the area to a less than significant degree. Because Alternative 1 results in little to no disturbance to vegetation in relation to project related activities, it would not incrementally add to the overall adverse cumulative effect and would be less than significant.

Impacts of Alternative 2– No Expansion Alternative

Under this alternative, the bike/pedestrian path construction and hard closure barrier installation would occur primarily on the previously described disturbed and predominantly weed infested sites adjacent to the existing road. Eliminating these areas by either hardening or preventing further disturbance (in the case of the hard closures) would eliminate some of the seed source for many undesirable species that inhabit the area and have the potential to invade adjacent areas. Some native plants would be eliminated during the bike/pedestrian path construction, but an equal number of non-native plants would be eliminated and a hardened surface adjacent to the road makes newly dispersed weed seed (via tires) more difficult to establish. Vegetation removal within Winter Camp wash would predominately consist of .03 acres of tamarisk with some minimal removal of native vegetation. The effects of the proposed Winter Camp Wash reroute would have temporary minor adverse impacts to native vegetation due to heavy pruning or removal, but would have long term beneficial impacts due to removal of some of the competitive tamarisk and the restoration of more natural flow regimes.

Bike/pedestrian path improvements outside of the existing paved surface would be limited to approximately 0.85 acres with additional minimal disturbance for roadside barrier installation. Sources of fill will be inspected for weed species and approved by NPS vegetation staff prior to transport to site, and all equipment will be cleaned and free of residual soil prior to construction. Similarly, all equipment must be carefully monitored and cleaned to prevent moving on-site weed seed to other areas post construction. Construction activities would be confined to the smallest area necessary to complete the work. Adjacent surface disturbance could facilitate the establishment and spread of invasive exotic plants, but several mitigation measures would be implemented to minimize the potential for exotic plant establishment and spread including monitoring and treatment for invasive weed species. Revegetation of disturbed areas is expected to take more than one year due to effects of variable seed dormancy and precipitation conditions.

Cumulative Effects- The cumulative effects to vegetation are the same as under Alternative 1 except that Alternative 2 does result in some vegetation loss, thereby incrementally adding to the overall adverse cumulative effect to vegetation. Although the contribution of effect from Alternative 2 does increase the overall adverse cumulative effect to vegetation, the incremental addition of vegetation impact under Alternative 2 is nominal and does not contribute substantially

to the overall effect. Therefore, considering the impacts to vegetation from Alternative 2 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to vegetation is adverse and less than significant.

Impacts of Alternative 3 – Expansion Alternative (Preferred Alternative)

Under this alternative, the proposed parking lot expansion, bike/pedestrian path construction, and installation of hard closure barriers would occur primarily on the previously described disturbed and predominantly weed infested sites. Eliminating these areas by either hardening or preventing further disturbance (in the case of the hard closures) would eliminate some of the seed source for many undesirable species that inhabit the area and have the potential to invade adjacent areas. This alternative would also eliminate relatively few common native plants in the expanded parking lot including the sparse Alkali sacaton growing along a run-off ditch, but it is likely that the new cut-off trench that will channel run-off water from the parking lot (0.1 acres) will host the same species in a new location. Some native plants would be eliminated during the sidewalk construction and rechannelization of Winter Camp Wash, but an equal or higher number of non-native plants would be eliminated and a hardened surface adjacent to the road makes newly dispersed weed seed (via tires) more difficult to establish.

Parking and sidewalk improvements outside of the existing paved surface would be limited to approximately 2.3 acres (0.85 parking expansion, 0.8 sidewalk construction, and 0.65 acres within Winter Camp Wash) with additional minimal disturbance for roadside barrier installation. Sources of fill will be inspected for weed species and approved by NPS vegetation staff prior to transport to site, and all equipment will be cleaned and free of residual soil prior to construction. Similarly, all equipment must be carefully monitored and cleaned to prevent moving on-site weed seed to other areas post construction. Construction activities would be confined to the smallest area necessary to complete the work. Adjacent surface disturbance could facilitate the establishment and spread of invasive exotic plants, but several best management practices would be implemented to minimize the potential for exotic plant establishment and spread including monitoring and treatment for invasive weed species. Revegetation of disturbed areas is expected to take more than one year due to effects of variable seed dormancy and precipitation conditions. Overall, the preferred alternative would result in beneficial effects on vegetation. Expansion of the parking lot, construction of the bike/pedestrian path and installation of hard barriers has a beneficial effect on vegetation in that it reduces vegetation trampling by eliminating social trails and parking in undesignated areas and along the roadside. The effects of the proposed Winter Camp Wash reroute would have temporary minor adverse impacts to native vegetation due to heavy pruning or removal, but would have long term beneficial impacts due to removal of some of the competitive tamarisk and the restoration of more natural flow regimes. Overall, this alternative would result in long-term beneficial effects on vegetation resources.

Cumulative Effects- The cumulative effects to vegetation are the same as under Alternative 1 and 2 except that Alternative 3 does result in additional vegetation loss, thereby incrementally adding to the overall adverse cumulative effect to vegetation. Although the contribution of effect from Alternative 3 does increase the overall adverse cumulative effect to vegetation, the incremental addition of vegetation impact under Alternative 3 is minor and does not contribute substantially to the overall effect. Therefore, considering the impacts to vegetation from Alternative 3 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to vegetation is adverse and less than significant.

Floodplains

Affected Environment

Floodplains are defined by the *NPS Procedural Manual 77-2: Floodplain Management* as “the lowland and relatively flat areas adjoining inland and coastal waters, including floodprone areas of offshore islands, and including, at a minimum, that area subject to temporary inundation by a regulatory flood.” Executive Order 11988 *Floodplain Management* requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. *NPS Management Policies* and Director’s Order 77-2 *Floodplain Management* will strive to preserve floodplain values and minimize hazardous floodplain conditions. According to Director’s Order 77-2 *Floodplain Management*, certain construction within a 100-year floodplain, including this project, requires preparation of a Statement of Findings (SOF) for floodplains. Appendix B includes the SOF for this project.

The existing Wolfe Ranch / Delicate Arch Viewpoint Road was constructed across the floodplains of three significant drainage systems that converge in the immediate vicinity of the Wolfe Ranch project area. From west to east, these systems include Salt Valley Wash, Salt Wash, and Winter Camp Wash. All three are ephemeral stream systems that flow only in direct response to precipitation events that are of sufficient magnitude and intensity to generate runoff and streamflow, although Salt Wash in the vicinity of Wolfe Ranch is characterized by perennial surface water resulting from subsurface groundwater discharge. Flashy hydrologic regimes, sparsely vegetated watersheds characterized by eroding sedimentary formations, the low-gradient valley setting in which the washes converge and cross the road, and road-wash crossings that were inadequately designed for such conditions have long resulted in frequent over-road flows at all three wash crossings and significant repeated sediment deposition on the road at Salt Valley Wash and Winter Camp Wash. These conditions likely are exacerbated by the extensive presence of exotic woody plant populations (*Tamarix chinensis*) in the floodplain both upstream and downstream of the road crossings, resulting in altered streamflow and channel configurations. The frequency and magnitude of over-road flow and sediment deposition events both appear to be increasing with time due to repeated deposition and floodplain aggradation. Over-road flows and sediment deposition frequently cause road closures that strand visitors and that require costly management actions to protect visitor safety and clear the road.

