Arches National Park

Draft Visitor Access and Experience Plan and Environmental Assessment

OCTOBER 2024

United States Department of the Interior
National Park Service
Arches National Park

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
CFR	Code of Federal Regulations
CUA	commercial use authorization
EA	environmental assessment
e-bike	electric bicycle
NEPA	National Environmental Policy Act
NPS	National Park Service
park	Arches National Park
PEPC	NPS Planning, Environment, and Public Comment
plan	Visitor Access and Experience Plan
PPV	people-per-viewscape
UMTRA	Uranium Mill Tailings Remedial Action
USC	United States Code
VERP	Visitor Experience and Resource Protection
VSMT	Visitation Scenario Management Tool
VUM	Visitor Use Management

CHAPTER 1: INTRODUCTION AND BACKGROUND

INTRODUCTION

Arches National Park (the park) is located in the heart of canyon country in southeastern Utah and features a landscape of contrasting colors, landforms, and textures unlike any other. The purpose of the park is to protect extraordinary examples of geologic features and fundamental resources of the park that include arches, natural bridges, windows, spires, balanced rocks, as well as other features of geologic, historic, and scientific interest; and to provide opportunities to experience these resources and their associated values in their majestic natural settings (NPS 2013a).

Supermoon at Turret Arch. (Photo courtesy of NPS/Neal Herbert 2012)

Visitors from across the world travel to this red rock wonderland to discover amazing geologic formations, venture on trails with outstanding viewpoints, and experience sunsets that inspire. Annual visitation to the park increased by 74% between 2011 and 2021, with record high visitation of 1.8 million visits in 2021 (NPS 2024a). Nearly all visitors arrive by private vehicle, with daily arrivals during the busiest months averaging 2,500 vehicles; on peak days, more than 3,000 vehicles enter the park. More than 96% of visitors enter the park through the main entrance accessed via US Route 191, 5 miles north of Moab, Utah. Once inside the park, nearly all visitors in private vehicles visit at least one of the park's three primary attraction sites: Delicate Arch, The Windows Section (the Windows), or Devils Garden (RSG 2020). This growth in visitation has resulted in long wait times at the entrance station and congestion in parking lots. Visitors' frustration over these circumstances has diminished the quality of their experience at key attraction sites accessed from the scenic drive corridor. In the past, between March and October, the park has attempted to alleviate these conditions by temporarily restricting access to the park until congestion lessens, with the main entrance closed for as long as three to five hours.

The National Park Service (NPS) is proposing to implement a Visitor Access and Experience Plan (the plan) at the park to quickly address vehicle congestion and crowding at the entrance station and key sites along the scenic drive corridor. This plan would formalize a system to manage vehicle access to the park. This environmental assessment (EA) evaluates alternatives for managing visitor access and the potential environmental effects of the alternatives. This EA is being prepared consistent with the purpose and goals of the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321 et seq.) and pursuant to the Council on Environmental Quality's regulations implementing NEPA at 40 Code of Federal Regulations (CFR) Parts 1500–1508 (as amended).

Chapter 1 of the plan/EA describes the reasons the NPS is proposing to implement a plan. Specifically, this chapter discusses the following:

- Project background
- Purpose of and need for action
- Project area
- Issues and resource topics identified for detailed analysis in this plan/EA
- Issues considered but dismissed from detailed analysis in the plan/EA

The NPS acknowledges, with respect, that Native people have been successful stewards of the land within the park since time immemorial. The NPS understands that the park is located within the ancestral and traditional homeland of the Hopi Tribe, Las Vegas Tribe of Paiute Indians of the Las Vegas Indian Colony, Moapa Band of Paiute Indians of the Moapa River Reservation, Navajo Nation, Rosebud Sioux Tribe of the Rosebud Indian Reservation, Southern Ute Indian Tribe of the Southern Ute Reservation, Ute Indian Tribe of Uintah and Ouray Reservation, Ute Mountain Tribe, White Mesa Ute, and Zuni Tribe of the Zuni Reservation.

BACKGROUND

Arches National Park was first established as a small national monument in 1929, was expanded several times, and became a national park in 1971. 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. The majority (96%) of the park is recommended wilderness and is managed as wilderness per NPS policy. One of the park's most distinctive arches, Delicate Arch, has become an icon; it is featured on a Utah license plate and was one of the images for the 2002 Winter Olympics in Salt Lake City, Utah. 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. The prominent La Sal Mountains to the southeast rise to more than 12,600 feet above sea level and provide a scenic background for the park. Elevations in the park range from 4,085 to 5,653 feet above sea level.

The park's foundation document describes the park's purpose, significance, and fundamental resources and values. As part of this visitor access and experience planning process, the park is proposing to formalize changes to zoning and desired conditions that incorporate the park's fundamental resources and values (NPS 2013a). Desired conditions are defined as "a park's natural and cultural resource conditions that the NPS aspires to achieve and maintain over time, and the conditions necessary for visitors to understand, enjoy, and appreciate those resources" (NPS 2006).

Visitor access management has been a consideration at the park since 1993, with the initiation of the Visitor Experience and Resource Protection (VERP) planning effort, resulting in the publication of a VERP Plan in 1995 (NPS 1995). In 2012, the NPS completed the Arches Alternative Transportation System and Congestion Management Study (NPS 2012), and in 2013, it completed the *Parkwide Road Maintenance and Modification EA* (NPS 2013b). Since these studies, the NPS has continued to monitor visitor use; collect additional socioeconomic data; conduct visitor surveys; and gather feedback from Tribal Nations, partner agencies, and members of the public to inform options to address visitor use, access, and experience issues in the park. The park gathered information and data through public and stakeholder meetings (2021 and 2022); the 2019 Visitor Use, Access, and Experience Study (RSG 2020); and implementation of timed entry pilots at the main entrance (2022, 2023, and 2024). Pilot programs provided an opportunity for the park to test temporary actions, collect data, and learn from systematic monitoring and evaluation of the actions. Additionally, operational changes were made to see how visitor access and flow could be improved at the entrance station.

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose and need statements below set the parameters for development of the proposed action described in "Chapter 2: Alternatives."

Purpose of the Plan

The purpose of the plan is to provide predictable, safe, and efficient access for visitors to experience the fundamental resources and values of Arches National Park along the scenic drive corridor, including providing visitor opportunities to enjoy the park in a way that achieves desired conditions for resources and visitor experiences in the park.

Need for the Plan

A congested parking lot at the base of the Windows section. (Photo courtesy of NPS/Claire Harbage 2021)

Action is needed to quickly address issues associated with congestion at the main entrance, along the scenic drive corridor, and at key sites accessed from the corridor. These issues include unpredictable temporary entrance station closures to manage congestion within the park, hazards posed by roadside parking and pedestrian travel along roadways, degraded resource conditions and visitor experience quality, and overburdened park infrastructure/facilities. Timed entry pilots implemented from 2022 to 2024 at the park provided opportunities to test temporary systems to reduce congestion, but long-term strategies that can be implemented immediately are needed to reduce uncertainty and support predictable, safe, and efficient access for visitors.

PROJECT AREA

The proposed plan and management actions are designed to manage visitor access and experience along the park's scenic drive corridor from its intersection with US Route 191 to Devils Garden, including the main entrance, key sites, and wilderness accessed from the road, as described below (see figure 1-1). Other actions, including future adaptive management measures and changes to zoning and desired conditions, would apply throughout the entire park. Therefore, the analysis in the plan/EA considers effects parkwide, where appropriate.

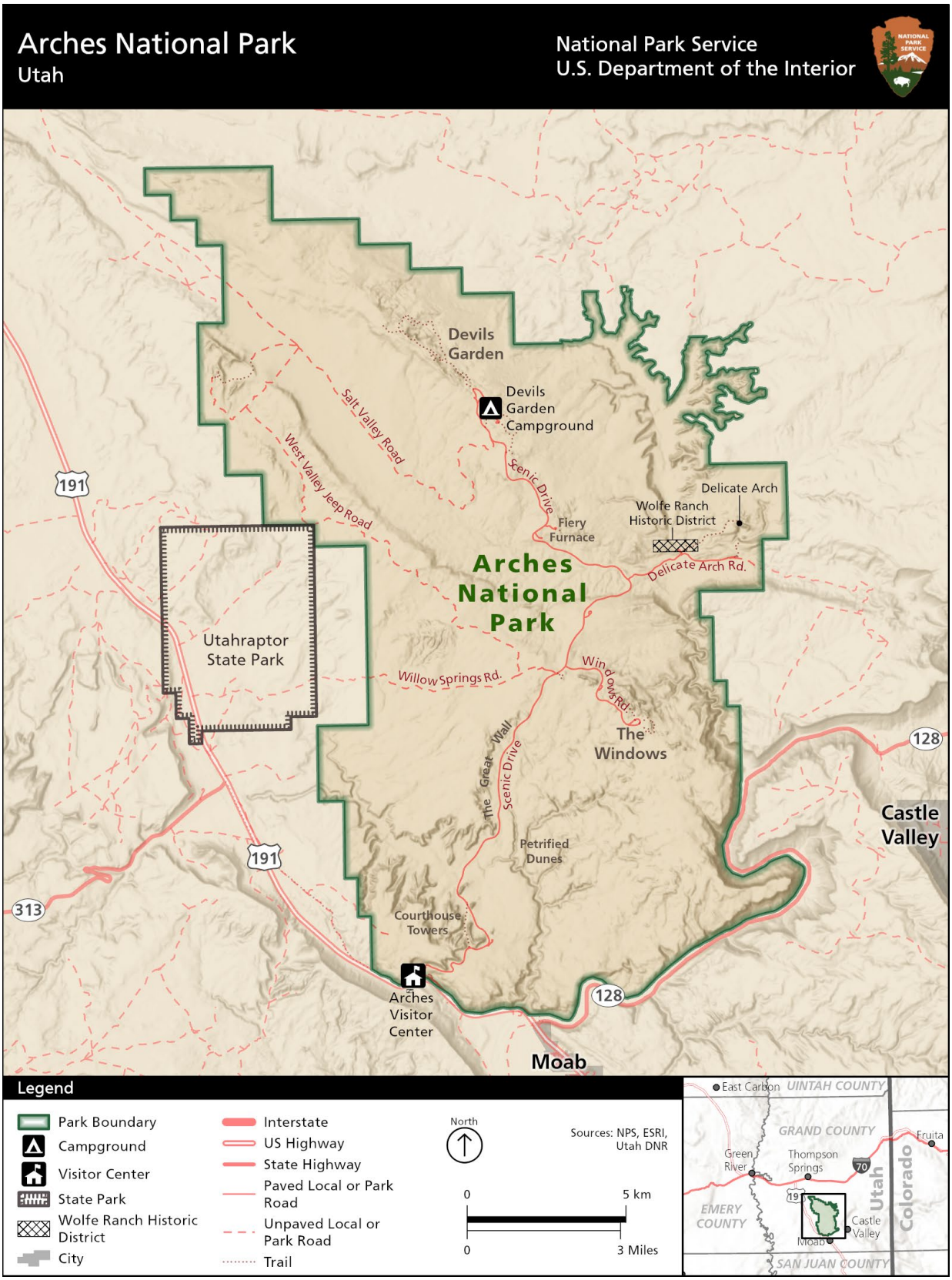


FIGURE 1-1. PROJECT AREA

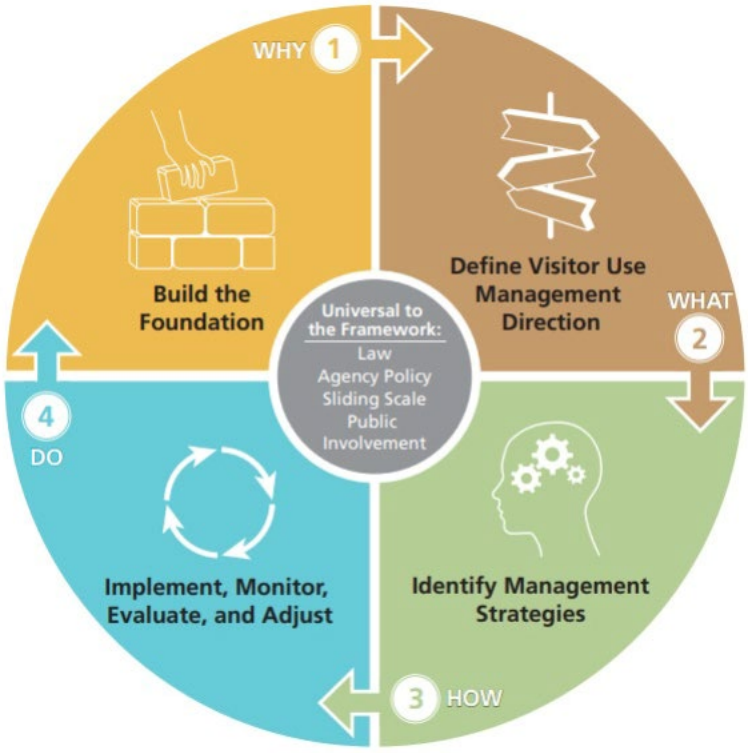
The park's main entrance station is 5 miles north of the town of Moab, on US Route 191. The park has one visitor center, located just inside the park entrance. From the main entrance station, visitors continue onto the scenic drive, which is the only fully paved road in the park. The scenic drive begins at the entrance station and travels approximately 18 miles north to the Devils Garden trailhead, passing many outstanding natural features. Visitors also can enter the park via the unpaved Salt Valley Road or Willow Springs Road. However, Salt Valley Road is a gravel road and is maintained to a level such that two-wheel-drive vehicles can only safely travel the road under favorable weather conditions, and Willow Springs Road is maintained at a level for four-wheel-drive vehicle use only in accordance with the park's general management plan to provide an additional vehicular experience in the park.

North and South Windows. (Photo courtesy of NPS/Neal Herbert 2012)

Key sites and popular destinations accessed from the scenic drive corridor include the Windows, Delicate Arch, and Devils Garden. The Windows is approximately a 12-mile drive north of the entrance station and is one of the most scenic and expansive viewshed locations in the park. It offers a large concentration of arches in just over 2 square miles, including North Window, South Window, Turret Arch, and Double Arch, all relatively accessible from a large parking oval. On busy days, the parking lot capacity is frequently exceeded, and visitors may experience crowding on trails and at vistas, including in the North Window subarea referred to as "the Windows viewscape." Delicate Arch is the largest free-standing arch in the park, making it a main visitor attraction. At Lower Delicate Arch Viewpoint, visitors can walk a level 100 yards to see the arch from a mile away. Nearby, the Upper Viewpoint offers a slightly less obstructed view. The trail to see Delicate Arch up close is 3 miles roundtrip and climbs 538 feet. Along this steadily uphill trail, visitors also pass the Wolfe Ranch cabin and Indigenous pictographs. Devils Garden is located at the very end of the scenic drive, 18 miles north of the visitor center, with a drive time of approximately 45 minutes. Devils Garden is home to arches, spires, and a large concentration of narrow rock walls called "fins." Fins eventually erode and can result in the formation of arches like Landscape Arch, the largest natural rock span in the western hemisphere and the crown jewel of Devils Garden.

VISITOR USE MANAGEMENT FRAMEWORK

The NPS strives to optimize access, opportunities, and benefits for visitors in a particular area while achieving and maintaining desired conditions for resources and visitor experience, and ultimately, preventing impairment of park resources and values. This plan/EA applies the visitor use management (VUM) framework (figure 1-2) to align decisions about visitor access to the park with the ability to achieve and maintain desired conditions for resources and experiences (IVUMC 2022). See table 1-1 for the elements of this process and where these elements are discussed in this plan.