Impacts of Alternative 1 – No Action

Alternative A would have no direct or indirect impacts on floodplain characteristics and would result in no changes to existing floodplain characteristics and values.

Cumulative Effects- Original construction of the Wolfe Ranch / Delicate Arch Viewpoint Road adversely affected the natural hydrologic and geomorphic processes associated with Winter Camp Wash, Salt Wash, and Salt Valley Wash. Planned past, current, and future prescribed burning and thinning also may affect hydrologic and water quality processes by temporarily removing surface cover, and increasing runoff and the concentration of nutrients in runoff into wash channels. Cumulatively, these effects have been and continue to be adverse and less than significant. Because Alternative 1 results in no change to the floodplain, it does not contribute to the overall cumulative effect to floodplains.

Impacts of Alternative 2– No Expansion Alternative

Under Alternative 2, one component of the proposed action is designed to mitigate the conditions at the Winter Camp Wash road crossing. Immediately upstream of the road crossing, approximately 0.3 acres of vegetation (primarily exotic *Tamarix* with a limited amount of native woody and

herbaceous vegetation) would be removed, and the channel of the wash would be excavated and straightened to facilitate greater conveyance of water and sediment across the road. The channel also would be excavated and reconfigured downstream of the road crossing to direct flow away from the current aggraded channel and towards a former channel with a lower surface elevation. In addition to these actions within the floodplain, portions of the proposed sidewalk / bike path also would be constructed across the floodplains of Winter Camp Wash and Salt Wash.

Removal of floodplain vegetation upstream of the road crossing, and channel excavation and reconfiguration upstream and downstream of the road crossing would result in localized beneficial impacts to the characteristics and functioning of the Winter Camp Wash floodplain. Due to the continued presence of the road and the dynamic characteristics of the wash system, impacts of these actions likely would be short term and adverse. Construction of the sidewalk / bike path across the Winter Camp Wash and Salt Wash floodplains would have negligible, long-term, localized, adverse impacts to floodplain characteristics. The net impacts of Alternative 2 would be localized, beneficial, short-term, and less than significant.

Cumulative Effects- The cumulative effects to floodplains are the same as under Alternative 1 except that Alternative 2 does result in beneficial effects to the floodplain, thereby creating a net cumulative effect to floodplains. Although net impacts of Alternative 2 would be beneficial and moderate, they would be small relative to the overall cumulative effects of road construction and the incremental addition of floodplain impact under Alternative 2 is nominal and does not contribute substantially to the overall effect. Therefore, considering the adverse impacts to floodplains from Alternative 2 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to floodplains is both adverse and beneficial and less than significant.

Impacts of Alternative 3 – Expansion Alternative (Preferred Alternative)

Under Alternative 3, impacts would be the same as Alternative 2.

Cumulative Effects- The cumulative effects to floodplains are the same as under Alternative 2.

Visitor Use and Experience

Affected Environment

There has been rapid growth to park visitation in the past ten years as the number of visitors to the park has increased an average of 3% each year. Over the past three years, Arches National Park has hosted more than one million visitors annually. The number of tour buses coming to the park in the same time span has increased an average of 7% annually, effectively tripling the number of large vehicles (> 35') present on park roads from 2000 levels (Johnson 2012a). During the park's relatively long peak season from March through September an average of 1435 vehicles entered the park daily. Weekends during this period averaged 1574 vehicles a day (Johnson 2012).

The most popular attractions visitors come to the park to see, according to a 2003 Visitor Survey (in order of most mentioned to least mentioned) were: Windows, Balanced Rock, Devils Garden, Delicate Arch (viewpoint and Wolfe Ranch) and Courthouse Towers/Park Avenue (NPS 2003).

Daily visitation to Delicate Arch/Wolfe Ranch site during the peak seasons is approximately 2,000 people and the parking lot is one the smallest of the popular park sites. Current parking capacity of 73 parking spaces is not sufficient for current visitation and the parking lot fills to capacity for most of the day, almost every day of the week during the spring and fall seasons. The parking capacity for the park, although initially designed through the Visitor's Experience and Resource Protection (VERP) analysis in the early 2000's, has been exceeding VERP standards ever since. In previous and

future transportation planning efforts the management of visitation is to control the capacity of visitors by the limits of available parking spaces (NPS 1989, NPS 2006). However, the parking area at Delicate Arch/Wolfe Ranch is frequently congested, causing visitors to park outside of paved areas, potentially damaging sensitive soils, vegetation. Maneuvering a large 40 passenger tour bus through the current parking lot is not advised as the turn radius is narrow. Dropping off and picking up passengers at the trailhead at times causes some congestion issues.

Due to the main road being paved in 1994, sediment from Winter Camp Wash, over the last 20 years has completely filled in the box culverts and now the wash is at the same grade with the road on both sides. The road itself has impeded the natural process of the wash system. The wash on the south side of the road is currently pooling water as water cannot flow freely down the wash. This pooling of water causes sediment and water to back up on the road. This section of road currently functions as a low water crossing. Most intermittent flood events cause the road to Delicate Arch Viewpoint to flood and traps visitors on the east side of the road until the water level recedes. Once the water recedes, the amount of sedimentation deposited on the road surface requires heavy equipment for removal prior to opening the road. The frequency and magnitude of over-road flow and sediment deposition events both appear to be increasing with time due to repeated deposition and floodplain aggradation. Over-road flows and sediment deposition frequently cause road closures that strand visitors and that require costly management actions to protect visitor safety and clear the road.

The Delicate Arch Viewpoint parking lot has a total of 73 parking spaces (53 standard, 17 oversized and 3 accessible). Sample occupancy data and staff observations show that this parking lot is only occupied at 30% of its total capacity and could accommodate additional parking for both oversized and standard vehicles (Johnson, 2012).

Impacts of Alternative 1 – No Action

Under this alternative, there would be no change in the fundamental nature and quality of the visitor experience or recreational opportunities under the no action alternative. With no construction related activities, ground disturbance, or new features introduced into the landscape, there would be no change to how visitors use and experience the project area. With no parking improvements, visitors would continue to park in undesignated areas which could also pose minor safety hazards from visitors getting out of their cars onto the road (unintended human-vehicle interactions). Congestion and safety issues in the existing parking lot and along the road would continue to occur due to lack of additional parking spaces. Unlimited number of visitors would continue to have access to the site and overcrowding on the trail would be a future adverse effect to a visitor's experience. The frequent closures of the road due to the flooding of Winter Camp wash would adversely affect a visitor by either trapping them for several hours during a flood event or preventing them from accessing the Delicate Arch viewpoint at all. While Alternative 1 would pose some minor inconveniences and safety concerns, impacts to visitor use and experience would be less than significant.

Cumulative Effects- Past actions such as construction of roads, trails, parking lots and other facilities have had adverse effects on visitors experience because of the inconvenience of possible off-limit areas, construction noise and dust. Ultimately, however, these actions would have a beneficial effect on visitor use and experience because of long-term improvements to the human health and safety aspects of the visitor; the visual and natural environment of the resources; and functionality of the park. The foreseeable future actions related to park transportation management and potential limits to visitor access, however, could have an adverse effect on visitor use. Overall, past, present, and future activities have resulted in a mix of beneficial and adverse effects to visitor use and experience, all of which, cumulatively, are less than significant. Because

Alternative 1 results in no change to visitor use and experience, it does not contribute to the overall cumulative effect to visitor use and experience and would be less than significant.

Impacts of Alternative 2– No Expansion Alternative

Under Alternative 2, the visitor experience would be impacted by construction activities required to construct of the bike/pedestrian path along the Delicate Arch road, but the new path would improve the quality of the visitor experience over the long term. Installation of hard barriers to prevent roadside parking would limit parking for the site to the current parking lot which only accommodates 73 vehicles at one time. Visitors would be adversely affected as these actions would limit access to the site to approximately 350 vehicles and 945 visitors per day. Under this alternative, a bus loading and unloading area would be created allowing bus visitors to safely access the trailhead. Bus and overflow parking would be provided by the use of the Delicate Arch viewpoint parking lot and the newly constructed path would allow visitors a safe place to walk or ride their bike to the main trailhead. With the rechannelization of Winter Camp wash, flooding and closures of the road would be greatly reduced further improving a visitors experience at the site.

Short-term moderate adverse effects on the quality of the visitor experience would occur at the site during periods of construction. While construction activities would temporarily inconvenience visitors, significant changes in the number of visitors to the park are not expected. Over the long term, the proposed improvements to the condition of the site would provide a moderate beneficial effect on the quality of the visitor experience for visitor enjoyment and safe travel for many years however, impacts to visitor use and experience would be less than significant.

Cumulative Effects- The cumulative effects to visitor use and experience are the same as under Alternative 1 except that Alternative 2 does result in some short-term adverse construction impacts (noise, dust, inconvenience) and some long-term beneficial effects (additional visitor amenities), thereby incrementally adding to the overall mix of beneficial and adverse cumulative effects to visitor use and experience. Although the contribution of effect from Alternative 2 does increase the overall adverse and beneficial cumulative effects to visitor use and experience, the incremental addition of visitor use and experience impact under Alternative 2 is nominal and does not contribute substantially to the overall effect. Therefore, considering the impacts to visitor use and experience from Alternative 2 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to visitor use and experience is both adverse and beneficial, and less than significant.

Impacts of Alternative 3– Expansion Alternative (Preferred Alternative)

Under Alternative 3, construction of parking improvements would improve visitor experience by providing designated parking areas which are safer and easier for visitors to use. However, the visitor experience would be adversely impacted by construction activities required to construct the larger parking lot and the bike/pedestrian path along the Delicate Arch road. At times, traffic delays as well as full closures would inconvenience visitors traveling along the road and wanting park at the trailhead. During construction of the parking lot, roadside parking would be allowed to occur and access to the trailhead would be available. After the expansion of the parking area is open to visitor use, and then the installation of hard barriers would occur to prevent roadside parking. This action would limit parking at the site to the expanded parking lot which would now accommodate 156 vehicles at one time. This alternative would not result in more visitation to the site but would accommodate the current roadside parking within an established parking area. Visitation to the site under Alternative 3 would be expected to be the same as current use; approximately 749 vehicles and 2,021 visitors per day.

Just like Alternative 2, a bus loading and unloading area would be created allowing bus visitors to safely access the trailhead. Bus and overflow parking would be provided by the use of the Delicate

Arch Viewpoint parking lot and the newly constructed path would allow visitors a safe place to walk or ride their bike to the main trailhead. With the rechannelization of Winter Camp wash, flooding and closures of the road would be greatly reduced further improving a visitors experience at the site.

Planned construction work would occur primarily between in October and July. Work would require closure of the west half of the parking lot. The east side could be left open for visitors. During this time the west side parking lot would be closed all day from Sunday night till Thursday night, but could be opened through the weekend. The new parking lot could be utilized beginning in the late winter early spring but it would only be dirt. Construction work may cause some visitors to avoid traveling into the site and choose to visit other areas of the park, where closures and delays are not occurring, which may result in increased visitor use and crowding at these other locations.

As described in the best management practices section, the park would implement a number of measures to reduce visitor impacts and maintain the quality of the visitor experience and access to recreation resources during construction. Visitors would be informed in advance of construction via a number of sources (i.e. park website, newspaper, radio, at entrance stations, variable message signs, visitor center and, kiosks) so they can best plan their schedule and activities. Traffic delays would be kept to a minimum. Additional parking improvements would provide for more parking for cars, large Recreational Vehicles (RVs) and commercial buses.

While construction activities and traffic delays would temporarily inconvenience visitors, significant changes in the number of visitors to the park are not expected. Over the long term, the proposed improvements to the condition of the site would provide a moderate beneficial effect on the quality of the visitor experience for visitor enjoyment and safe travel for many years.

Cumulative Effects- The cumulative effects to visitor use and experience are the same as under Alternative 1 and 2. However Alternative 3 does result in more short-term adverse construction impacts (noise, dust, inconvenience) and some long-term beneficial effects (additional visitor amenities), thereby incrementally adding to the overall mix of beneficial and adverse cumulative effects to visitor use and experience. Although the contribution of effect from Alternative 3 does increase the overall adverse and beneficial cumulative effects to visitor use and experience, the incremental addition of visitor use and experience impact under Alternative 3 is nominal and does not contribute substantially to the overall effect. Therefore, considering the impacts to visitor use and experience from Alternative 3 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to visitor use and experience is both adverse and beneficial, and would be less than significant.

Park Operations

Affected Environment

The Arches General Management Plan outlines park issues and goals to manage the protection of the park resources and provide for visitor access (NPS 1989). NPS operations perform a range of activities to manage the visitor access, safety and resource protection. The Superintendent is responsible for overall management, operation, and safety in the park and is supported by five operational divisions of responsibility. The following park divisions will be impacted with the management of Delicate Arch/Wolfe Ranch site: Resource Stewardship and Science, Resource and Visitor Protection, and Maintenance. The Resource Stewardship and Science Division (RSS) is responsible for the management and protection of natural and cultural resources. It is tasked with the responsibility to understand, maintain, restore, and protect the inherent integrity of the natural

resources, processes, systems, and values of the park and to maintain the natural condition of resources that will occur in relation to human activities, climate, and landscape setting. The Resource Stewardship and Science Division is also responsible for cultural resources and to ensure that cultural resources are preserved and protected, and are made available for public understanding and enjoyment, including the historic Wolfe Ranch site.

The Resource and Visitor Protection (RVP) Division is also responsible for protecting the natural and cultural resources of the park, as well as providing for the enjoyment and safety of park visitors. Programs managed include law enforcement, backcountry permit fee collection management, wildland fire activities, emergency medical services/search and rescue coordination, concessions, special use, commercial use management and continued efforts in resource education. Parking infractions and congestion at the Delicate Arch/Wolfe Ranch site are ongoing issues and the current staffing of four permanent law enforcement rangers and one seasonal ranger is continually challenged with these site issues and park wide patrolling.