Source: IVUMC 2016

FIGURE 1-2. THE VISITOR USE MANAGEMENT FRAMEWORK

TABLE 1-1. VISITOR USE MANAGEMENT FRAMEWORK AND PLANNING PROCESS

Visitor Use Management Framework Elements	Framework Steps and Corresponding EA Chapter Location
Element 1: Build the Foundation Building the foundation is the first of the four elements of the VUM framework. The purpose of this element is to help managers understand what needs to be done, how to organize the plan, and how to define the resources needed to complete the plan.	1. Clarify the plan purpose and need (chapter 1). 2. Review the planning area's purpose and applicable legislation, agency policies, and other management direction (chapter 1). 3. Assess and summarize existing information and current conditions (e.g., current conditions of natural, cultural, and recreation resources and visitor experience opportunities in the area) (chapter 3). 4. Develop a plan strategy (chapter 1).
Element 2: Define VUM Direction The purpose of this element is to answer critical questions about what the planning effort is trying to achieve and the acceptable levels of impacts from visitor use.	5. Define desired conditions for the planning area (chapter 2; appendix A). 6. Define appropriate visitor activities, facilities, and services (chapter 2). 7. Select indicators and establish thresholds (chapter 2; appendix B).

Visitor Use Management Framework Elements	Framework Steps and Corresponding EA Chapter Location
Element 3: Identify Management Strategies This element is intended to help managers identify management strategies and actions to achieve and maintain desired conditions in the plan area. This element also identifies visitor capacity. The goal of element 3 is to define how visitor use would be managed to achieve desired conditions.	8. Compare and document the differences between existing and desired conditions; for visitor use-related impacts, clarify the specific links with visitor use characteristics (chapter 3). 9. Identify VUM strategies and actions to achieve desired conditions (chapter 2). 10. Where necessary, identify visitor capacities and strategies to manage use levels within capacities (chapter 2; appendix C). 11. Develop a monitoring strategy (chapter 2; appendix B).
Element 4: Implement, Monitor, Evaluate, and Adjust This element focuses on implementing management actions, monitoring, evaluating monitoring results, and adjusting management strategies and actions based on monitoring results. This phase of the planning process focuses on making progress toward meeting desired conditions, as well as evaluating potential unintended consequences of the actions for visitors or resources.	12. Implement management actions. 13. Conduct and document ongoing monitoring and evaluate the effectiveness of management actions in achieving desired conditions. 14. Adjust management actions, if needed, to achieve desired conditions and document rationale.

ENVIRONMENTAL ISSUES

The environmental issues considered in this plan/EA were identified through a series of internal meetings and site visits to the project area by an interdisciplinary team of park and regional staff; input from multiple civic engagement efforts; and an analysis of site conditions, federal laws, regulations, executive orders, and NPS director's orders. The team identified a range of issues, including potential impacts resulting from management of visitor access and experience in the park, to evaluate. Issues are problems that the current situation has caused or that will continue to occur if they are not addressed. Impact topics are resources or values to be analyzed in the plan/EA.

The 2015 NPS *NEPA Handbook* provides specific guidance for determining whether an issue should be retained for detailed analysis. Issues should be retained for consideration and discussed in detail if:

- the environmental impacts associated with the issue are central to the proposal or of critical importance,
- a detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives,
- the environmental impacts associated with the issue are a big point of contention among the public or other agencies, or
- there are potentially significant impacts to resources associated with the issue (NPS 2015a).

If none of the considerations described above apply to an issue, the issue is dismissed from further consideration. Issues and impact topics that could be affected by this project are described below.

Visitor Access, Use, and Experience

Before implementation of the timed entry pilots in 2022, issues related to sustained, high levels of visitation, such as traffic queuing at the main entrance, parking lots filling to capacity, slow driving speeds along the scenic drive, and high use at key sites (the Windows, Delicate Arch, and Devils Garden), were becoming common at the park. Concentrated use within the park affects freedom of movement (e.g., inability to find a parking space, crowded trail conditions) and desired use. High visitor concentrations along trails, at viewpoints, and at other key park features deteriorate visitor experience for some visitors and, in some cases, these high densities deter people from visiting key sites during current and future visits. Staff time and park resources required for traffic management increased before implementation of the timed entry pilots, leaving the park struggling to maintain routine visitor services such as formal interpretive programs, visitor center staffing, and frontcountry and backcountry patrols. Facilities and infrastructure (i.e., bathrooms, trails, and buildings) became overburdened from increased and highly concentrated use. These factors degrade visitors' ability to experience the park's fundamental resources and values.

Traffic overflowing onto US 191 during Memorial Day weekend, 2016. (Photo courtesy of NPS/Shannan Marcak)

Prior to the timed entry pilots in 2022, 2023, and 2024, the park implemented management actions to address issues, including temporary entrance station closures and parking lot closures. Visitor access, use, and experience, which are interrelated, are affected by high levels of use and by these corresponding management actions. Therefore, these issues are carried forward for analysis.

Socioeconomics

Gateway Community Economies

Visitation to the park has a direct and measurable effect on the economies of gateway communities. Gateway communities are defined as the areas surrounding NPS sites, including the counties, cities, and towns where visitors typically stay and spend money while visiting sites (Flyr and Koontz 2023). For the

park, the analysis of socioeconomic effects focuses on Grand County and San Juan County and, more specifically, the gateway community of Moab, Utah (figure 1-3). Visitor spending directly affects the hospitality industry, namely hotels, restaurants, and outdoor recreation businesses.

In addition to the importance of economic contributions from park visitors, another key consideration is the quality of life for residents in Grand County, specifically Moab. Research indicates that tourism development can have varying impacts and, as it continues, can shift residents' attitude and overall quality of life from positive to negative (Uysal et al. 2016). A recent socioeconomic study suggests that approximately 96% of visitors to the park traveled via a private vehicle (i.e., car, truck, or sport utility vehicle) from their home, which can lead to traffic congestion in gateway communities (Miller et al. 2023). When this occurs, residents must plan their own activities around the park's peak visitation times of day and season. Changes in visitor access at the park could result in changes in traffic in Moab and other communities in Grand County and San Juan County. Stakeholders and members of the public identified potential socioeconomic effects of the proposed action as a concern; therefore, potential socioeconomic effects to gateway communities are carried forward for analysis.

Equitable Access

Constraints or barriers to visitation that both visitors and non-visitors experience are another important socioeconomic consideration. Understanding these barriers can help inform NPS managers of how best to serve populations. In this case, equitable access means access to a "healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices" (Executive Order 14096, 2023). A recent study suggests that the top barriers for non-visitors to national parks are the travel distance from home to a national park system unit, associated costs of travel, lack of transportation options, and the cost of entrance fees at national parks (Institute for Tourism and Recreation Research et al. 2022). The alternatives proposed in this plan/EA may pose additional barriers for potential visitors, including those without internet access, those who do not have the flexibility to take time off work to book a reservation, or those with language barriers. Therefore, this issue is carried forward within the socioeconomic impact analysis.

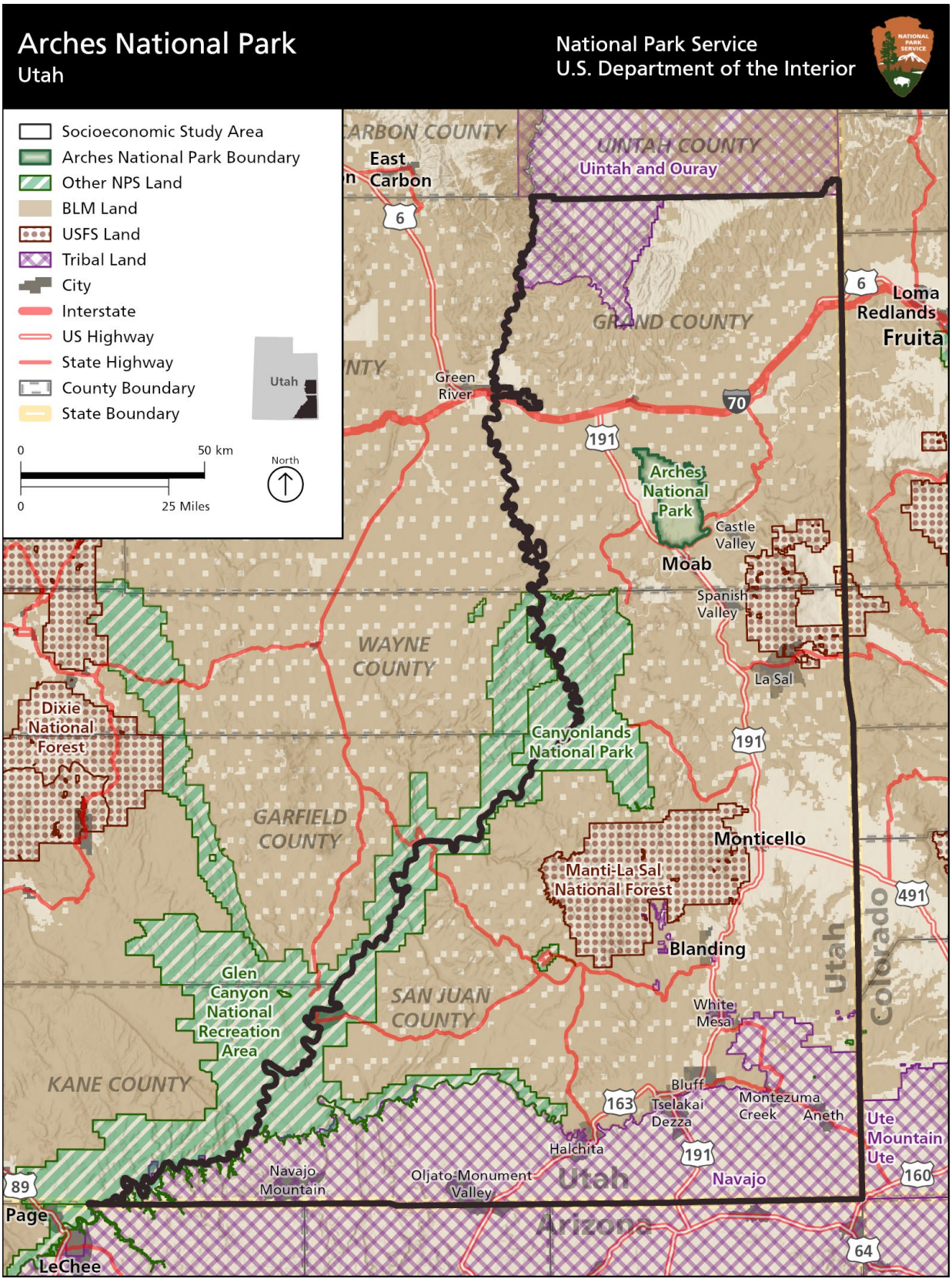


FIGURE 1-3. SOCIOECONOMIC IMPACT STUDY AREA

ENVIRONMENTAL ISSUES DISMISSED FROM DETAILED ANALYSIS

This section evaluates and explains why the NPS dismissed the following impact topics from further consideration.

Vegetation, Soils, and Geology

Visitor densities at key sites and visitors navigating to other areas of interest have resulted in the widening, cutting, braiding, and branching of trails. These disturbances have changed the soils in previously undisturbed areas, including damaging biological soil crusts and native vegetation. The impacts of social trailing vary by site, but many key sites, including Devils Garden and Sand Dune Arch, experience greater impacts as a result of vegetation and biological soil crust losses and soil compaction.

Additionally, roadway and parking congestion, specifically visitor-created parking outside established and/or signed parking areas along roadways, has observable impacts on vegetation and soils. This activity and its impacts have been frequently observed along the roadway near Sand Dune Arch.

The reservation systems proposed under the action alternatives are intended to reduce crowding at key sites and on trails and greatly reduce parking outside established and/or signed parking areas. This could in turn have beneficial impacts on vegetation and soils compared to conditions under the no-action alternative. Under alternative B, the estimated number of vehicle entries daily (6:00 a.m. to 6:00 p.m.) to maintain desired conditions in the park would be 1,920 to 2,030 (see discussion under "Alternative B: Timed Entry Reservations" in chapter 2). The estimated number of vehicle entries daily under alternative C to maintain desired conditions is 1,380 to 1,450 (see discussion under "Alternative C: Daily Reservations" in chapter 2). While the estimated number of daily vehicle entries under alternative C would be lower than under alternative B, the number of vehicles accessing the park during peak hours may be higher because alternative C would not distribute visitation evenly throughout the day. The number of reservations available under either action alternative would be established and adjusted as needed based on monitoring to achieve desired conditions and not exceed thresholds, including instances of parking outside established and/or signed parking areas, vehicle use levels at indicator parking lots, and soil loss (see table 2-2 in chapter 2). Management under either of the action alternatives would be an improvement from the no-action alternative because visitor use levels would be managed to achieve desired conditions, which would result in beneficial impacts on vegetation, soils, and geology.

Biological Resources – Nonnative and Exotic Species, Species of Special Concern, and Other Wildlife

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

Under all alternatives, park managers would continue to implement existing practices for protection and management of sensitive species. Wildlife would be broadly affected by ongoing visitor use, park management, and actions proposed in this plan. The introduction of nonnative species would still be possible from visitors (i.e., their shoes, camping gear, or cars), and this would not represent a change from existing conditions.

Surges in visitation during peak hours under alternative C or outside hours when reservations are in effect (i.e., during the early morning and evening hours) under both alternative B and C could disrupt wildlife near highly used areas of the park. The number of reservations available and the daily hours when reservations are required under either action alternative would be established and adjusted as needed based on monitoring to achieve desired conditions (including related to visitor capacity). Additionally,

both action alternatives would be an improvement from the no-action alternative because concentrated visitor use would be reduced, which would result in beneficial impacts on biological resources.

Natural Soundscapes

In accordance with the NPS *Management Policies 2006* and Director's Order 47: *Sound Preservation and Noise Management* (NPS 2000), an important component of the NPS mission is the preservation of the natural soundscape associated with national park system units. The quality of natural soundscapes is also an indicator of wilderness character. Frequently hearing or seeing other visitors in wilderness can impede the ability of visitors to experience the solitude quality of wilderness character.

Both action alternatives would have beneficial impacts on natural soundscapes compared to the no-action alternative because visitation would be distributed temporally or capped, resulting in reduced crowding and congestion and reduced human-generated noise, such as from vehicle traffic. While the timed entry reservation system proposed under alternative B would more evenly distribute visitation throughout the day, the daily reservation system proposed under alternative C would allow visitors with a reservation to access the park at any time during the day, which could result in increased human-generated noise during peak hours. Alternative C could result in higher noise levels during peak hours; however, alternative B could result in human-generated noise impacts over a longer duration each day because visitation would be distributed throughout the day, and potentially during surges in visitation outside periods when timed entry is in effect.

Air Quality

Section 118 of the Clean Air Act requires the NPS to meet all federal, state, and local air pollution standards (42 USC 7401 et seq.). The park is located in a Class 1 airshed. Class 1 airsheds, including national parks larger than 6,000 acres and designated wilderness areas larger than 5,000 acres, have the highest level of legal protection for air quality, visibility, and resources that could be affected by a change in air quality (known as air quality related values) (NPS 2018, 2023). Extended periods of idling associated with traffic congestion at the main entrance and at key sites contributed to air quality concerns prior to implementation of the timed entry pilots. The estimated number of vehicle entries daily would be higher under alternative B compared to alternative C (1,920 to 2,030 vehicles under alternative B compared to 1,380 to 1,450 vehicles under alternative C, a difference of approximately 570 to 670 vehicles). This difference could result in higher air emissions from vehicles under alternative B compared to alternative C, although it is important to note that visitation would not be distributed throughout the day under alternative C, which could result in increased air emissions during peak hours compared to alternative B. Vehicle traffic in the park would continue to emit air pollutants through exhaust and reduce air quality in the immediate area under either action alternative; however, the action alternatives would reduce congestion and idling at the main entrance and in parking lots, consequently reducing air emissions and resulting in beneficial impacts to air quality compared to the no-action alternative.

Cultural Resources – Landscapes, Ethnographic Resources, Archeological Resources

The National Historic Preservation Act requires federal agencies to consider the effects that a proposed action may have on any cultural resources. Specifically, the act requires the consideration of effects on cultural resources either listed in, or eligible to be listed in, the National Register of Historic Places. Cultural resources include historic structures and districts, cultural landscapes, underwater and surface archeological resources, ethnographic resources, and artifacts.