The Maintenance Division is charged with maintaining and constructing facilities in the park for visitor safety and satisfaction. Campground, trail and road maintenance as well as maintaining restrooms and picnic areas and clearing debris off of roads after flood events are many of the tasks the maintenance crews are tasked with in the park. Flooding along Delicate Arch road occurs 5-10 times a year. Many times maintenance crews are called in after hours to clear the road after flood events. Maintenance crews would clear the road of sedimentation from flood events each time they occur. Sedimentation from these floods are collected and removed to an offsite location. However, the offsite location can no longer accommodate the collected material and the maintenance division is seeking an additional location to haul the collected sediment.

Increased visitation is always accompanied with increased impacts to resources. Park management is constantly challenged in successfully managing user activities in order to decrease recreation-related impacts to sensitive resources. During the scoping process, the public commented that management changes would be needed in order to protect and preserve the unique resources that make the park special. Park management is constantly challenged in successfully managing user activities in order to decrease recreation-related impacts to sensitive resources. The majority of comments were in favor of a shuttle system. The expansion of the parking area and implementing a reservation system were also highly popular suggestions in the public's comments.

Impacts of Alternative 1 – No Action

Under this alternative, there would be no change in the fundamental nature and quality of park operations under the no action alternative. With no construction related activities, ground disturbance, or new features introduced into the landscape, there would be no change to how the park manages the project area. Law enforcement would continue to deal with illegal parking, vehicles parked within the road way along the road shoulders, and assisting visitors when they are stuck on the east side of Winter Camp wash when the wash floods. LE would also deal with the increasing congestion issues due the high number of visitors who access the site. RSS division will continue to treat exotic plants within the road prism and frequency of treatments may increase due to continued trampling of soils from foot and vehicle traffic. Restoration efforts of native vegetation along road shoulders prove unsuccessful due to continued roadside disturbances and would not be attempted. Maintenance crews would continue to clear the road of sedimentation from flood events each time they occur.

Cumulative Effects- The development of private lands near Arches; park recreational uses in other parts of the park, development and maintenance of park infrastructure including roads, trails, and facilities; and foreseeable future actions related to park transportation management and activities by other federal, state, and local agencies with respect to natural and cultural resources, all effect

park operations due to additional staff time required for patrols, restoration, and maintenance. Activities in and adjacent to the park contribute to both beneficial and adverse effects to park operations. Because Alternative 1 results in no change to the management of park operations, it does not contribute to the overall cumulative effect to park operations and would be less than significant.

Impacts of Alternative 2– No Expansion Alternative

Under Alternative 2, installation of hard barriers along the road would reduce the need to continually cite visitors for illegal parking and LE would be able to patrol more areas of the park which would have a long term beneficial effect on park operations. Maintenance would be responsible for installing and maintaining the hard barriers. The construction and maintenance associated with the proposed barriers and bike/pedestrian pathway would result in short-term adverse impacts to park operations as compared to existing levels due to the construction and improvement costs. Beneficial impacts on park operations under this alternative would result from easier routine maintenance of Winter Camp Wash. The rechannalization would reduce the need for emergency calls to deal with removal of flood sedimentation on the road as well as the LE staff time managing the closure of the road.

The combined proposed actions at Wolfe Ranch would temporarily increase the exotic plant treatment workload for RSS staff due to disturbance created during construction. However, due to more paved surfaces adjacent to human and vehicular weed vectors, resulting in reduced available soil surface for germination, the long term workload would be reduced.

Cumulative Effects- The development of private lands near Arches; park recreational uses; development and maintenance of park infrastructure including roads, trails, and facilities; the conduct of resource monitoring and research activities; and foreseeable future actions related to park transportation management and activities by other federal, state, and local agencies with respect to water, wildlife, and soundscapes, all effect park operations due to additional staff time required for patrols and monitoring. All these improvements provide more efficient infrastructure for visitors but also place additional demands on park operations resulting in both beneficial and adverse impacts on operations and infrastructure. Therefore, considering the impacts to park operations from Alternative 2 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to park operations is adverse and beneficial and less than significant.

Impacts of Alternative 3– Expansion Alternative (Preferred Alternative)

Under Alternative 3, the expanded parking area and other improvements such as the new bike/pedestrian path, elimination of roadside parking due to the installations of hard barriers would result in greater beneficial effect on operations and operating costs by reducing staff time needed to address circulation and parking issues throughout the year. The construction of the expanded parking lot and pathway would result in short-term adverse impacts to park operations as compared to existing levels due to the construction, improvement and maintenance costs. Beneficial impacts on park operations would result from easier routine maintenance of Winter Camp Wash. The rechannalization would reduce the need for emergency calls to deal with removal of flood sedimentation on the road as well as the LE staff time managing the closure of the road.

Maintenance operations may increase in the future to repair and maintain the facilities over time. These additions would have a long-term but minor impact on park operations. The combined proposed actions at Wolfe Ranch would temporarily increase the exotic plant treatment workload for RSS staff due to disturbance created during construction. However, due to more paved surfaces adjacent to human and vehicular weed vectors, resulting in reduced available soil surface for germination, the long term workload would be reduced.

Cumulative Effects- The cumulative effects to park operations are the same as under Alternative 2. All these improvements provide more efficient infrastructure for visitors but also place additional demands on park operations resulting in both beneficial and adverse impacts on operations and infrastructure. However Alternative 3 does result in more short-term adverse construction impacts (improvement and maintenance costs) and some long-term beneficial effects (reduction in staff time and effort), thereby incrementally adding to the overall mix of beneficial and adverse cumulative effects to park operations.. Although the contribution of effect from Alternative 3 does increase the overall adverse and beneficial cumulative effects to park operations, the incremental addition of operations impact under Alternative 3 is nominal and does not contribute substantially to the overall effect. Therefore, considering the impacts to park operations from Alternative 3 in the context of the other past, present, and reasonably foreseeable future projects, the overall cumulative effect to park operations is both adverse and beneficial, and would be less than significant.

CONSULTATION AND COORDINATION

Internal Scoping

Scoping is a process to identify the resources that may be affected by a project proposal, and to explore possible alternative ways of achieving the proposal while minimizing adverse impacts. Internal scoping was conducted by an interdisciplinary team of professionals from the park. Interdisciplinary team members met to discuss the purpose and need for the project; various alternatives; potential environmental impacts; past, present, and reasonably foreseeable projects that may have cumulative effects; and possible mitigation measures. The team also gathered background information and discussed public outreach for the project. Over the course of the project, team members have conducted individual site visits to view and evaluate the proposed road and parking area work. The results of the various site visits and meetings are documented in this EA.

External Scoping

External scoping was conducted to inform the public about the proposal to construct various improvements at the Wolfe Ranch/Delicate Arch site and parking area and to generate input on the preparation of this EA. This effort was initiated with the distribution of a scoping letter, which was mailed to over 100 residents, county and city officials in the city of Moab and Grand County as well as neighboring agencies. In addition, the scoping letter was posted on the NPS Planning, Environment, and Public Comment (PEPC) website. A press release was also sent to local news organizations. The public was given 30 days to comment on the project.

During the external scoping period, approximately 121 pieces of correspondence were received from the public through the PEPC website and letters. The majority of respondents were in favor of a shuttle system. This alternative was examined by the interdisciplinary team and ultimately dismissed (see Impact Topics Dismissed from Further Analysis in Alternatives). The remaining responses included 31% in favor of expansion of the parking lot, with 17% not in favor of expansion. Comments regarding the implementation of a reservation system were mixed. Most responders stated that action did need to take place to improve the parking and crowding situation at the site.

Agency Consultation

In accordance with the Endangered Species Act, NPS contacted the U.S. Fish and Wildlife Service with regards to federally listed special status species, and in accordance with National Park Service policy. The results of these consultations are described in the *Special Status Species* section in the *Purpose and Need* chapter.

In accordance with §106 of the National Historic Preservation Act, NPS provided the Utah State Historic Preservation Officer an opportunity to comment on the effects of this project. A letter from the Utah State Historic Preservation Officer, dated April 2, 2014, confirmed NPS's "no adverse effect" determination under §106 of the National Historic Preservation Act (USHO 2014).

Native American Consultation

Twenty-nine Native American tribes were contacted at the beginning of this project to determine if there were any ethnographic resources in the project area and if they wanted to be involved in the environmental compliance process. These tribes included:

Hopi Tribal Council
Jicarilla Apache Nation
Kaibab-Paiute Tribal Council
Navajo Nation
Paiute Indian Tribe
Pueblo of Acoma
Pueblo of Cochiti
Pueblo of Isleta
Pueblo of Jemez
Pueblo of Laguna
Pueblo of Nambe
Pueblo of Picuris
Pueblo of Pojoaque
Pueblo of San Clara
Pueblo of San Ildefonso
Pueblo of Santo Domingo
Pueblo of Taos
Pueblo of Tesuque
Pueblo of Zia
San Felipe Pueblo
San Juan Pueblo
Sandia Pueblo
Santa Ana Pueblo
Southern Ute Tribe
Ute Indian Tribe
Ute Mountain Tribe
White Mesa Ute
Ysleta Del Sur Pueblo
Zuni Tribal Council

One of these tribes responded; the Hopi Tribal Council. This tribe concurred with the NPS's determination of No Adverse Effect. They had no objection to the proposed project and requested to be notified if any cultural deposits are encountered during construction.

Environmental Assessment Review and List of Recipients

The EA is subject to a 30-day public comment period. To inform the public of the availability of the EA, NPS will publish and distribute a letter to various agencies, tribes, and the park's mailing list, as well as place an ad in the local newspaper. The document will be available for review on the PEPC website at <http://parkplanning.nps.gov/arch> and at the park's visitor center. Copies of the EA will be provided to interested individuals, upon request.

During the 30-day public review period, the public is encouraged to submit their written comments to NPS, as described in the instructions at the beginning of this document. Following the close of the comment period, all public comments will be reviewed and analyzed, prior to the release of a

decision document. The National Park Service will issue responses to substantive comments received during the public comment period, and will make appropriate changes to the EA, as needed.

List of Preparers

The following persons assisted with the preparation of the EA. All are employees of NPS and/or the Southeast Utah Group Parks:

Name/Title	Contribution
Kate Cannon, SEUG Superintendent	Reviewed EA
Sabrina Henry, SEUG Environmental Protection Specialist	Prepared EA and Visitor Use and Experience and Park Operation sections
John Lewis, SEUG Chief of Facility Maintenance	Reviewed EA
Mike Henry, ARCH Supervisory LE Ranger	Reviewed EA
Mark Miller, SEUG Chief of Resource Science and Stewardship	Prepared Soil and Floodplain sections; reviewed EA
Cheryl Decker, SEUG Vegetation Resource Program Manager	Prepared Vegetation section
Chris Goetze, SEUG Cultural Resource Program Manager	Prepared Cultural Resource Sections, Consultation with SHPO and Tribes
Cheryl Eckhart, Intermountain Regional Environmental Protection Specialist	Reviewed EA
Gary Smillie, Hydrology Program Lead, Water Resources Division, Intermountain Region	Reviewed Statement of Findings for Floodplains

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Appendix A: State Historic Preservation Office Concurrence Letter



United States Department of the Interior

NATIONAL PARK SERVICE
Southeast Utah Group
Arches and Canyonlands National Parks
Hovenweep and Natural Bridges National Monuments
2282 S. West Resource Boulevard
Moab, Utah 84532-3298

IN REPLY REFER TO:

1A2 (SEUG-RSS)

March 26, 2014

Lori Hunsaker
Deputy Utah State Historic Preservation Officer
Division of State History
300 South Rio Grande St.
Salt Lake City, UT 84101-1182

Reference: §106 Compliance; Delicate Arch/Wofe Ranch Site Plan at Arches National Park, Grand County, Utah

Dear Ms. Hunsaker:

In accordance with §106 of the National Historic Preservation Act of 1966, amended, and the Council's regulations, 36 CFR Part 800, we seek your review and comment regarding a proposed undertaking to upgrade parking at the Delicate Arch/Wolfe Ranch Trailhead in Arches National Park, Grand County, Utah.

Parking at Delicate Arch/Wolfe Ranch trailhead is frequently congested, causing visitors to park outside of paved areas and along roadsides, damaging soils and vegetation. Flooding is another issue in the area since Winter Camp Wash bisects the road. During flood events the road to Delicate Arch Viewpoint must be closed. Congestion and inadequate parking along with road closures frustrates our visitors. There is a need to develop a site plan to help determine specific goals and objectives for the management of congestion related issues within this area of the park.

Delicate Arch is one of the primary locations in the park visitors want to see when they are in Arches. Daily visitation to Delicate Arch during the peak seasons is approximately 2,000 people and the parking lot is one of the smallest of the popular park sites. Proposals for this project include doubling the size of the existing parking lot and re-opening the clogged Winter Camp Wash drainage to alleviate periodic flooding.

Two cultural resource sites are located within the Area of Potential Effect of the proposed project. Wolfe Ranch National Historic District (42GR03574) is listed on the National Register but has been determined ineligible as a Cultural Landscape. An open lithic scatter (42GR00558) is located to the north of the proposed parking lot expansion, on a

Received
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USHPO

ridge top overlooking Salt Wash. We are enclosing a map of the proposed project area showing the location of these sites relative to the proposed parking lot expansion and the Winter Camp Wash drainage re-opening, along with a completed Assessment of Effect form.

Based on our assessment that these cultural resources will not be impacted by proposed project activities, we are making a recommendation of No Adverse Effect to sites 42GR00558 and 42GR03547. If you concur with our recommendation, please sign the concurrence line below and return a copy to our office. If you have further questions or need additional information, please contact Chris Goetze, Southeast Utah Group Cultural Resource Program Manager, at 435-719-2134, or Chris_Goetze@nps.gov.