Ethnographic resources are natural and cultural resources identified by traditionally associated communities as significant to their identity as a group and critical to maintaining ongoing traditional lifeways. Resources identified by traditionally associated Tribal Nations who participated in the 2016 Arches National Park Ethnographic Overview and Assessment study include plants and minerals. Plant and mineral resources that exist along congested roadsides and trails are often trampled by visitors parking outside established and/or signed parking areas and social trailing. Such an effect, however, is localized to the immediate area and does not influence the overall abundance, diversity, or distribution of these resources within the park.

The proposed action alternatives are not anticipated to adversely affect cultural landscapes, or archeological or ethnographic resources, nor will they affect access to ethnographic resources by traditionally associated communities. Traditionally associated Tribal Nations would continue to have unrestricted access to their homelands for traditional uses under all alternatives. Current disturbance to cultural resources located adjacent to or bisected by existing roads and trails would be reduced under the action alternatives compared to the no-action alternative, and any beneficial impacts on visitor experience of cultural resources resulting from reduced crowding at key sites would be minimal.

Wilderness

The majority (more than 96%) of the park is recommended wilderness and is managed as wilderness according to chapter 6 of NPS *Management Policies 2006*. The term "wilderness character" was first referenced in the 1964 Wilderness Act. The act states that federal agencies, like the NPS, are responsible for preserving the wilderness character of wilderness areas. According to NPS Director's Order 41, wilderness character is the combination of biophysical, experiential, and symbolic ideals that distinguishes wilderness from other lands. The five tangible and measurable qualities of wilderness character are: (1) untrammeled, (2) natural, (3) undeveloped, (4) opportunities for solitude or primitive and unconfined recreation, and (5) other features of value (including features of historical, scientific, and scenic value that collectively make up the park's wilderness).

Wilderness character is not discussed further because none of the alternatives being considered is intended to or would have adverse effects on the qualities of wilderness character, as discussed below.

Untrammeled. The untrammeled quality represents places where the earth and its community of life are untrammeled by people and generally appear to be primarily affected by forces of nature. This definition refers to ecosystems that are unhindered and free from human control or manipulation, meaning that this wilderness quality can be degraded by human actions that control or manipulate components of processes of ecological systems in the wilderness area. Among the alternatives considered in this plan, no actions would intentionally manipulate the biophysical environment.

Natural. The natural quality emphasizes wilderness ecological systems that are substantially free from the effects of human development and occupation. The alternatives in this plan do not propose any development in or occupation of recommended wilderness. As noted under "Vegetation, Soils, and Geology," under both action alternatives, visitor use levels would be managed to achieve desired conditions, which would result in beneficial impacts on vegetation and soils. Discussions related to wildlife species and air quality explain the factors considered in dismissing these resource topics from detailed analysis in this plan/EA.

Undeveloped. The undeveloped quality of wilderness character emphasizes retaining an area's primeval character and influence, meaning a wilderness area should be preserved without permanent improvement or modern human occupation. The alternatives in this plan do not propose any development or human occupation in recommended wilderness.

Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation. This quality of wilderness character emphasizes outstanding opportunities for recreation in an environment that is

relatively free from the encumbrances of modern society, and for the experience of the benefits derived from self-reliance, self-discovery, physical and mental challenge, and freedom from societal obligations. The action alternatives could result in occasional pulsing visitation before and after the timed entry reservation system, which could increase visitor encounter rates on wilderness trails and detract from the opportunity for solitude for these visitors. However, pulsing would be an infrequent impact, generally occurring twice a day, thereby not affecting most wilderness visitors. In addition, overall visitation would be temporally distributed, with fewer visitors on a trail at one time, thereby improving the opportunity for solitude in wilderness for most of the day. The action alternatives considered in this plan would also benefit solitude in recommended wilderness by distributing visitation to reduce vehicle congestion and crowding, which would reduce impacts on solitude from the sights of large numbers of people and human-generated noise on trails, roads, and in parking lots that may otherwise extend into wilderness. Alternative B may have more of a beneficial impact on solitude because visitation would be distributed throughout the day, while alternative C is likely to result in higher numbers of people visiting during peak hours; however, both action alternatives would result in benefits compared to the no-action alternative where the pulsing of visitation during peak hours is anticipated to be higher than under alternative C.

The action alternatives would require day use visitors to obtain a reservation before visiting the park during periods when reservation systems are in effect, which would represent a management restriction on visitor behavior that would affect opportunities for primitive and unconfined recreation. However, the reservation systems proposed under the action alternatives are designed to eliminate the need for temporary entrance station closures, which are unpredictable in duration and prevent visitors from accessing the park's wilderness via the main entrance while they are in effect. Some visitors would be excepted from the reservation requirement, including those with backcountry, Fiery Furnace, canyoneering/climbing, and/or wilderness camping permits; visitors with campground reservations; bicyclists; and visitors who use commercial services to access the park. These exceptions would limit additional impacts to day users, and there would be no additional impacts to overnight users. Additionally, visitors would still be able to access wilderness at any time of the year by entering through one of the other entrances or entering through the main entrance outside the timed entry reservation period and times of day (i.e., from November through February; and before 6:00 a.m. and after 6:00 p.m. from March through October).

Other Features of Value Quality. Wilderness may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. Other features of value to the park's wilderness character include geological features, paleontological resources, opportunities for scientific research into natural and human systems in diverse landscape settings, and cultural resources. The recommended wilderness in the park is home to the world's greatest concentration of natural rock arches, including iconic geologic sites such as Landscape Arch, the longest arch in the western hemisphere; Park Avenue; Devils Garden; the Great Wall; Klondike Bluffs; the Fiery Furnace; Cache Valley; and Delicate Arch. The park's wilderness also is geographically situated in one of the most paleontologically rich areas of North America, with hundreds of fossils documented within and around the boundaries of the park (Pippins 2014). This quality of wilderness also recognizes the cultural traditions of Indigenous people and others who explored and resided within this area, leaving behind evidence of their relationships with the wilderness. The action alternatives would not adversely affect other features of value in the park's recommended wilderness and would benefit visitors' experiences of these features because they would reduce crowding and traffic congestion. Management of visitor use levels under the action alternatives may result in additional benefits by reducing creation or expansion of social trails that could affect archeological and paleontological resources and ethnographic resources, such as culturally important plant species.

CHAPTER 2: ALTERNATIVES

INTRODUCTION

Council on Environmental Quality NEPA regulations require federal agencies to explore a range of reasonable alternatives and include a no-action alternative. The description and evaluation of the no-action alternative provide a basis for comparing the impacts of other alternatives.

This chapter describes the no-action alternative (alternative A), under which the park would return to managing visitor access as it did before the timed entry pilots; and two action alternatives (alternatives B and C) for achieving the purpose and need. It also describes actions that would be common to all alternatives, and actions common to just alternatives B and C.

ACTIONS COMMON TO ALL ALTERNATIVES

The following actions are common to all alternatives (including the no-action alternative). The NPS places strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. Therefore, the NPS would implement mitigation measures and best management practices, as described in this section, to reduce or minimize impacts on visitor experience, access, and natural and cultural resources. Unless otherwise specified, the authority for these mitigation measures comes from the NPS Organic Act and NPS *Management Policies 2006*.

Fees

Visitors would continue to pay a per vehicle or per person/bicycle entrance fee or use a park pass to access the park, as currently required.

Visitor Information, Orientation, and Enforcement

Park staff would continue to provide seasonally focused educational materials for trip planning, orientation, Leave No Trace outdoor ethics, and park information. The park would continue to disseminate visitor information and traffic messages through the park's brochures, park radio station, website, park webcams, social media, and news releases. Staff would continue to use signage to delineate roads, trails, and parking areas to prevent resource damage and improve visitor experience. Staff would continue to manage signage on trails in accordance with the *Backcountry Management Plan* and *Arches Sign Plan* (NPS 1998). Enforcement of existing parking restrictions and other park regulations, such as the Superintendent's Compendium would continue.

The park would continue to coordinate with the Utah Highway Patrol, Grand County Sherriff's office, and Utah Department of Transportation on the busiest weekends to handle traffic congestion at the junction of the park entrance road and US Route 191. The park would continue to work with the Moab Area Travel Council, Moab Information Center, Moab Chamber of Commerce, Utah Office of Tourism, City of Moab, Utah Department of Transportation, Grand County, and other local businesses and organizations on issues and messaging related to traffic congestion management.

Minor Facility Upgrades

Under all alternatives, the park may implement facility upgrades, where appropriate and feasible, to parking lots and other facilities (i.e., parking lot or road restriping) to maintain or improve access. The park may also consider upgrades to the existing entrance station, including an automatic swinging gate, to

improve the experience for visitors. Improvements under any of the alternatives would be within the footprint of existing infrastructure.

The park would continue to consider additional upgrades to the entrance station, including potentially extending the bypass road, expanding the 10-minute parking area, and adding a partial third lane and booth. These actions would be evaluated through separate planning and compliance processes in the future, as appropriate.

Tribal Nation Access

Native Americans lived in, traveled through, and managed the landscape of Arches National Park for thousands of years before colonization by Spanish and Anglo people. Descendant Indigenous communities who maintain traditional connections with the park include 10 Tribal Nations: the Hopi Tribe of Arizona, Las Vegas Tribe of Paiute Indians of the Las Vegas Indian Colony, Moapa Band of Paiute Indians of the Moapa River Reservation, Navajo Nation, Rosebud Sioux Tribe of the Rosebud Indian Reservation, Southern Ute Indian Tribe of the Southern Ute Reservation, Ute Indian Tribe of Uintah and Ouray Reservation, Ute Mountain Ute Tribe, White Mesa Ute, and the Zuni Tribe of the Zuni Reservation. As noted in chapter 1, under all alternatives, traditionally associated Tribal Nations would continue to have unrestricted access to their homelands. This aligns with NPS *Management Policies 2006*, Section 8.5, which states "…the Service will be as unrestrictive as possible in permitting Native American tribes access to park areas to perform traditional religious, ceremonial, or other customary activities at places that have been used historically for such purposes." The NPS would actively consult with Tribal leaders to improve and streamline access for Tribal members under any alternative.

ALTERNATIVE A: NO ACTION, RETURN TO PRE- PILOT MANAGEMENT

Under this alternative, park staff would manage visitor access similar to how it was managed before implementing the timed entry pilots (i.e., before 2022). The park would be accessed on a first-come, first--served basis, and staff would close areas of the park or implement temporary entrance station closures when visitor demand exceeds parking capacity.

Temporary Entrance Station Closures

Park managers would close the main entrance station for a period of time, based on monitoring congestion at primary attraction site parking lots and queues at the entrance station. Entrances along Salt Valley and Willow Springs Road would remain open. Temporary entrance station closures would be unpredictable in duration, depending on the level of visitation, and generally would last for a period of three to five hours between March and October. Temporary entrance station closures would be announced on the park's social media channels and website, and the park would maintain a web camera showing the vehicle queue at the entrance station. Improvements would be made to signage as needed in reaction to acute visitor congestion issues.

Temporary Area-specific Closures

Under this alternative, instances of high visitation may cause temporary closures at parking areas for key sites to maintain desired conditions for resources and experiences. Based on past experience, parking capacity is expected to be exceeded frequently between March and October, with fewer temporary area-specific closures during the winter.

Parking lot attendants would manage congestion at key sites. Rangers would manage traffic in the park as staffing allows and as congestion spreads to new areas of the park requiring temporary closures at other sites and parking lots. These staff interactions with visitors would be limited and focused largely on traffic management activities.

Fees

No additional reservation transaction fee would be in effect under the no-action alternative.

Commercial Visitor Services

Commercial visitor services would continue to be monitored and approved through concessions contracts and/or commercial use authorizations (CUAs).

ACTIONS COMMON TO ACTION ALTERNATIVES B AND C

The following are strategies for managing visitor access to the park in conjunction with a reservation system and would not vary by action alternative.

Temporary Entrance Station Closures

Entrance station closures are not expected to be needed under alternatives B and C to manage congestion.

Temporary Area-specific Closures

Area-specific closures are not expected to be needed under alternatives B and C to manage congestion.

Fees

Under alternatives B or C, visitors would still pay an entrance fee or use a park pass to access the park. In addition, visitors would be required to obtain a reservation to access the park via the main entrance (as described in the "Reservation Systems" section), which would include a nominal transaction fee.

Zoning and Desired Conditions Updates

Park zoning, as defined in the 1989 General Management Plan and as implemented in the VERP Plan (NPS 1989, 1995), would be updated to clarify and reduce redundancy and align the desired conditions of these two plans to answer the question, "what are we managing for?" in each area of the park. The changes (summarized below) are considered amendments to the park's general management plan and an update to the VERP Plan. While this plan does not include actions within all zones of the park, the park's management zones would be comprehensively updated as part of this planning process. All park zones and their spatial extents are defined in appendix A.

Zoning changes that would be implemented as part of this planning process are shown on figure 2-1 include:

- **Combining Backcountry and Primitive Zones into one Backcountry Zone.** During the review and updating of the zoning, park staff determined that the management goals and resource conditions of these two zones were the same. These two zones would be merged to simplify the management guidance for these areas of the park into one Backcountry Zone.

- **Establishing New Sensitive Resource Protection Zones.** Areas previously included in the Pedestrian, Backcountry, Developed, Primitive, and Hiker Zones (see table 2-1) would be updated to a new Sensitive Resource Protection Zone. Sensitive Resource Protection Zones include critical viewshed or sensitive resource areas where the NPS's tolerance for additional resource degradation as a result of public use is extremely low. These areas have been severely impacted by past use and may require intensive restoration activities or area restrictions. Under alternatives B and C, the NPS would update management actions for these zones to indicate that area restrictions may be required, but these zones would not be entirely closed to visitors.
- **Updating Zones with Additional Detail.** Since 1996, park staff have completed multiple research studies and documented observations that provide additional detail about the resources and range of visitor experiences in each of these zones. Each zone description and desired condition would be updated to include additional details. Except for the changes in the management actions proposed for Sensitive Resource Protection Zones noted above and in appendix A, these details would not change the management direction for any of the zones.