Kate Cannon
Superintendent
Arches National Park

Enclosures

I Concur  **Chris Merritt, Ph.D.**
Senior Preservation Planner
USHPO
for Lori Hunsaker Date 3/2/14
Utah State Historic Preservation Officer



National Park Service
U.S. Department of the Interior
Arches National Park
Moab, Utah

Appendix B – Statement of Findings for Floodplains

Recommended by:

Kate Cannon, Superintendent, Arches National Park, National Park Service

Concurred by:

Forrest E. Harvey, Chief of the Water Resources Division, National Park Service

Approved by:

Sue E. Masica, Intermountain Regional Director, National Park Service

Introduction

Executive Order 11988 *Floodplain Management* requires the National Park Service (NPS) and other federal agencies to evaluate the likely impacts of actions in floodplains. 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. NPS Director's Order 77-2: *Floodplain Management* and NPS Procedural Manual 77-2: *Floodplain Management* provides NPS policies and procedures for complying with Executive Order 11988. This Statement of Findings for Floodplains (SOF) documents compliance with Executive Order 11988 *Floodplain Management*, NPS Director's Order 77-2: *Floodplain Management*, and NPS Procedural Manual 77-2: *Floodplain Management*.

The purpose of this Floodplain SOF is to review the actions associated with the proposal to restore Winter Camp Wash within Arches National Park in sufficient detail to:

- Provide an accurate and complete description of the flood hazard assumed by implementation of the selected alternative (without mitigation);
- Provide an analysis of the comparative flood risk among alternative sites;
- Describe the effects on floodplain values associated with the selected alternative;
- Provide a thorough description and evaluation of mitigation measures developed to achieve compliance with Executive Order 11988 *Floodplain Management*, NPS Director's Order 77-2: *Floodplain Management*, and NPS Procedural Manual 77-2: *Floodplain Management*.

Proposed Action

The NPS prepared an Environmental Assessment (EA) for the proposal to expand the parking lot at Delicate Arch/Wolfe Ranch parking area, restrict roadside parking, construct a paved path from Delicate Arch Viewpoint parking area to Delicate Arch/Wolfe Ranch parking lot and rechannel Winter Camp Wash. All of these actions will be constructed or implemented within Arches National Park, as follows:

Parking Expansion – The parking lot will be expanded by an additional 82 standard vehicle spaces and eight oversized spaces (i.e. RV's, SUV's, truck's) for a total of 156 parking spaces at the trailhead (116- standard, 34- oversized, 2- accessible). The expanded parking area will only accommodate current roadside parking overflow.

The design of the expansion will fit the current design of the existing parking area and will be located on the northern end (Figure 1). A total area of ground disturbance for this expansion will be 37,200 square feet or 0.85 acres. The area proposed for the expansion will require fill dirt to be brought in to bring the site to grade with the existing lot. A two-rail fence will be constructed on the eastern side of the expanded parking area to enable visitors to safely access the trailhead and to prevent visitors from short cutting to the trail from their vehicles. The oversize parking area to the south of the trailhead or the Delicate Arch Viewpoint parking area will not be expanded.

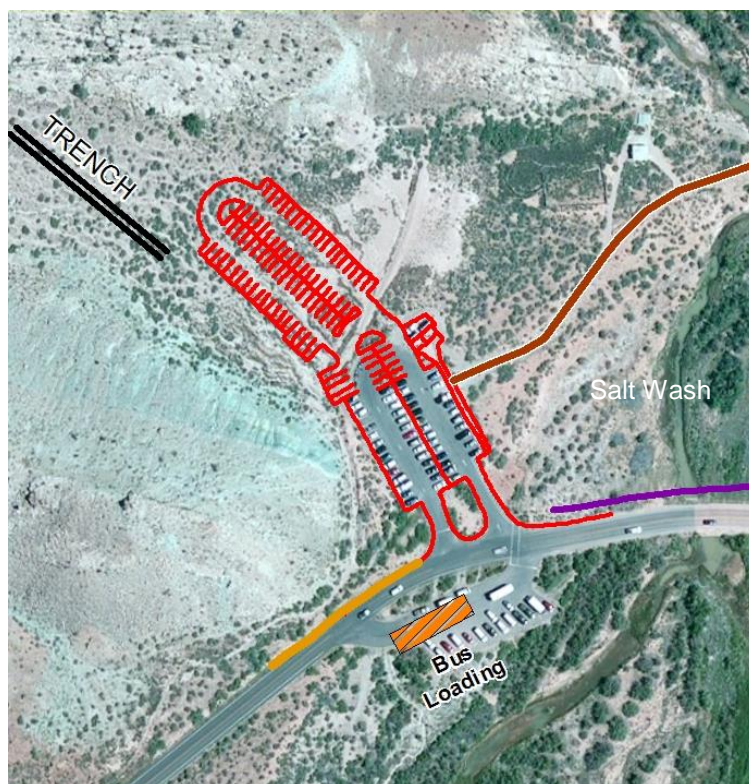


Figure 9: Proposed Parking Expansion

Restrict Roadside Parking – In order to prevent vehicles from parking along the road shoulders, hard barriers, such as large boulders and/or two rail fencing, will be installed along both sides of the road where the topography does not naturally prevent roadside parking. Strict enforcement with posted signs, ticketing and potential booting of vehicles to enforce no roadside parking policy will also occur.

Paved Bike/Pedestrian Path – A 1.1 mile six foot wide bike/pedestrian sidewalk will be constructed along the road to allow safe pedestrian passage for visitors to bike or walk from the Delicate Arch Viewpoint parking area to an access trail which ties into the main trail. The path will not be constructed over Salt Wash.

Rechannel Winter Camp Wash – The plan will restore Winter Camp Wash in an effort to recreate a natural channel shape by removing vegetation from within the wash and reshaping the channel to a new alignment (Figures 2 and 3). Immediately upstream of the road crossing, approximately 0.3 acres of vegetation (primarily exotic Tamarisk with a limited amount of native woody and herbaceous vegetation) will be removed, and the channel of the wash would be excavated and straightened to facilitate greater conveyance of water and sediment across the road. The channel also will be excavated and reconfigured downstream of the road crossing to direct flow away from the current aggraded channel and towards a former channel with a lower surface elevation. In addition to these actions within the floodplain, portions of the proposed sidewalk / bike path also will be constructed across the floodplains of Winter Camp Wash. A footbridge may be installed over the wash in the future, once the wash has been restored.

A culvert will not be installed under the road. The road will be managed as a low water crossing.