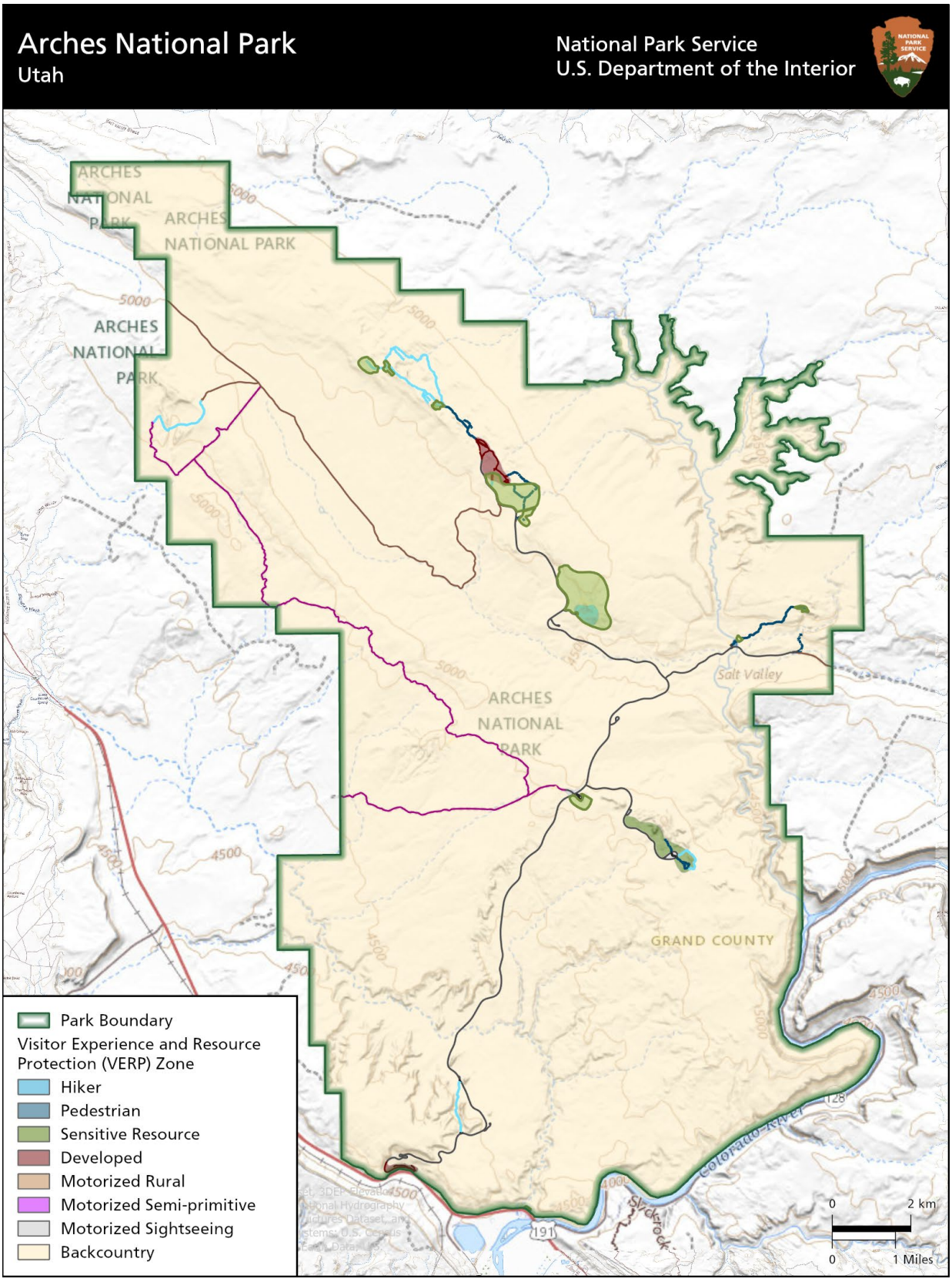


FIGURE 2-1. PROPOSED ZONING UPDATES

TABLE 2-1. NEW SENSITIVE RESOURCE PROTECTION ZONES

Sensitive Resource Protection Zones	Purpose	New Acreage in the Zone
Double O Arch and Dark Angel (previously zoned as a Backcountry Zone)	• Address social trailing and soil loss caused by high visitation at Double O Arch • Protect cultural sites, ethnographic resources, and viewsheds at Dark Angel	• Double O Arch: 10.1 acres • Dark Angel: 33.0 acres
Sand Dune (previously zoned as a Primitive Zone), Broken (previously zoned as a Backcountry Zone), and Skyline Arch Area (previously zoned as a Developed Zone)	• Address social trailing and soil loss caused by high visitation • Protect ethnographic resources	• Sand Dune Arch: 20.0 acres • Skyline/Broken Arch: 181.8
Fiery Furnace (previously zoned as a Hiker Zone)	• Protect endemic plant species of management concern	• 350.1 acres
Wolfe Ranch Historic District and Delicate Arch Viewscape (previously zoned as a Pedestrian Zone)	• Protect cultural sites and ethnographic resources at Wolfe Ranch • Protect viewshed and ethnographic resources at Delicate Arch Viewscape	• Wolfe Ranch Historic District: 2.9 acres • Delicate Arch Viewscape: 6.8 acres
Balanced Rock (previously zoned as a Backcountry Zone)	• Address social trailing and soil loss caused by high visitation • Protect cultural sites and ethnographic resources	• 31.2 acres
Mouth of Courthouse Wash (previously zoned as a Backcountry Zone)	• Protect cultural sites and ethnographic resources • Address social trailing and soil loss caused by high visitation	• 2.5 acres
Total Acreage		638.4

Adopt Monitoring Indicators, Thresholds, and Related Triggers

Under either action alternative, the park would establish indicators and thresholds, or triggers, for monitoring (see table 2-2). Upon implementing the management actions described in the action alternatives, the park would monitor the indicators, along with other recurring and ongoing monitoring at the park. If indicators reached identified thresholds or triggers, the park may adapt management actions. This iterative practice of implementing management strategies, monitoring, adapting, and then continuing to monitor to gauge the effectiveness of those actions would allow park managers to maximize the benefits for visitors while achieving and maintaining desired conditions for resources and visitor experiences in a dynamic setting.

Table 2-2 summarizes indicators and thresholds that would be established under either alternatives B or C; for full descriptions of these indicators and thresholds see appendix B.

TABLE 2-2. SUMMARY OF INDICATORS, THRESHOLDS, AND RELATED TRIGGERS

Indicator	Thresholds and Triggers
Frequency of instances of parking outside established and/or signed parking areas in a given lot per month	Four instances of parking outside established and/or signed parking areas in lots per month during the peak season (February-November). Indicator includes, but is not limited to, the following lots: - Delicate Arch - Windows area - Devils Garden area - Sand Dune Arch area
People-per-viewscape (PPV) at key visitor destinations or along high-density trail corridors, measured from consistent locations	High-Density Trail Corridors: - Devils Garden: No more than 18 PPV more than 10% of the time Viewsheds: - Windows: No more than 30 PPV more than 10% of the time - Delicate Arch: No more than 70 PPV more than 10% of the time - Sand Dune Arch: No more than 15 PPV more than 10% of the time - Broken Arch: No more than 11 PPV more than 10% of the time
Soil Loss - Percent increase of rills and gullies in comparison to reference areas - Percent increase in number of pedestaled plant bases in comparison to reference areas - Percent change in area of bare ground from baseline conditions of reference areas established in summer 2022	Thresholds and triggers for soil loss are divided into tiers (Tier 1 and Tier 2) to dedicate monitoring resources in a prioritized manner. Tier 1 thresholds, based on percent cover of bare ground compared to reference area plots, would be managed annually, and Tier 2 thresholds, including thresholds for increases in rills and gullies and pedestals, would be monitored when Tier 1 thresholds are exceeded. More information on these thresholds and triggers is provided in “Appendix B: Indicators and Thresholds,” including quantified thresholds that would be used to identify departures from desired conditions.
Vehicle use levels at indicator lots	Days during the reservation season: Vehicles per day do not exceed the design capacity of the lot more than 20% of the time. Days outside the reservation season: Vehicles per day do not exceed the design capacity of the lot more than three days per week for three consecutive years.

Identify Visitor Capacities

Visitor capacity is the maximum amount and types of visitor use that an area can accommodate while achieving and maintaining the desired resource conditions and visitor experiences that are consistent with the purposes for which an area is managed. By identifying and managing the maximum amount and types of visitor use (visitor capacities), the NPS can protect resources and provide visitors with the opportunity for a range of high-quality experiences, today and for future generations, as directed by the NPS Organic Act (1916) (54 USC 100101).

Visitor use levels best meet desired conditions when use is dispersed throughout the day, rather than when use occurs at concentrated times, causing pulsing visitation patterns. When visitation is concentrated, desired conditions for resource protection and visitor experience are difficult to maintain. Table 2-3 includes the identified visitor capacities for the analysis areas where the visitor capacity is directly related to plan actions, and these actions are needed to manage within this capacity. See appendix C for other identified capacities (where no immediate action is needed to manage to these capacities in this plan) and additional details on these analysis areas, including maps of these areas.

TABLE 2-3. IDENTIFIED VISITOR CAPACITIES

Analysis Area	Proposed Visitor Capacity
The Windows	330 people at one time
Delicate Arch	450 people at one time
Devils Garden	390 people at one time
Sand Dune/Broken Arch	165 people at one time
Salt Valley Road	12 vehicles per hour
Willow Springs Road	8 vehicles per hour

Reservation Systems

Under alternatives B or C, visitors would still pay an entrance fee or use a park pass to access the park; additionally, they would be required to obtain a reservation to access the park via the main entrance, during periods when reservations are in effect (excluding the exceptions discussed below in this section). Park staff would adaptively manage the reservation systems described under alternatives B and C based on monitoring indicators and thresholds to ensure that desired conditions for resources are being maintained and achieved (see "Zoning and Desired Conditions Updates" and "Adopt Monitoring Indicators, Thresholds, and Related Triggers" above and appendix B). Park staff may adjust a reservation or timed entry system if the following occur:

- A change is occurring (based on the monitoring of indicators), and it is of a magnitude and direction (approaching thresholds) for which park managers need to take action; and
- The change in conditions is likely a result of the amount of visitor use occurring, and a change in visitor use levels would prevent unacceptable resource impacts.

The following components of a reservation or timed entry system generally would be evaluated and adjusted annually, depending on factors including, but not limited to, visitor use patterns and staff availability. Any changes to a reservation system would be within the range of adaptive management strategies discussed below and would be communicated with the public before implementation.

- **Seasonality.** Initial implementation of the reservation systems would be similar to the previous timed entry pilots (e.g., reservations would be required from April 1 through October 31) with slight changes to time of day. However, changing visitor use patterns (e.g., an increased interest in winter recreation) or climate change effects (e.g., later snowfalls in fall/early winter) may lead to increased visitation during historically lower-use seasons. Consequently, park staff may expand the number of days or weeks when a reservation system would be implemented should the monitoring of relevant indicators show this to be necessary. The following seasonal modifications to reservation system may result in:
  - a need for reservations to start earlier or later in the spring,
  - a need for reservations to end earlier or extend later in the fall, and/or
  - a need for reservations to be implemented for winter weekends and/or holidays.
- **Time of Day.** Times when reservations would be required are described for each alternative. Changing visitor use patterns (e.g., visitors arriving earlier or more visitors using the afternoon/evening periods) may signal the need for a change in the time of day when reservations are required. Park staff may change the number of hours per day when a reservation system would be implemented, should monitoring of relevant indicators show this to be necessary. This adjustment may result in reservation systems starting earlier or later in the day (e.g., changing from a 6:00 a.m. start time to 5:00 a.m.). The change may also result in reservation systems ending earlier or extending later into the afternoon/evening (e.g., changing from a 6:00 p.m. end time to 7:00 p.m.). For timed entry reservations specifically, the window of duration for which the reservation would grant access to the park may be adapted (e.g., from one hour to two hours). Changes to hours would be adjusted to maximize visitor access and convenience while maintaining desired conditions.
- **Distribution.** Reservations would be made available to the public for purchase using a variety of time frames, from months in advance to night-before or day-of sales. The exact duration and allocation of these reservations would be evaluated each year and may be adjusted. Distribution of reservations for a given year would be communicated with the public before the start of the reservation season.
- **Tribal Access.** Members of traditionally associated Tribal Nations would be able to access traditional sites within the park without a reservation via the main entrance or through one of the secondary road entrances (i.e., Willow Springs Road or Salt Valley Road).
- **Exceptions.** Vehicles entering the park for nonrecreational purposes (e.g., administrative use) and those with special use permits (e.g., weddings, First Amendment activities), CUAs or concessions contracts, or academic fee waivers would be exempt from the reservation systems. Visitors driving into the park on Willow Springs or Salt Valley Roads would not be required to obtain a reservation. Pedestrian visitors and visitors with Fiery Furnace or canyoneering/climbing permits likewise would be exempt from the reservation systems. Visitors with an overnight reservation at a campground or backpacking permit would not be required to also purchase a reservation to enter the park. However, park staff may change these exceptions if use levels need to be adjusted to manage within identified capacities and achieve desired conditions. These types of changes would likely require a plan amendment with analysis.
- **Bicycle Use.** Rules for the use of bicycles and electric bicycles (e-bikes) in the park are set out in the Superintendent's Compendium. Bicyclists would not be required to obtain a reservation under either action alternative. Bicycle access (including e-bikes) may be subject to the reservation system in the future should use levels increase and necessitate proactive management to maintain use levels that are consistent with desired conditions. Roadway safety or high numbers of bicycles parked at trailheads could be monitored as indicators in the future. Changes in these

indicators could warrant a need to consider bicycles in the reservation system or other adaptive management actions. These types of changes may require a plan amendment with analysis.

- **Availability of Reservations.** Reservations would be available through an internet-based reservation system (www.recreation.gov or another online reservation system). Reservations would initially be made available in a mid-term window (months in advance of the entry date) and a short-term window (24 to 72 hours in advance). These windows may be reevaluated based on future changes to the online system; however, potential changes to the system currently are unknown and cannot be factored into this planning process. This allocation would be reevaluated based on monitoring data so that reservation availability is optimized. Initially, no day-of reservations would be set aside because data gathered has shown that most park visitors (95%) plan their trip to the park at least one day in advance. However, visitors would be able to purchase reservations the day of their visit if reservations are still available, or they could access the park outside hours when reservations are in effect. Visitors would only be able to purchase one reservation per day, and reservations would be non-transferable. Visitors would be allowed to purchase reservations on consecutive days.

New Technology

The NPS would continue to investigate and consider improvements in visitor access based on new technology and options allowed on the online reservation system.

Commercial Visitor Services

Commercial visitor services would continue to be monitored and approved through concessions contracts and/or CUAs. Concessions and CUA client numbers currently make up approximately 0.4% and 0.6%, respectively, of total annual visitation to the park. Any changes to services offered by concessioners would be handled through the contracting process. CUA holders and concessioners would initially be exempt from reservation requirements; however, park managers would continue to monitor and establish appropriate client numbers and trips and would require operators to report their annual visitor use statistics. Park managers may implement management actions, potentially including developing a reservation system specific to commercial visitor service providers, if desired conditions and thresholds are being exceeded and these changes in resource conditions are correlated with an increase in commercial use. Development of a reservation system specific to commercial visitor service providers may require a plan amendment with associated analysis.

ALTERNATIVE B: TIMED ENTRY RESERVATIONS (PREFERRED ALTERNATIVE)

Under alternative B, the NPS's preferred alternative, all visitors in private vehicles would be required to obtain a timed entry reservation to access the main entrance. Initially the park anticipates implementing timed entry from April to October between 7:00 a.m. and 4:00 p.m. Because the park may adapt these time periods (as described above under "Strategies Common to Action Alternatives B and C"), the EA analyzes the potential for timed entry to be in effect from March through October between 6:00 a.m. to 6:00 p.m. Visitors can still enter the park without a reservation when timed entry is not in effect, and before or after these hours when timed entry is in effect. During periods when timed entry is in effect, visitors would be required to obtain a reservation to enter the park within a specific hourly time window (e.g., between 9:00 a.m. and 10:00 a.m.) on a specific date. A timed entry reservation and entrance pass or park pass would allow visitors access to all areas of the park except areas requiring specific permits, such as Fiery Furnace.

Number of Vehicle Entries

The number of reservations issued per day and per hour would be based on desired conditions. For the purposes of analysis in the EA, the maximum number of daily vehicle entries with reservations (6:00 a.m. to 6:00 p.m.) is estimated to be between 1,920 to 2,030 (see appendix C for the visitor capacity analysis). The number of available reservations would be subject to change based on continued monitoring to manage within identified capacities and to achieve desired conditions. The number of reservations available would factor in an anticipated number of no-shows, based on data collected through the online reservation system, to maximize the availability of reservations for visitors.

ALTERNATIVE C: DAILY RESERVATIONS

Under alternative C, visitors choosing to arrive at the main entrance to the park via personal vehicle from would be required to obtain a daily reservation for entry into the park that would allow for arrival at any time of the day between 6:00 a.m. and 6:00 p.m. Initially the park anticipates implementing timed entry from April to October. Because the park may adapt these time periods (as described above under "Strategies Common to Action Alternatives B and C"), the EA analyzes the potential for timed entry to be in effect from March through October. Visitors can still enter the park without a reservation when daily reservation entry is not in effect. Unlike the timed entry reservations proposed under alternative B that would specify hourly entry windows (e.g., between 9:00 a.m. and 10:00 a.m.), daily reservations for the park would allow more opportunities for flexibility and spontaneity because visitors with reservations could arrive at any time during the day. Alternative C is intended to distribute visitor use temporally throughout the week or season and achieve desired conditions, while allowing visitors more flexibility to enter at any time of the day.