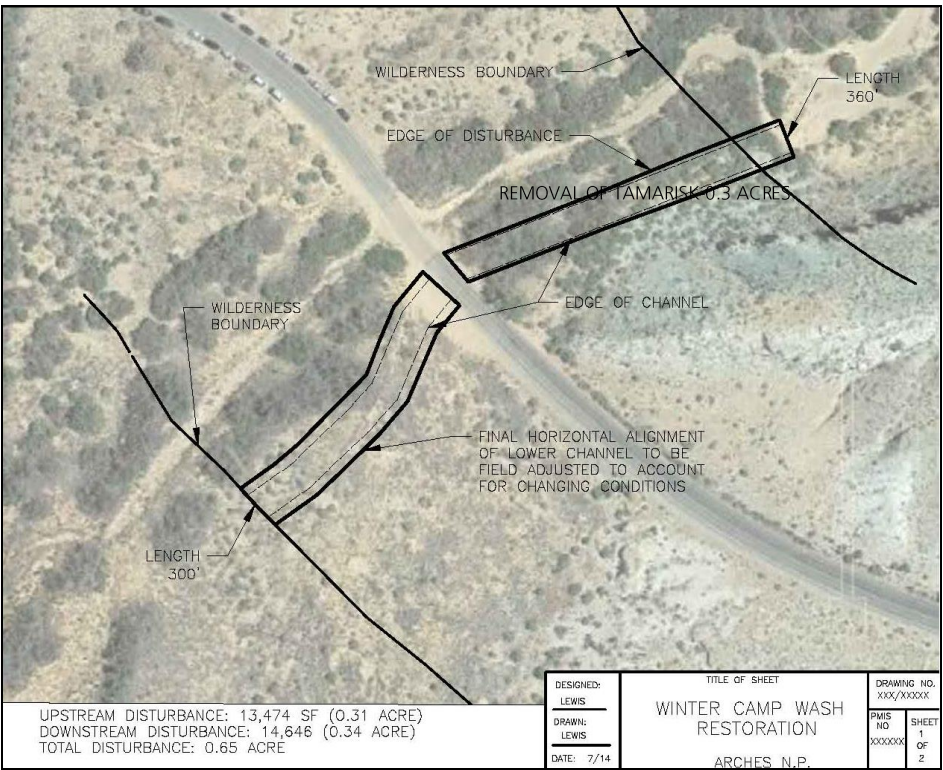


Figure 2: Winter Camp Wash Proposed Site Plan

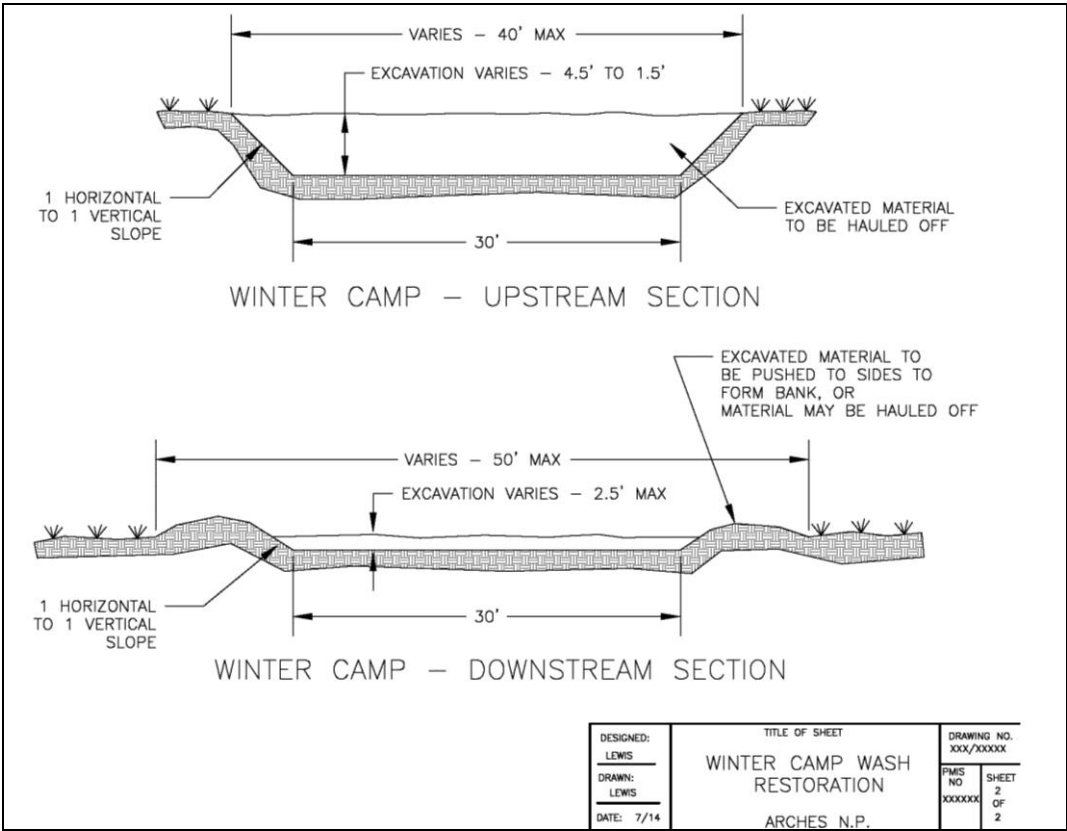


Figure 3: Winter Camp Wash Restoration Detail

A bulldozer and backhoe will be used above and below the road within the wash to excavate the wash channel and to distribute the sediment out from along the streambed sides. A Section 404 permit will be required for any channel in-stream work.

Site Description

The project area is the area for one of the most popular sites in Arches, the trailhead for Delicate Arch, a 65-foot (20 m) tall freestanding natural arch. Delicate Arch is the most widely-recognized landmark in Arches National Park and the state of Utah and as such is depicted on the Utah state license plates. Visitors come from all over the world to see Delicate Arch which is touted as a “must see”.

Historic Wolfe Ranch is also located near the project site off of the trail to Delicate Arch. The Wolfe Ranch was settled in 1888 by Civil War Veteran John Wolfe and his son. The Wolfe's built a one-room cabin, a corral and a small dam across Salt Wash. This site has been added to the National Register of Historic Places in 1975. An additional cultural resource, a Ute Indian rock art panel depicting bighorn sheep, horses and dogs on boulders, can be found near the trail to Delicate Arch.

Daily visitation to the site during the peak seasons is approximately 2,000 people and the parking lot is one the smallest of the popular park sites. Current parking capacity of 73 parking spaces is not sufficient for today's visitation. Parking capacity was initially designed and limited through Visitor Experience and Resource Protection (VERP) analysis in the early 2000's, however demand for parking has exceeded available parking capacity ever since. According to park occupancy and duration data collected in 2010 and staff observations, the parking lot fills to capacity for most of the day starting at 9:30am and it is the new norm to see more than 100 vehicles parked along the road shoulders.

Physical Setting

The project area is located approximately 18 miles north of Moab, Utah at a latitude of 38°44'11.3" N and a longitude of 109°31'12.5" W. Elevation is approximately 4290 ft (1308 m). The climate is arid and characterized by hot, dry summers and cool to cold winters. From 1981 through 2010, mean annual precipitation at park headquarters (approximately 10 mi away and 200 ft lower in elevation) was 8.75 in (222 mm) and mean annual temperature was 58.2 deg F (14.6 deg C). Mean maximum temperature in July was 98.9 deg F (37.2 deg C) and mean minimum temperature in January was 20.3 deg F (-6.5 deg C). Despite the arid climate, intense rain events are common and often occur in association with convective storms during summer and early fall. October is the month with the highest mean monthly precipitation (1.05 in, 26.7 mm) and also the month with the greatest inter-annual variability in precipitation due to occasional heavy rains associated with late-season tropical storms. In October 2006, the park received a record 4.86 in of rain. Similar to the surrounding region, the project area is visually dominated by colorful exposures of various sandstones and shales with upland vegetation consisting of sparse shrublands, woodlands, and occasional grasslands. Riparian areas are vegetated by heavier growth of woody plants that often are dominated by the exotic tamarisk (*Tamarix* sp.).