Number of Vehicle Entries

Under a daily reservation system, it is expected that there would be a "peak arrival" period in the mid-morning hours (as historically observed under the no-action alternative). Therefore, the number of reservations that would be made available under a daily reservation system would be designed to be consistent with achieving and maintaining desired conditions and identified visitor capacities during this peak period of the day. For the purposes of analysis in the EA, the maximum number of daily vehicle entries with reservations (6:00 a.m. to 6:00 p.m.) is estimated to be between 1,380 to 1,450 (see appendix C for the visitor capacity analysis). After initial implementation of the reservation system, the number of reservations may be adjusted to maximize visitor access within related thresholds and identified capacities.

ALTERNATIVES CONSIDERED BUT DISMISSED

The planning team considered other alternatives and potential actions, including those identified through civic engagement. The following alternatives were considered and dismissed from further analysis because they do not meet the purpose and need, are outside of the scope of the plan, or are infeasible.

Building for Demand: Parkwide

Improvements at key sites have been completed over recent years, including trail hardening, the addition of barriers (e.g., rocks) to prevent parking along road shoulders, and new restrooms. The park has already expanded parking lots in areas where feasible, such as the expansion of the Delicate Arch and Windows parking lots. This action would include constructing more parking spaces and infrastructure at key sites (the Windows, Delicate Arch, and Devils Garden) to accommodate an increase in vehicle traffic as park

visitation grows. Existing parking lots would be expanded, and new trails and parking lots would be built. Undeveloped areas within the park would be marketed and developed. Trails at popular sites would be widened, hardened, and fenced to limit resource damage.

This action alone could not address the purpose and need for this plan because existing parking infrastructure at key sites already provides adequate parking to meet desired conditions. Additional parking would continue to worsen congestion within the park by allowing more visitors at key sites. This action would likely result in volumes of visitors on trails and at key sites that exceed desired conditions and established thresholds.

Building to meet demand only addresses congestion in parking lots and along sections of trails that can be expanded. Additional visitor use to these areas (via expanded parking) would result in use levels at iconic attractions that are inconsistent with the desired conditions and resource protection goals for these areas. Additional visitor use could diminish natural viewsheds and negatively affect visitor experience at attraction sites and would not ease congestion at the entrance station. Visitor surveys have shown that a plurality of visitors agree or strongly agree that Arches is "too crowded" (Otak 2022) or find the popular sites in the park to be "very" or "extremely" crowded (NPS 2017). As popular areas are developed to accommodate more visitation, the ability to experience and meaningfully connect with park resources would be diminished.

Establishing and promoting new hiking trails may disperse some percentage of visitors; however, new trails are unlikely to serve as substitutes for the sites popular with most visitors. Visitor surveys have shown that a majority of visitors (67%–74%) say that visiting Delicate Arch is "very" or "extremely" important to their overall trip to Arches (Otak 2022). Visitors may spend more time in the park to see the popular sites and any newly developed trails but are unlikely to avoid the popular sites altogether. Therefore, the overall impact on congestion at the three key sites from the development of new parking lots and new hiking trails elsewhere is likely minimal. Furthermore, development of currently undeveloped areas of the park to accommodate increased visitor use would result in additional resource impacts and impacts to the visitor experience. Specifically, the ability of park visitors to experience natural sounds and solitude would be diminished as more areas are developed. Research suggests that management strategies that focus recreational use on existing sites and trails and maintain overall visitor capacities such that these locations can accommodate use, are the most effective at limiting resource impacts (e.g., to soils and vegetation; Monz 2021). Additionally, this alternative would not address the issues quickly, as it would require many years to secure funding for, design, and construct new improvements. Therefore, this alternative was dismissed because it would not meet the purpose and need and would have impacts that could be avoided with other alternatives.

Dismissing additional infrastructure development (specifically parking areas and new trails) as an alternative in the current planning process does not preclude future infrastructure improvements. Future parkwide infrastructure development would depend on which action alternative is implemented and would be subject to additional planning and compliance, as appropriate.

Building for Demand: Secondary Entrance Roads

This action would include the creation of another formal entrance into the park on either Salt Valley Road or Willow Springs Road. Infrastructure improvements associated with this action would include a new entrance station as well as road infrastructure because each of these unpaved roads often becomes impassable when wet.

Salt Valley Road covers a distance of 19.5 miles, 10 of which are in the park; the rest are on lands managed by the Bureau of Land Management or other entities. Salt Valley Road is maintained to a level such that two-wheel-drive vehicles can safely travel the road under favorable weather conditions, but may become impassable during wet conditions. The construction cost to improve (pave) Salt Valley Road to

accommodate typical passenger cars and provide associated infrastructure, is estimated (in 2020 dollars) to be approximately $49 million, not including compliance, design, and project management costs (NPS 2022).

Willow Springs Road covers a distance of 7.7 miles, 4 of which are in the park, and the rest are on lands managed by the Bureau of Land Management and other entities. The NPS maintains Willow Springs Road at a four-wheel-drive level so visitors have the opportunity for that type of road experience, as specified in the park's *Backcountry Management Plan* (NPS 1988). This road is infrequently maintained and rugged. The construction cost to improve (pave) Willow Springs Road to accommodate typical passenger cars and provide associated infrastructure is estimated (in 2020 dollars) to be approximately $57 million, not including compliance, design, and project management costs (NPS 2022).

Improvement of either Salt Valley Road or Willow Springs Road would fundamentally alter visitor experiences currently provided by these road corridors and would be inconsistent with the desired conditions for these roads. In addition, both Salt Valley Road and Willow Springs Road are historic roads eligible for listing in the National Register of Historic Places (National Register). Any improvements to the secondary roads would affect their eligibility for the National Register.

The volume of visitors currently entering on Salt Valley Road and Willow Springs does not meaningfully affect crowding in the park. Between 2% and 4% of total park use occurs on or via these roads. An improved secondary entrance would make access to the park more convenient for visitors who currently arrive from locations north of the existing entrance. However, improvement or construction of a secondary entrance road would not address traffic congestion at the main entrance or at key sites within the park. This action is unlikely to more evenly distribute visitation levels to reduce peaks in visitation and would not improve and could possibly worsen congested conditions within the park. Furthermore, the NPS does not have decision-making authority to improve segments of these roads outside the park. Additionally, improvement of these roads is not economically feasible in the foreseeable future and could not be completed quickly to address issues related to vehicle congestion at the main entrance and in the park. Therefore, this alternative was dismissed because it would not meet the purpose and need, would result in greater resource impacts along these secondary road corridors, is outside the NPS's decision-making authority, and is not economically feasible.

Building for Demand: Entrance Station

The NPS considered a stand-alone alternative to redesign and expand the main entrance gate. This action would include building an additional entrance kiosk/booth as well as additional lanes at the existing entrance station to accommodate more vehicles queuing to enter the park and to prevent vehicles from backing onto US Route 191.

Space at the entrance station is limited by topography, existing development, and nearby resources that would present challenges for constructing additional infrastructure at this location. Design and construction would require years and would not meet the need to quickly address traffic congestion at the main entrance and in the park. Although this option would alleviate some of the traffic congestion and wait times at the entrance station and would help prevent traffic from backing up onto US Route 191, redesigning the main entrance would not resolve the crowding or parking issues within the park at popular destinations. If anything, this alternative could exacerbate the congestion and crowding already occurring because vehicles would enter the park at a faster pace without sufficient turnover in parking lots to accommodate the increase in arrivals. Additionally, this alternative would not address the issues quickly, as it would require many years to secure funding for, design, and build additional kiosks/booths and lanes. This alternative was dismissed because it would not meet the purpose and need of the plan on its own.

Dismissing redesign and expansion of the main entrance as an alternative in the current planning process does not preclude future infrastructure improvements in this area. Future infrastructure needs in the

entrance area would depend on which action alternative is implemented and would be subject to additional planning and compliance, as appropriate.

Site-Specific Reservations

This alternative would implement a site-specific timed entry reservation system daily between 6:00 a.m. and 6:00 p.m. from March through October only for visits to the Windows, Delicate Arch, and Devils Garden rather than the entire park. A site-specific system would be an internet-based reservation system, similar to the timed entry reservation system proposed under alternative B. Site-specific reservations could manage the number of vehicles allowed at a site at any given time to maintain desired conditions, reduce vehicle congestion in parking lots, and provide visitors with the certainty of visiting a site. However, this alternative would not address congestion at the main entrance and along the scenic drive corridor outside these areas, and therefore would not meet the purpose and need for the proposed action.

Infrastructure (e.g., turn-around points and booths) would need to be constructed at these key sites to allow staff to verify reservations and accommodate queuing lanes. Construction activities would increase impacts to resources such as soils and vegetation, compared to alternatives B and C. Additionally, this alternative would not address the issues quickly, as it would require many years to secure funding for, design, and construct new infrastructure needed to implement site-specific reservations. Site-specific reservations also would not alleviate parking and overcrowding issues in locations beyond those where permits would be implemented. Dispersal strategies and shifting visitor use to areas of unmanaged access can create substantial problems with site expansion and proliferation that increase impacts. As noted above, research suggests that management strategies that focus recreational use on existing sites and trails and maintain overall visitor capacities such that these locations can accommodate use, are the most effective at limiting resource impacts (Monz 2021).

Compared to alternatives B and C, this action would require visitors to obtain multiple reservations to access popular sites in the park, which would increase impacts to visitor access and experience because of the constraints imposed on flexibility and spontaneity. About 36% of park visitors visit all three popular spots in the park during a single visit. About 61% visit at least two of the three sites, and 96% of visitors visit at least one of the three sites, based on Global Positioning System tracking data (RSG 2020). Visitors could lose the freedom and flexibility to visit the entire park in the manner in which they choose, and if unable to obtain their desired site-specific permit(s), could have to forgo visiting certain sites altogether. Therefore, this alternative was dismissed because it would not meet the purpose and need and is duplicative with other alternatives carried forward for detailed analysis that would have fewer constraints on visitor use and experience.

Multiple Day Reservations

Allowing visitors to purchase a single daily or timed entry reservation that would be valid for multiple days was suggested as an alternative during the civic engagement comment period in fall 2023. While multiple day reservations would provide some flexibility for visitors, allowing them to plan around weather conditions or other circumstances, this alternative would reduce the number of reservations available each day and may result in inconsistent no-show rates on a given day, which would make planning for reservation availability complicated. For example, if the park had two days of poor weather, people may choose to only come to the park on the third day, increasing no-shows on the first two days, and causing a surge on the third day. To maintain desired conditions in this scenario and to manage for these surges, permit numbers would need to be lower on each day than any of the other alternatives analyzed in this EA. The reduction in available reservations would have the overall effect of reducing visitor access and the predictability of planning a visit to the park, which the other alternatives avoid. Therefore, this alternative was dismissed because it is duplicative with other alternatives carried forward for detailed analysis that would have fewer constraints on visitor access.

While purchasing a single reservation covering multiple days was dismissed as an alternative, the online reservation system that would be used under alternatives B or C would provide similar functionality, allowing users to purchase daily reservations for multiple days in separate transactions. Therefore, visitors would be able to purchase reservations on multiple days under these alternatives if desired.

Mandatory Shuttle System

Under this system, from March through October, the NPS would require visitors to enter the main entrance of the park by taking a shuttle from a park-and-ride lot or transit hub outside the park boundary. It is estimated that 40 passenger shuttle buses would need to operate daily from 6:00 a.m. to 8:00 p.m. with 4 to 60-minute headways across the day (average interval of time between shuttles within the park). These numbers were determined through modeling completed in the Visitation Scenario Management Tool (VSMT), which incorporated assumptions made to meet desired conditions in the park. Assumptions include:

- The daily profile for visitor arrival patterns at the shuttle park-and-ride is based on the 2018 and 2019 vehicle entrance data for the park.
- Headways are set to ensure hourly visitation at Windows, Devils Garden, and Delicate Arch/Wolfe Ranch stays below visitor experience thresholds and upholds identified visitor capacities for these sites (see appendix B).
- Visitors' origins and destinations are based on the 2019 Global Positioning System parkwide travel patterns data.
- All visitors enter the park using the shuttle, except for exempted uses identified in this section.

The shuttle system would be first-come, first-serve with two routes: (1) an express shuttle with limited stops at the Windows, Delicate Arch, Fiery Furnace, and Devils Garden; and (2) a shuttle with 11 stops analyzed previously (NPS 2012). These routes could function independently or together. The shuttle system would be designed to maintain desired conditions (see appendix A) within the park and would not be demand-driven.

A mandatory shuttle system would substantially reduce the number of private vehicles within the park and alleviate acute parking and traffic congestion. Private vehicles would be unable to access the park during or outside shuttle hours, other than for exempted uses. Exemptions would be in place for visitors with campground permits, Tribal members accessing the park for traditional uses, tour bus CUAs, concessioners, and those with specific disabilities protected under the Architectural Barriers Act Accessibility Standards.

The VSMT provided modeling of private vehicle visitation patterns in Arches from 2018 to 2019 (pre-timed entry pilot and pre-pandemic) to develop a baseline daily visitor profile. The daily visitor profile is the percentage of visitors entering and exiting the park hourly and the percentage of people visiting sites within the park hourly. The VSMT for the analysis under this plan used the best available data at that time to test a range of conditions (low to high visitation scenarios and shifting preferences for primary site visitation) (NPS 2024b).

Under a first-come, first-serve shuttle system, shuttle boardings are anticipated to be lower during the early mornings and late afternoons based on the baseline daily profile data. Shuttle utilization is the percentage of available shuttle capacity (seating) that is occupied by visitors. Under lower to moderate visitation scenarios, shuttle utilization would rarely be maximized, and predicted wait times to board the shuttle at the park-and-ride lot under these scenarios would range from 2 to 31 minutes across the day.

Under a higher visitation scenario, the shuttle system would more evenly distribute visitation to destination sites across the day but would result in excessive queues and associated shuttle boarding wait

times at the park-and-ride lot. Shuttle utilization would be maximized across most hours of the day (except for early mornings), and many hours of the day (9:00 a.m. to 5:00 p.m. or later) would have hourly shuttle demand higher than shuttle capacities. Predicted wait times to board the shuttle at the park-and-ride lot under this scenario would range from 11 to 44 minutes across the day.

According to VSMT modeling, up to 10,500 daily visitors could be accommodated by a mandatory shuttle system, and visitation at the park would still be at or below the established site capacities and desired conditions would be maintained. Therefore, a mandatory shuttle system would accommodate the maximum daily visitation level observed at Arches.

The length of the park's road system, a total of 26 miles of paved roads one-way, and the distance between several key areas in the park complicate potential shuttle operations and increase projected annual operating costs. Where possible, the shuttle system would be adapted to maximize utilization. Costs estimates are based on shuttle utilization staying at or above 50% for all hours of operation. Anticipated annual operating costs for a mandatory shuttle system that meets the 2019 design day visitation (7,850 daily visitors) exceed $45 million. Modeling for lower to moderate visitation scenarios (4,544–5,562 daily visitors) results in much more reasonable wait times and annual operating costs of approximately $25 to $32 million. Increasing shuttle utilization to stay at or above 75% decreased annual operating costs for the low visitation scenario to $23 million. These costs assume a partnership shuttle system with leased shuttle vehicles. Park-acquired shuttles would have lower annual operating costs but would require high up-front capital costs for purchasing a shuttle fleet. Not included in these annual operating costs are the costs to design and construct one or more park-and-ride lots outside the park and other infrastructure improvements within the park, such as shuttle stops with shaded benches and water stations.

Impacts to the visitor experience include potentially long wait times, especially during certain times of day, to board the shuttle at the park-and-ride lot and to reboard from locations within the park. During warmer months, visitors could experience more heat exposure than they prepared for, especially at sites with shorter lengths of stay where visitors may be stuck waiting for a shuttle longer than they planned to visit the site. Visitors would be unable to stop at unnamed pullouts and viewpoints. Visitors with a single site itinerary would have longer commuting times (compared to travel by private vehicle) because they would be unable to go directly to their desired site. Shuttle routes would be 118 to 130 minutes long roundtrip, meaning a visitor who took the shuttle through the whole park and did not get off would be on the shuttle for more than two hours. Visitors would have to pack all their belongings onto the shuttle and be prepared to spend more time in the park than they might have in their personal vehicle. These considerations might contribute to the low level of public support for a mandatory shuttle system (25%–28%) received from park visitors during surveys conducted in 2021 and 2022 (Otak 2022, 2023).

Visitation patterns are likely to be altered by the implementation of a mandatory shuttle system (i.e., visitors stopping at more or fewer stops, visitors stopping for shorter or longer amounts of time). Changes in visitor lengths of stay at destination sites would change the average number of shuttle trips per person per hour. Should a mandatory shuttle system be implemented, subsequent data on how these travel behaviors shift would adjust the modeling and shuttle operations.

While a mandatory shuttle system could be designed and operated in a way that achieves desired conditions in the park, it is currently economically and technically infeasible for the park to implement in the immediate future to address the urgent need. Annual operating costs of at least $23 million and up to $45 million are three to four times more than what the park currently collects in fee revenues and there are no other reliable and sufficient funding sources available without a local transit agency partner willing to supplement funding. In addition, there is insufficient space within the park to construct the park-and-ride lot necessary for shuttle operation. Per the City of Moab, the only identified site that appears viable for construction of a transit hub outside the park would be the Moab Uranium Mill Tailings Remediation Action (UMTRA) project site; however, remediation of this site is not anticipated to be completed until

2029; additional planning and design would be required; and additional funding would need to be secured. As a result, the city does not anticipate full development of the site for 7 to10 years or more (City of Moab, Langianese pers. comm. 2024). Currently, there are no reasonably foreseeable viable options for partnering with the community and building a transit hub outside the park. Therefore, consideration of a mandatory shuttle system is speculative at this time. If funding became available through partnerships and a transit hub was built and available for the park to use as a park-and-ride for a mandatory shuttle system, the park may reconsider this alternative in the future. However, given the timelines to secure the funding and build the infrastructure needed to support this alternative, it would not address issues quickly. Therefore, this alternative was dismissed because it would not meet the purpose and need for the proposed action, is not economically viable, and is not reasonably foreseeable.

Voluntary Shuttle System

The park considered a stand-alone voluntary shuttle system that would provide visitors with an alternative to driving private vehicles in the park. The shuttle system would be an alternative mode of transportation for those who choose to use it.

Unlike the mandatory shuttle system discussed above, visitors would still be allowed to drive private vehicles along park roads and park in available parking lots. A shuttle system would require the acquisition of shuttle vehicles through purchase or partnership, the design and construction of one or more park-and-ride lots in the surrounding community, maintenance and/or fueling facilities, and other infrastructure improvements such as shuttle stops with visitor amenities. Like the mandatory shuttle alternative, there would be two different route combinations: (1) a route with stops at 11 sites, or (2) an express route with limited stops. These routes could function independently or together.

Because private vehicle use would still be allowed in the park under this alternative, traffic congestion at the entrance station and in the park would likely continue. In fact, a shuttle system could increase congestion and visitor use at already high use areas by providing access for even more visitors. The 2012 Alternative Transportation System and Congestion Management Study indicated that 23% to 28% of vehicle traffic in the park would be reduced or diverted with a voluntary shuttle (NPS 2012). An informal review of a few successful NPS voluntary transit systems suggests that actual vehicles diverted under transit systems are low compared to overall visitation, and there is not strong evidence at this time to suggest that these rates would exceed 10% of total visitation. Other national park system units with voluntary shuttle systems in place, such as Rocky Mountain National Park, Yosemite National Park, and Glacier National Park, are using or currently pursuing additional traffic management measures because the shuttle systems alone are not sufficient to address traffic and parking congestion. While some visitors would use a shuttle system, providing a quality visitor experience for the variety of users with different travel habits and patterns would be problematic and difficult to accommodate.

A stand-alone voluntary shuttle would not meet the purpose and need because it would not address the congestion and parking issues resulting from an increasing number of private vehicles entering the park and could contribute to additional crowding on trails and at high use areas that exceeds thresholds. Even if this alternative could be combined with other elements to achieve the purpose and need, there is insufficient space within the park to construct the park-and-ride necessary for shuttle operation. Per the City of Moab, the only identified site that appears viable for construction of a transit hub outside the park would be the Moab UMTRA project site; however, remediation of this site is not anticipated to be completed until 2029; additional planning and design would be required; and additional funding would need to be secured. As a result, the city does not anticipate full development of the site for 7 to 10 years or more (City of Moab, Langianese pers. comm. 2024). As result, this alternative would not address issues quickly.

Currently, there are no reasonably foreseeable viable options for partnering with the community and building a transit hub outside the park. However, the NPS remains open to proposals to operate a shuttle system in the park that would not depend on additional infrastructure within the park. Existing CUA holders currently provide shuttle and taxi services within the park that could provide models for this type of system or service. No new proposals for shuttle or taxi services have been received; therefore, consideration of a voluntary shuttle system is speculative at this time. Based on the above, this alternative was considered but dismissed from further analysis during the current planning process because it would not meet the purpose and need for the proposed action and is not reasonably foreseeable.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes the current and expected future conditions of visitor access, use, and experience, and socioeconomics that may be affected by the alternatives under consideration, including the reasonably foreseeable environmental trends and planned action(s) in the area. This chapter also analyzes the environmental impacts of the alternatives on these resources (40 CFR 1502.15 and 1502.16). Impact topics considered but dismissed from detailed analysis are described in chapter 1.

METHODOLOGY

This chapter is organized by impact topic. The current and expected future conditions of the resource are presented first, followed by a discussion of trends and past, present, and reasonably foreseeable future actions for each resource. For the purposes of this analysis, the affected environment describes conditions primarily during the timed entry pilots from 2022 to 2024. The impacts of the no-action alternative, which would return to pre-2022 management actions, are based on the conditions of resources primarily from 2016 to 2019, prior to the global COVID-19 pandemic beginning in 2020 and the initiation of the first timed entry pilot program in 2022 (see the timeline in figure 3-1). The "Environmental Consequences" section evaluates the direct, indirect, and cumulative impacts of implementing each alternative (40 CFR 1508.1[i]) and compares these impacts to both current conditions and the expected condition of the resource under the no-action alternative. The description of current and expected future conditions, and potential impacts, is based on the best professional judgment of NPS staff, recent research as described in chapter 1 and as part of each individual resource topic below, and civic engagement efforts. A comparative conclusion of the impacts across alternatives is included for each impact topic.

FIGURE 3-1. TIMELINE FOR ALTERNATIVE ANALYSIS

VISITOR ACCESS, USE, AND EXPERIENCE

Affected Environment

Arches National Park lies within the heart of the Colorado Plateau, and its distinctive landscape is considered one of America's scenic wonders. It provides visitors with the opportunity to develop a personal connection with nature that inspires stewardship. The park has more than 2,000 natural stone arches, hundreds of soaring pinnacles, massive rock fins, and giant balanced rocks. Its landscape offers visitors abundant recreational opportunities, with 76,679 acres of expansive desert and unique geologic features, the majority of which (96%) is managed as wilderness. The park also protects a notable array of

cultural sites and features that reflect the different ways people have occupied and used Colorado Plateau landscapes over the last 12,000 years.

As shown in figure 3-2, annual visitation to the park has dramatically increased from 2011–2013 levels. The figure illustrates the 2020 decline in visits at the beginning of the global COVID-19 pandemic as well as the 2021 record-high 1.8 million visits as the public rushed to return to activities following COVID-19 lockdowns. The no-action alternative level of annual recreation visitation averaged 1.61 million visits during the 2016–2019 comparison period (figure 3-2). Although many visitors continued to experience the fundamental resources and values of the park under the no-action pre-2022 management actions, undesirable long-term impacts to visitor access, use, and experience occurred from sustained and high levels of visitation (Miller et al. 2023). Annual recreation visitation under current conditions in 2022–2023 averaged 1.47 million visits, which was well within a similar drop in 2022 visitation compared to pre-COVID-19 visitation levels experienced at other national park system units in the region. This drop could be due to several external factors, including the slow return of international visitors and higher travel costs (Bioeconomics and RRC Associates 2024).

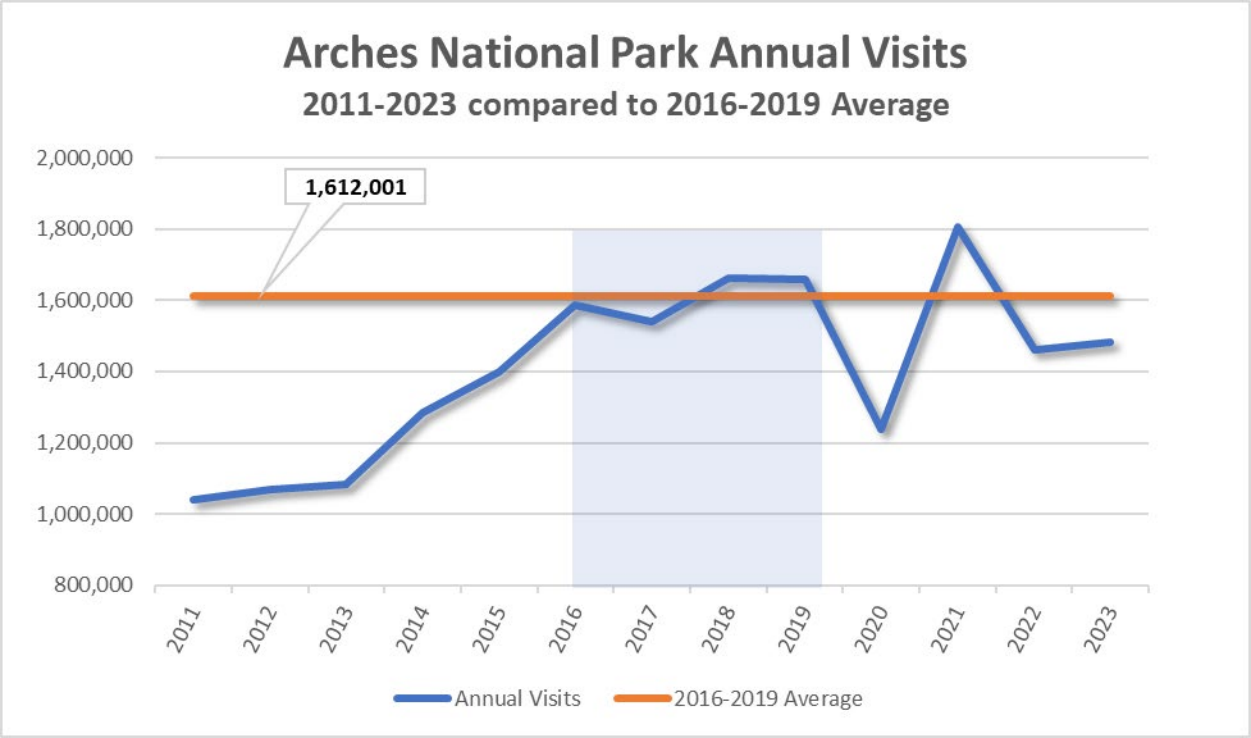


FIGURE 3-2. ARCHES RECREATIONAL VISITS FOR 2011–2023 AND COMPARISON PERIOD 2016–2019

Visitor access, use, and experience are unique but intertwined elements of a visit to national parks. For example, access can influence how a visitor uses and experiences the park, and desired experiences can influence how a visitor recreates and when they access the park. Visitor access, use, and experience are individually described in the "Affected Environment" sections to provide a detailed understanding of these concepts. Due to the close relationship between the concepts, the "Environmental Consequences" section brings these concepts together to evaluate the effects of the alternatives.

Visitor Access

Delicate Arch. (Photo courtesy of NPS/Jacob W. Frank 2011)

Visitor access refers to how and when visitors enter the park or reach infrastructure and facilities and how and when park management may influence the amount and timing of visitor access. The ways visitors access the park and destinations within it influence visitor experience and type of use.

Visitors' first impression of the park is often the arrival at an entrance station. Most visitors (more than 96%) access the park by private vehicle via the one paved main entrance road just north of Moab (Miller et al. 2023). The main entrance has two staffed booths where staff members greet visitors and collect fees. Visitors can also access the park via two secondary roads that provide a different experience when accessing the park: Willow Springs Road, a dirt road that is lightly used by the general visitor population because it requires high-clearance, four-wheel drive vehicles; and Salt Valley Road, a gravel road that provides access to Klondike Bluffs and the Tower Arch trailhead near the northwestern boundary of the park. Both secondary roads connect with the scenic drive in the park. No public transportation is available inside the park. The park is generally open year-round, 24-hours a day, and is busiest between March and October.

Parking at Devils Garden. (Photo courtesy of NPS/Neal Herbert 2013)

Beginning in 2022, the park piloted timed entry systems to distribute visitor use evenly throughout the day. Under the 2022 timed entry pilot, visitors arriving by private vehicle needed a reservation to enter the park between 6:00 a.m. and 5:00 p.m. daily. In 2023 and 2024, from April 1 through October 31, visitors entering the park in a private vehicle between 7:00 a.m. and 4:00 p.m. required a

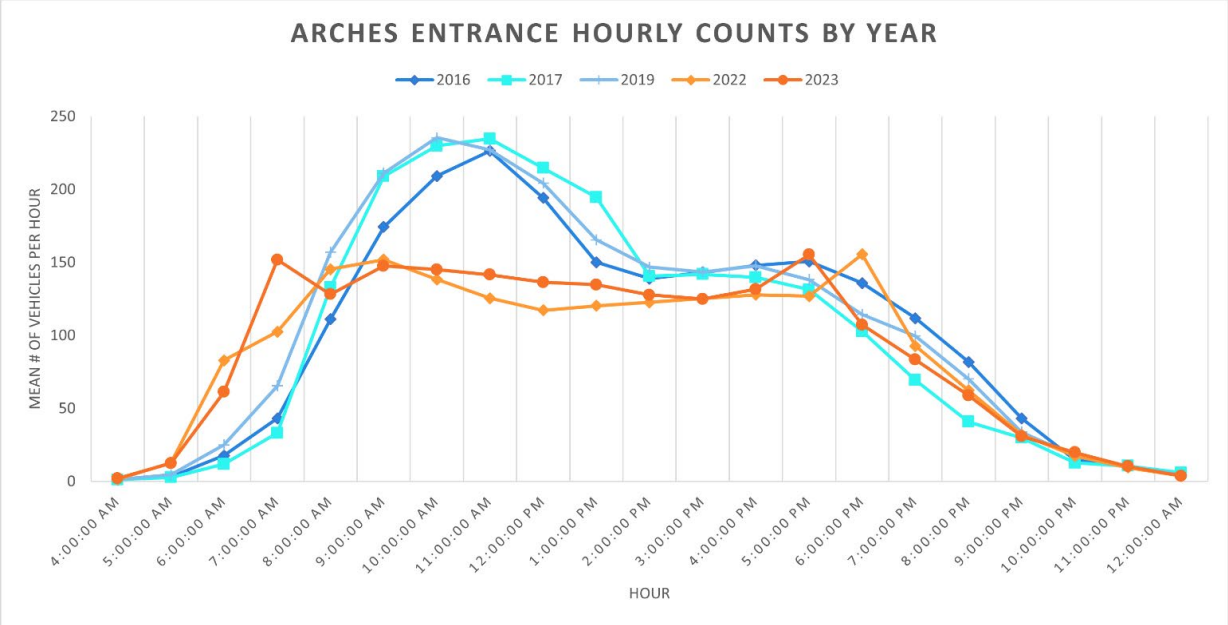
reservation. Timed entry reservations were allotted in hourly entry time blocks. Visitors could book these reservations up to three months in advance or as late as the night before their intended arrival through an online reservation system. If reservations were available, visitors could make a reservation on the day of their intended visit. The timed entry pilots provided information to help park staff understand changes in visitor access, use, and experiences at key sites accessed from the scenic drive, including the Windows, Delicate Arch, and Devils Garden.

With timed entry pilots in place from 2022 to 2024, visitors were able to access the park without a reservation during times of the day and days of the year when the reservation system was not in effect. In 2022, visitors could enter the park before 6:00 a.m. and after 5:00 p.m. without a timed entry reservation; and in 2023 and 2024, visitors could enter the park before 7:00 a.m. and after 4:00 p.m. without a timed entry reservation. Allowing vehicles to enter the park without a reservation outside high use times preserved a level of spontaneity and flexibility for visitor access, particularly for visitors who live or were staying nearby.