Hydrology

The existing Wolfe Ranch / Delicate Arch Viewpoint Road was constructed across the floodplains of three significant drainage systems that converge in the immediate vicinity of the Wolfe Ranch project area. From west to east, these systems include Salt Valley Wash, Salt Wash, and Winter Camp Wash. All three are ephemeral stream systems that flow only in direct response to precipitation events that are of sufficient magnitude and intensity to generate runoff and streamflow, although Salt Wash in the vicinity of Wolfe Ranch is characterized by perennial surface water resulting from subsurface groundwater discharge and Winter Camp Wash is a small

ephemeral stream system that flows only in direct response to precipitation events. Salt Valley Wash is outside the project area and proposed actions would have no effect on this wash system.

Winter Camp Wash is also characterized by a flashy hydrologic regime controlled by storm occurrence and the surface characteristics of the 12,294 ac watershed. Approximately 75 percent of the watershed surface is dominated by extensive exposures of sandstone bedrock (the Kayenta Formation, Navajo Sandstone, and the Slickrock Member of the Entrada Formation). The remaining 25 percent consists primarily of sandy residuum and aeolian deposits. Extensive exposed bedrock contributes to the relatively high frequency of flash flood events that typically result in the deposition of sandy alluvium where the wash crosses the road in a low-gradient, aggradational setting. Downstream of the road, Winter Camp Wash converges into a delta with Salt Wash which drains then to the Colorado River. The delta is very broad, long, flat and aggradating. The center of the delta is supporting dense, tamarisk, which enhances the capture of most sediment that enters. This has occurred to the point where there is little slope to provide a positive drainage path for the Winter Camp Wash during a flow event.

Flood Frequency and Conditions

Flashy hydrologic regimes, sparsely vegetated watersheds characterized by eroding sedimentary formations, the low-gradient valley setting in which the wash crosses the road, and culverts that were inadequately designed for such conditions have long resulted in frequent over-road flows and significant repeated sediment deposition on the road at Salt Wash and Winter Camp Wash. These conditions likely are exacerbated by the extensive presence of exotic Tamarisk in the floodplain both upstream and downstream of the road crossings, resulting in altered streamflow and channel configurations. The frequency appears to be increasing with time due to repeated deposition and floodplain aggradation and the closure of the road typically occurs five times to ten times a year.

Justification for Use of the Floodplain

Objectives of the project are to provide a safer visitor experience, reduce closures of the Delicate Arch road during and after flood events over the road and to return Winter Camp Wash to a functioning wash system once again. Expanding the existing Wolfe Ranch parking area would cover and pave approximately 0.8 acres of the soil surface within a floodplain. However, as the current parking area does not interfere with flood flows it is anticipated that the design of the new expanded area would also not interfere with flood flows. The new parking area is designed to be cantered at an angle away from Salt Wash.

The majority of actions affecting the floodplain would occur within Winter Camp Wash. Rechanneling of the wash would enhance and improve visitor experience in the project area by reducing the frequency the road is closed due to accumulation of sediment. Since the main road was paved in 1994, sediment from Winter Camp Wash, over the last 20 years has completely filled in the box culverts and now the wash is at the same grade with the road on both sides. The wash over the years transports large amounts of sediment during a flow event and deposits very fine sand to silt on or near the roadway. The road itself has impeded the natural process of the wash system. The wash on the south side of the road is currently pooling water as water cannot flow freely down the wash. This pooling of water causes sediment and water to back up on the road. This section of road currently functions as a low water crossing. Most intermittent flood events cause the road to Delicate Arch Viewpoint to flood and trap visitors on the east side of the road until the water level recedes. Once the water recedes, the amount of sedimentation deposited on the road surface requires heavy equipment for removal prior to opening the road. There is a need to address the maintenance of the road and the wash system. By moving the wash to the east of the existing wash which has become the natural direction of current flow and excavating a

channel, the park is confident that the velocity of the water will increase and significantly reduce sediment build-up on the road surface.

Investigation of Other Alternatives

Several alternatives for managing Winter Camp Wash were considered, including improving the existing channel and constructing a bridge over both Salt Wash and Winter Camp Wash. These alternatives were considered but dismissed and are discussed in the EA.

Mitigation

The following best management practices will be implemented to minimize the degree and/or severity of adverse effects to floodplains and water quality. By using best management practices the impacts of the action will minimize the adverse effect of restoring Winter Camp Wash.

- Best management practices will be implemented to ensure no pollutants enter Winter Camp Wash as a result of the project.
- Only biodegradable, vegetable-based hydraulic fluid will be used in excavators that may reach into Winter Camp Wash.
- All fueling will occur more than 100 feet from the wash in a location where a fuel spill will not be able to enter the wash.
- To minimize possible petrochemical leaks from construction equipment, the park will regularly monitor and check construction equipment to identify and repair any leaks.
- A fuel/lubricant spill absorption kit will be in place to address potential land and water spills and leaks.
- Stormwater runoff control measures, including silt capture techniques such as silt fences will be employed to improve quality of runoff and prevent degradation of the wash.
- Fuel and oil services for construction machinery will be provided in a designated area away from the wash when feasible. This will include a secondary containment for all fuel storage tanks and on-site availability of a spill kit.
- All staging and stockpiling areas will be situated outside of the 100-year floodplain.
- Sediment curtains will be used when needed to contain sediment to the immediate work zone.
- Staging and stockpiling areas will be situated outside of the floodplain.

Conclusion

The preferred alternative was designed to achieve project objectives while considering the floodplain values of the Salt Wash and Winter Camp Wash areas. There would be no significant impact to floodplain resources and values under the proposed actions. The expansion of the parking area and paved bike path would not have any impact to the flow events of Salt Wash and Winter Camp Wash. The new channel for Winter Camp Wash would be designed and located to minimize reduction of flow velocity near the road crossing. By maintaining higher velocities within Winter Camp Wash, sediment will be less likely to drop out of transport and accumulate in the vicinity of the road and therefore create again a functioning wash system. Best management

practices will be implemented to minimize the adverse effects to floodplain values, water quality, during and after the construction. Although expanding the parking area and rechanneling the wash is considered optional, the purpose of the project strongly supports these actions to meet the project objectives. In addition, individual state and federal permits will be obtained prior to the commencement of construction activities. Therefore, the National Park Service finds the preferred alternative to be acceptable per Executive Order 11988 *Floodplain Management*, NPS Director's Order 77-2: *Floodplain Management*, and NPS Procedural Manual 77-2: *Floodplain Management*.

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