Responses from 2022 visitor use surveys conducted inside the park indicated most visitors were able to acquire a reservation for their desired day (98%) or time of visit (86%). If a respondent indicated they were unable to obtain a reservation for their desired day or time, they were asked if the alternative day/time they ultimately received affected their overall experience. Most visitors indicated that the alternative day did not affect their experience (88%). Similarly, 76% of respondents who did not get a reservation for their desired time indicated the new time did not affect the quality of their experience (Freimund and Wheeler 2023). If reservations were not available for their desired time, 73% of visitors stated they were somewhat or extremely likely to visit the park early or late in the day when access was not limited (Freimund and Wheeler 2023). Data collected by park staff at the park entrance during the timed entry pilots showed that approximately 15% of visitors arriving daily during the 2022 timed entry pilot were turned around because they did not possess a timed entry reservation (Tendick, Meyer, and Miller 2023).

During civic engagement in fall 2023, the park received comments reflecting different viewpoints on the timed entry pilots. Some commenters emphasized the importance of maintaining unplanned access to the park, particularly given external factors such as weather. Some commenters stated that the requirement to obtain a reservation during timed entry affected their desired use (e.g., an unplanned drive through the park to entertain guests), or that they were unaware of the timed entry requirement and were unable to change their plans, and therefore missed an intended visit to the park (NPS 2024c). Conversely, others appreciated the ability to plan their visits before arriving at the park (NPS 2024c) and supported the current management strategy because access to the park was more predictable, and they were able to access key sites while experiencing reduced road and parking lot congestion and reduced crowding on park trails (Miller et al. 2023).

The timed entry pilots from 2022 through 2024 resulted in changes to visitor access when the reservation system was in effect. Under the pilots, consistent and dispersed visitation contributed to less congestion and improved visitor access. The systems encouraged dispersed visitation throughout the day, as shown in figure 3-3, compared to visitation before the timed entry pilots, which was concentrated during peak times, primarily in the morning. As shown in figure 3-3, prior to 2022, average hourly entrance counts from April through October between 6:00 a.m. and noon exceeded 200 vehicles per hour. During the timed entry pilots, hourly entrance counts were measured at a more consistent rate of between 100 and 150 vehicles over most of the day, with small surges in visitation immediately before and after the periods when timed entry was in effect. These surges still did not approach the level of visitation seen during peak hours in the years prior to the timed entry pilots. The park developed monitoring thresholds as part of the timed entry pilots to indicate if temporary closures of the entrance station were needed based on impacts to desired conditions. These thresholds were not exceeded during the 2022–2023 pilots and have not been exceeded in 2024 to date.



Note: This chart shows data for hourly entrance counts by year for the period between March and October 2016 and 2019 (blue lines) and the timed entry pilot years of 2022 and 2023 (orange lines). Data for 2018 are not included because entrance counts for this year were similar to 2019. Data for 2020 and 2021 are not included because these years are outside the reference years for pre-pilot conditions and were affected by conditions during the COVID-19 pandemic.
Source: NPS, Tendick pers. comm. 2024e

FIGURE 3-3. ARCHES NATIONAL PARK HOURLY ENTRANCE COUNTS BY YEAR (MARCH–OCTOBER)

Visitor Use

Visitor use refers to human presence and activities in an area for recreational purposes, including education, interpretation, inspiration, and physical and mental health. Visitors have opportunities to experience the park's fundamental resources and values through a variety of uses. From the entrance station, visitors can drive along the scenic drive to access the park's visitor center, hiking trails, world--renowned geological formations, and Devils Garden Campground. Many of the popular geological formations in the park are visible from the scenic drive and accessible from designated parking lots and roadside pullouts (RSG 2020). The scenic drive offers views of the Colorado Plateau, punctuated by rocky ridges, canyons, fins, towers, monoliths, pinnacles, and its iconic arches. More than a dozen hiking trails provide access to arches and other features and to the backcountry. With a variety of hiking opportunities, visitors can find a trail or destination that best suits their desired experience (e.g., short walks to famous viewpoints or more challenging exploration of the Fiery Furnace).

While visitation occurs throughout the park, the highest level of visitor use occurs at key sites that offer access to some of the park's most iconic geological formations. The Windows is a popular developed area featuring the densest concentration of large arches in the park including North and South Windows, Double Arch, and Turret Arch. This area is 12 miles from the park entrance off the scenic drive with short trails to access the arches. The maximum parking capacity at the Windows is 119 vehicles (Tendick, Meyer, and Miller 2023). The Wolfe Ranch Historic District and Delicate Arch area are roughly 13 miles from the park entrance off the scenic drive. Delicate Arch is an iconic location in the park and is a primary attraction for visitors (RSG 2020). A spur road connects to this area, and the main parking area and overflow parking at Wolfe Ranch contain 157 spaces (Tendick, Meyer, and Miller 2023). This parking area provides access to the 3-mile round trip hiking trail to Delicate Arch, and road-proximate

interpretive areas showcasing the historic Wolfe Ranch homestead and rock writing panel created by Ute and Zuni (also referred to as A:shiwi) peoples prior to mass European American settlement of the region. Farther along the spur road is a second parking lot for the Delicate Arch Viewpoints—a 200-foot wheelchair accessible path to the lower viewpoint and a 0.5-mile one-way trail to the Upper Viewpoint provide views of the arch from a mile away. Devils Garden is located at the terminus of the scenic drive, approximately 18 miles north of the park entrance. Devils Garden features the longest hiking trail system in the park, including the primary access trail to Landscape Arch, which is the longest arch in the western hemisphere. The Devils Garden area, including the trail to Landscape Arch and beyond to Double O Arch and the "Primitive Loop," is accessed by a large parking area with 179 spaces (Tendick, Meyer, and Miller 2023). See figure 1-1 for a map that shows these areas.

Data collected in 2019 suggest that private vehicle visitor groups spent an average of 3.3 hours in the park, while commercial vehicle visitor groups spent an average of 2.7 hours in the park (RSG 2020). Data collected by the NPS in its most recent visitor survey in 2022 suggest that private vehicle visitor groups spent more time on average (5.5 hours) in the park, and commercial guide visitor groups spent on average 3 hours in the park (NPS 2024f). Once inside the park, about 36% of visitors visit all three key sites (the Windows, Delicate Arch, and Devils Garden). About 61% visit at least two of the three sites, and 96% of visitors visit at least one of the three sites, based on Global Positioning System tracking data (RSG 2020). Hourly visitor arrivals at key site trailhead locations are generally highest in the morning, with a slight downward trend through the afternoon hours (RSG 2020).

Visitor Experience

Visitor experience is defined as the perceptions, feelings, and reactions that a visitor has before, during, and after a visit to an area. Perceptions of resources and resource condition can affect visitor experience in a national park system unit. For instance, views of a red rock landscape can invoke awe, while trampled vegetation may negatively affect perceptions of park resources. High visitor concentrations along trails, at viewpoints, and at other key park features can negatively affect the experience for some visitors. However, while some visitors may appreciate a quieter or more isolated experience, others visit the park for a social experience with friends and family, and all experiences are considered in this EA.

Visitors at Delicate Arch prior to timed entry. (Photo courtesy of Whit Richardson 2021)

The availability of parking can affect visitor experience in the park. When practical parking capacity is reached (defined as when 90% of striped spaces in a parking lot are occupied), parking lots generally feel full, and arriving drivers experience a lack of available parking and congestion in the lot (Tendick, Meyer, and Miller 2023; Urban Land Institute and National Parking Association 2010). In 2016, 35% of visitor groups experienced parking problems, occurring most frequently at the Windows and "everywhere" in the

park (NPS 2017). Visitor groups were most likely to report feeling “extremely” and “very” crowded at the Windows (43%), Delicate Arch (38%), and Devils Garden Trail (25%) (NPS 2017).

Another measure of visitor experience quality is a people-per-viewscape (PPV) indicator. PPV is assessed against a “management action” condition and a “displacement” condition. The management action condition is the density of PPV at which visitors want the NPS to take action to deal with deteriorating visitor experience quality. The displacement condition is the point at which visitors would no longer visit the location because the density of PPV is too high. Using PPV as a measure, visitor experience under the timed entry pilots improved in all measured locations (i.e., the Windows, Delicate Arch, Devils Garden). While average PPV counts slightly improved, maximum PPV counts improved more markedly, suggesting that extremely high visitor volumes were reduced during the timed entry pilots. Throughout the entire 2022 timed entry pilot, fewer than 3% of hours at the Windows, Delicate Arch, and Devils Garden demonstrated conditions where visitors would want the NPS to implement management actions to address the density of people at key locations, and fewer than 1% of hours at these same locations demonstrated conditions where people would no longer visit the area due to the density of people (Tendick, Meyer, and Miller 2023).

Hiking to North Window. (Photo courtesy of NPS 2018)

Data from visitor use surveys suggest that the timed entry pilots helped disperse visitation throughout the day and reduced crowding on trails and at trailheads, allowing visitors to engage in desired recreational activities (Miller et al. 2023). While hiking, visitors reported an all-around improvement in the quality of their experience during the timed entry pilots, including more positive evaluations regarding the number of people on trails.

Data also suggest that visitor perceptions of resources and conditions at the park were more positive during the timed entry pilots (Miller et al. 2023) compared to conditions prior (based on a sampling of visitors who were able to obtain a timed entry reservation or entered the park outside hours when reservations were required during the sampling period). During the 2022 pilot, between 60% and 69% of surveyed visitors reported no problem with crowding at the arches, trail crowding, or wait time to enter the park. Only 21% considered parking, people walking on the road, too many people in the park, or traffic congestion to be a problem (Freimund and Wheeler 2023). At parkwide levels, visitors perceived less crowding, higher levels of safety, and better protection of historic and cultural resources. When asked how timed entry improved or detracted from their experience in the park overall, 57% of visitors said that timed entry made their experience in the park much or somewhat better. An additional 38% said their experience was about the same as they expected it to be without timed entry. Collectively, these data suggest that the timed entry pilots changed the on-the-ground conditions at the park (e.g., by reducing congestion at key sites), and surveyed visitors noticed the changes and evaluated their experience as more positive when compared to previous conditions (Miller et al. 2023). Visitors indicated that timed entry might change their visitation pattern, but because their experience was perceived more positively, it would not prevent them from visiting the park on a trip to

the Moab region (Freimund and Wheeler 2023). When asked about preferences for a reservation system on future trips, 84% indicated they would like there to be a reservation system (Freimund and Wheeler 2023). People who were unable to obtain a reservation and chose not to visit the park outside hours when reservations were required are an unknown data set and were not able to be surveyed.

Facilities, infrastructure, and staff presence all contribute to the quality of visitor experiences at the park. Access to basic and clean facilities help visitors feel comfortable and can affect the overall perception of "pleasantness" of a place. During the timed entry pilots, visitation was more equally distributed throughout the day, and park staff were able to interact with visitors more frequently rather than focus their attention on managing parking lots. Furthermore, facilities and infrastructure that support visitor use and experience—such as buildings, trails, roads, and restrooms—required less routine maintenance when visitation was spread throughout the day and season compared to when use was highly concentrated. Lastly, park staff were generally better able to access facilities and infrastructure for routine maintenance when the roadways and parking lots were less congested.

Park staff observed that the 2022 and 2023 timed entry pilots resulted in beneficial impacts on visitor experience by accommodating visitors at a pace that facilities and park staff were equipped to handle. Under the timed entry pilots, park staff noticed a decrease in congestion on roadways, lower encounter rates on some trails, and more meaningful visitor contacts (Miller et al. 2023).

Trends and Planned Actions

Ongoing and planned actions that affect visitor access, use, and experience include actions such as routine maintenance and facility upgrades for safety and accessibility (e.g., trails, roads, buildings, utility lines). Currently, park staff are planning several projects, subject to funding availability, to improve visitor experience and accessibility throughout the park. Projects include the replacement of low bridges over three wash crossings on Delicate Arch Road, sidewalk construction at the Windows area bus drop off, and improvements to the Fiery Furnace restrooms and parking lot. These actions would temporarily degrade visitor access and experiences during construction phases (e.g., closures of parking areas or traffic lanes), but once complete, they would help promote visitor access, safety, and quality experiences at these areas.

Other planned actions include the development of Utahraptor State Park, located roughly 15 miles northwest of Moab, neighboring the park on its western boundary. Utah State Parks are developing the recreational and administrative facilities. Currently, only 1% to 2% of visitors to Arches National Park enter the park using Willow Springs Road, which passes through Utahraptor State Park (RSG 2020). Development of and increasing visitation at Utahraptor State Park could increase the number of visitors accessing Arches National Park via Willow Springs Road, increasing hourly vehicle arrivals. An increase in vehicles on park roads and increased congestion at key sites could degrade visitor access and experience within the park.

Climate change is anticipated to affect visitor use patterns throughout the national park system, including when, where, and how visitors recreate (Fisichelli et al. 2015). Historically throughout the national park system, higher visitation was related to warmer temperatures, except at the very warm end of the temperature spectrum (>77 degrees Fahrenheit [°F]) where visitation numbers dropped off rapidly. Shifts in climatic conditions, such as temperature increases beyond the historical range, are occurring in southeastern Utah. Pronounced aridification and associated reductions in water availability to ecosystems have emerged as predominant characteristics of climate conditions in the Colorado Plateau. For example, summer temperatures in the park often exceed 100ºF, making strenuous exercise, such as hiking, difficult. Many outdoor recreation activities rely on favorable weather conditions; therefore, climate change has the potential to drive changes in visitation patterns. Extremely high temperatures during summer months could change tourism seasonality, resulting in an increase in shoulder season visitation and a decrease in summer visitation. Rising spring temperatures over the coming decades are expected to cause earlier peak attendance to national park system units (Buckley and Foushee 2012). Continued shifts in climatic

conditions are expected to drive a change that is already occurring at the park. Over the past 10 years (2013–2023), the lowest visitation growth rates at the park have occurred in June, July, and August, and the highest growth rates have occurred in December, January, and February. Similar patterns are seen at nearby Canyonlands National Park, where the lowest visitation growth rates have occurred during summer months and the highest visitation growth rates have occurred during shoulder season or winter months. Such changes in visitation patterns, particularly increased visitation in the shoulder seasons, can change patterns of visitor use and affect opportunities for high-quality visitor experiences.

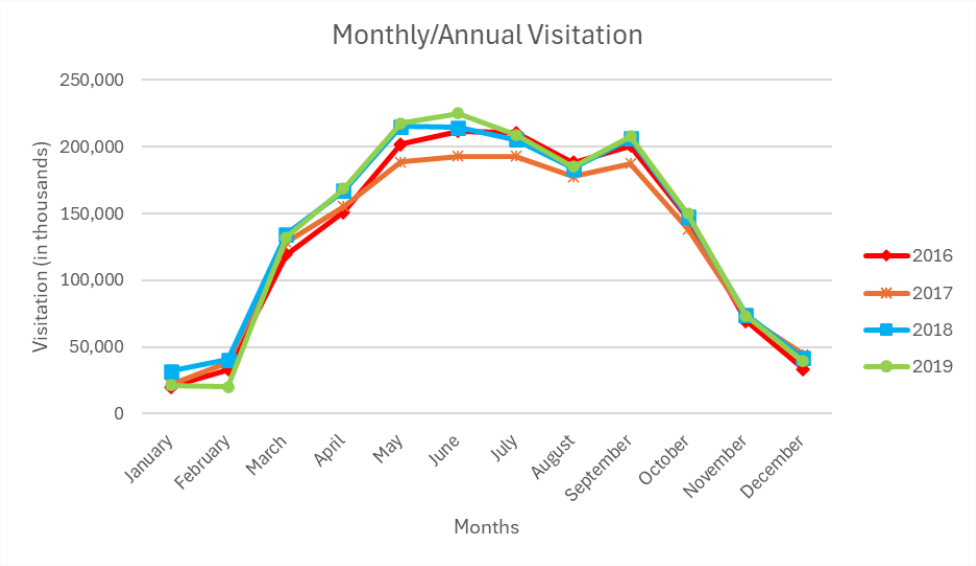
Environmental Consequences

Common to All Alternatives

Actions common to all alternatives would not result in any new impacts on visitor access, use, and experience beyond what is described in the "Affected Environment" section. Many of the actions common to all alternatives are consistent with ongoing park operations. Ongoing actions, such as providing visitor information, orientation, and enforcement, would continue to have long-term, beneficial impacts on visitor use, access, and experience. Actions common to all alternatives would not result in changes to Tribal Nation access to the park. Members of traditionally associated Tribal Nations would continue to have unimpeded access to lands within the park boundary for traditional uses.

Alternative A: No Action

Under the no-action alternative visitor access, use, and experience would return to conditions similar to those observed between 2016 and 2019, prior to the timed entry pilots. Concentrated visitor use during peak times could lead to long wait times and gate closures at the main entrance station; roadway and parking lot congestion; high demand on facilities; displacement of visitors from desired destinations; and long-term, observable impacts to natural and cultural resources that could affect visitor experience. Based on the 2016–2019 data, the highest visitation levels are expected to occur between March and October (see figure 3-4).



Source: NPS 2024c,d

FIGURE 3-4. MONTHLY AND ANNUAL RECREATION VISITS TO ARCHES NATIONAL PARK, 2016–2019

Traffic queues at the main entrance station.
(Photo courtesy of NPS/Chris Wonderly 2017)

As visitation grew before the implementation of the timed entry pilots, congestion at the main entrance increased and resulted in periods of excessive vehicle queuing and long wait times, which degraded visitor experience. Hourly entrance data from 2016 through 2019 from a traffic counter at the park's main entrance indicate that peak hours for vehicles entering the park at the main entrance varied by season, ranging from 8:00 a.m. to noon between May through September, and 10:00 a.m. to noon during the shoulder seasons. During these years, hourly traffic at the main entrance frequently exceeded 200 vehicles during peak times and sometimes exceeded 300 vehicles, with average hourly vehicle arrivals increasing slightly on weekends and holidays (RSG 2020). During peak entry times, the vehicle queue to enter the park could extend down the entrance road to or onto US Route 191. Peak queues ranged from approximately 27 to 75 vehicles on weekend days and holidays and from approximately 13 to 81 vehicles on weekdays (RSG 2020). Park staff frequently received complaints from visitors regarding wait times to access the park. Peak wait times exceeded one hour, and when queues backed up nearly to the junction with US 191, park staff would have to flush the line, pulsing more vehicles and visitors into the park without collecting fees or providing orientation/information. Under the no-action alternative, queues and wait times at the main entrance would be similar to conditions experienced between 2016 and 2019 and would negatively impact visitor access, use, and experiences compared to current conditions. During peak visitation hours, particularly in the morning, the number of vehicles entering the park is expected to be higher than the number of vehicles exiting, and parking availability would likely be limited or exceeded.

The park temporarily closed the main entrance station or individual parking lots with increasing frequency in the years prior to implementing the timed entry pilots as a result of increasing visitation. Between 2018 and 2021, the main entrance gate was closed for two to four hours at a time when primary parking lots in the park were full, and there were long vehicle queues on the entrance road (Tendick, Meyer, and Miller 2023). Temporary closures of the entrance station occurred as few as 2 times and as many as 118 times annually primarily between March to October (Tendick, Meyer, and Miller 2023). The unpredictability of temporary entrance station closures degraded visitor access, use, and experience because they prevented visitors from participating in their desired recreational activities at their desired time and served as a barrier to visitation. Area-specific (parking lot) closures were less common but were employed when congestion was an issue at a single site. Once a closure was implemented at a single

parking lot, however, visitor use would shift in response, and other parking lots were quick to fill. More often than not, this would necessitate restrictions at the main park entrance. Under the no-action alternative, the park would implement temporary entrance station closures to manage congestion at the main entrance and at key sites, and no visitor access would be permitted during these times. Temporary entrance station closures may increase commensurate with increases in visitation and would be unpredictable in terms of frequency and duration, which would adversely affect visitor access and experience.

Because visitation levels and patterns under the no-action alternative are assumed to be similar to park visitation conditions between 2016 and 2019, before the timed entry pilots, high levels of congestion and crowding would occur along the scenic drive corridor and in parking lots, on trails, and at primary attraction sites. Prior to timed entry, traffic affected viewscapes as vehicles lined up to find parking spots and were parked in out-of-bounds areas. Illegal passing, competition for parking spaces, honking horns, and exhaust smells diminished visitor experiences, distracting from iconic views and connections to nature. During the August through October 2019 sampling period for the Visitor Use, Access, and Experience Study, parking capacity in the Windows parking lot was consistently exceeded during peak hours. Similarly, parking capacity in the Devils Garden and Delicate Arch parking lots was exceeded on several occasions during the sampling period (RSG 2020). Increased visitation displaced visitors from many trailheads because parking lots could fill up as early as 7:00 a.m., which resulted in visitors parking outside established and/or signed parking areas to reach their destination. Parking outside established and/or signed parking areas occurred more frequently without a timed entry reservation system, which led to safety concerns, such as visitors walking in the roadway, and vehicle congestion that impeded traffic flow, thus impeding emergency response access throughout the park. Furthermore, high encounter rates on trails diminished the quality of hiking experiences for some visitors, affecting the ability of visitors to hike at their preferred pace, stop or pass freely, engage in activities like wildlife viewing, or meaningfully connect with their surroundings particularly at key sites. The higher concentration of visitors affected visitor use and adversely affected enjoyment of the natural environment for visitors who were more sensitive to crowding. Similar conditions would occur under the no-action alternative.

Opportunities for educational programming and meaningful interactions with rangers would decline due to staffing needs for parking management. Prior to the timed entry pilots, when an area received a concentrated volume of vehicles, park rangers would be pulled from other duties to help manage parking, resulting in fewer ranger-led programs for visitors or preventive search-and-rescue interactions. Under the no-action alternative, park facilities would continue to experience heavy use, and there would be an increased demand for facility upkeep (i.e., routine cleaning and maintenance). In addition, visitors would likely experience long waits for facilities (e.g., restrooms) and may not be able to access picnic areas.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described in the "Trends and Planned Actions" section. When combined with actions common to all alternatives and impacts from past, ongoing, and reasonably foreseeable future actions, the no-action alternative would result in long-term, adverse cumulative impacts on visitor access, use, and experience compared to current conditions. The development in the areas surrounding the park could increase the number of visitors accessing Arches National Park via Willow Springs Road, increasing hourly vehicle arrivals. As a result, overall cumulative impacts on visitor use and experience would be adverse under alternative A.

Conclusion. While the no-action alternative would allow spontaneity and flexibility by allowing visitors to visit the park on a first-come, first-served basis without a reservation, they would also encounter temporary entrance station closures during peak hours from March through October, which would affect their ability to actually visit the park during their desired times, would contribute to long entrance gate lines, vehicular congestion along roadways, increased frequency of out-of-bounds parking, demand for additional maintenance of park facilities and infrastructure, and crowding along trails that would result in degraded visitor access, use, and experience parkwide. These conditions and temporary closures of the

entrance station under the no-action alternative would result in long-term, adverse impacts on visitor access, and by association visitor use and experience.

Common to Action Alternatives B and C

Under alternatives B and C, reservations would be required for visitors to access the main park entrance during certain times of year and day, which would represent no change to current conditions under the 2024 timed entry pilot. These alternatives would require additional preparation by visitors prior to a planned visit to the park compared to the no-action alternative because of the requirement to obtain a reservation. As a result, compared to conditions under the no-action alternative, establishing a reservation system at the park would negatively affect visitors seeking unplanned access to the entire park, including day-trip visitors who do not stay overnight in the local area. However, this requirement would maintain spontaneity for visitors accessing desired sites once inside the park and would eliminate the need for temporary closures at the main entrance to address traffic congestion. Effects on visitor access would be mitigated by providing daily hours when visitors could enter the park without a reservation and exempting pedestrians, bicyclists, and other visitors (see chapter 2, "Strategies Common to Alternatives B and C") from reservation requirements.

Alternatives B and C would provide predictable access to the park for those who obtain a reservation, and access would be improved by a reduction in long vehicle queues at the entrance station and less competition for parking at key attraction sites along the scenic drive. Furthermore, as discussed in the "Affected Environment" section, a reduction in concentrated visitor use during peak times would lead to less crowding at trailheads and at primary attraction sites and likely reduce hourly encounter rates on trails, compared to conditions under the no-action alternative (Miller et al. 2023). Visitors would be able to use park facilities (e.g., restrooms) with shorter wait times, and opportunities for educational ranger interactions would increase.

Under the action alternatives, the park would exempt certain users from the reservation system, including vehicles entering the park for nonrecreational purposes (e.g., uses outlined under Director's Order 22); those with special use permits (e.g., weddings, First Amendment activities), CUAs or concessions contracts, or academic fee waivers; visitors with Fiery Furnace or canyoneering/climbing permits; members of traditionally associated Tribal Nations accessing cultural sites; and visitors with an overnight reservation at a campground or backpacking permits. Bicyclists and pedestrians would not be required to obtain a reservation under either action alternative; however, entrance fees would continue to be charged at the main entrance or at the end of the bike path on the visitor center patio.

Under the action alternatives, park staff may adaptively manage components of the reservation system, such as the seasonality and timing. The park would adaptively manage any reservation system based on monitoring indicators and thresholds described in chapter 2 and appendix B to ensure that desired conditions for resources are being maintained and achieved. In addition, park staff would identify and manage to visitor capacities by implementing the actions described in chapter 2. Managing visitor use within identified capacities would help ensure that desired conditions for visitor use and experience are maintained, thus beneficially impacting the experience. However, managing visitor use within identified capacities would affect visitor access because fewer vehicles would enter the park during hours when reservations are required compared to conditions before the timed entry pilots. If the reservation system were expanded to the shoulder or winter weekend season, impacts would be similar to what is described above.

Updates to park zoning, as outlined in chapter 2, would be considered an amendment to the park's general management plan (NPS 1989) and to the VERP Plan (NPS 1995) and would be implemented as part of this planning process. The VUM zones would provide updated management direction for visitor use, visitor experience, and resource protection across the various park landscapes and would consider equitable, accessible, and inclusive experiences and facilities that support a diverse range of visitor

interests and preferences. The development of zones and desired conditions would benefit visitor use and experience because they would provide clear direction for long-term management of the park. In contrast, the additions to the Sensitive Resource Protection Zones that would be established under alternatives B and C could result in area restrictions in these zones, which would affect visitor access, use, and experience. The proposed Sensitive Resource Protection Zones would encompass 638.4 acres in the park, less than 1% of the park's total acreage. While the NPS may implement area restrictions in these zones, they would not be entirely closed to visitors, and would improve resource conditions which could benefit visitor experience.

Alternative B

Under alternative B, distributing visitor use spatially and temporally by implementing a timed entry reservation system would likely lower hourly encounter rates on trails and at primary attraction sites, thus potentially improving the visitor experience. In addition, distributing use throughout the day would likely reduce vehicle volumes on roads and in parking areas at peak times, which would benefit visitor access, use, and experience.

Visitor access to parking under this alternative would be similar to current conditions described in the "Affected Environment" section and would improve compared to conditions under the no-action alternative. Collectively, no parking lots at key sites exceeded practical parking capacity more than 5% of the time during the timed entry pilot observation periods, and no parking lot ever exceeded 100% of striped parking spaces during the same periods (Tendick, Meyer, and Miller 2023). Under alternative B, once inside the park, visitors would not need to plan ahead to visit key sites, and it is more likely that parking at a visitor's preferred destination would be available throughout the day.

Visitor displacement from key sites would be reduced, resulting in visitor access, use, and experience conditions that most resemble conditions under the timed entry pilots and described in the "Affected Environment" section. Dispersed visitation under alternative B would alleviate congestion and crowding compared to the no-action alternative. Visitor surveys and staff observations during the timed entry pilots indicate that although congestion may still occur under a timed entry reservation system, cars mostly moved freely on roadways within the park. In addition, data collected from timed entry pilots indicate that visitors would likely experience shorter wait times for facilities and have more opportunities for educational interactions with rangers, thus positively impacting visitor experience. If all reservations are utilized, this alternative would likely result in an 23% increase in total visitation from April to October compared to a five-year average (2015–2019) of the same months and a 15% increase when compared to the same months in 2019.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the "Trends and Planned Actions" section. When combined with these impacts and with impacts from actions common to all alternatives, alternative B would result in long-term, positive cumulative impacts on visitor access, use, and experience. Conditions under this alternative would be most similar to conditions under the timed entry pilots described in the "Affected Environment" section. With development in the surrounding area, the number of visitors accessing Arches National Park via Willow Springs Road could increase hourly vehicle arrivals. An increase in vehicles on park roads and increased congestion at key sites would degrade visitor access, use, and experience within the park; however, this increase would be offset by the distribution of visitation under the timed entry reservation system or mitigated by adaptive management actions.

Conclusion. While the timed entry reservation system would have an adverse impact on visitors seeking unplanned access to the park compared to current conditions and under the no-action alternative, this alternative would have a long-term, beneficial effect on the experiences of visitors who are able to obtain a reservation because it would disperse visitor use temporally and spatially in a manner that reduces vehicle congestion and crowding and maintains spontaneity for visiting sites once inside the park. This

alternative would eliminate the need for temporary closures at the main entrance and maximize the number of visitors who can enter the park to provide for a range of quality visitor experiences while protecting park resources to meet desired conditions. Visitor use and experience would improve under alternative B compared to the no-action alternative because the reservation system would be designed to achieve and maintain desired conditions in the park. While some visitors may experience adverse impacts because of the limitations associated with the reservation system, overall cumulative impacts on visitor access, use, and experience would be beneficial under alternative B.

Alternative C

Because fewer reservations would be made available compared to current conditions under the timed entry pilots, alternative C could result in more opportunities for visitors to disperse, shorter wait times at the entrance station, fewer vehicles on roadways, and less crowding and congestion on trails during most of the day, compared to current conditions and the no-action alternative. As a result, alternative C would have long-term, beneficial impacts on visitor experience in the park. Alternative C would also provide predictable entry to the park for those with reservations and would allow more opportunities for flexibility and spontaneity than alternative B because visitors with reservations could arrive at any time during the day (between 6:00 a.m. and 6:00 p.m.). Under alternative C, once inside the park visitors would not need to plan ahead to visit key sites, and it is more likely that parking at a visitor's preferred destination would be available throughout the day.

As described in chapter 2 under "Alternative C: Daily Reservations" the number of reservations made available under a daily reservation system would be designed to be consistent with achieving and maintaining desired conditions and identified visitor capacities during peak periods of the day; therefore, there would be long-term, adverse impacts on visitor access because fewer people overall would be able to access the park during the reservation period (6:00 a.m. to 6:00 p.m.). The reduced availability of reservations would negatively impact visitors who may not be able to get a reservation for their preferred day (see "Comparative Conclusion Across Alternatives" for a discussion of reservation availability). If all reservations are utilized, this alternative would likely result in an 5% decrease in total visitation from April to October compared to a five-year average (2015–2019) of the same months and a 11% decrease when compared to the same months in 2019.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the "Trends and Planned Actions" section. When combined with these impacts and impacts from actions common to alternatives B and C, alternative C would result in long-term, beneficial cumulative impacts on visitor access, use, and experience because this alternative would distribute visitation to manage to desired conditions. As described for alternative B, development in the surrounding area could increase hourly vehicle arrivals at Arches National Park via Willow Springs Road. An increase in vehicles on park roads and increased congestion at key sites would degrade visitor access, use, and experience within the park; however, this increase would be offset by the distribution of visitation under the timed entry reservation system or mitigated by adaptive management actions.

Conclusion. While the daily reservation system would have an adverse impact on visitors seeking unplanned access to the park compared to the no-action alternative, this alternative would have a long--term, beneficial effect on the experiences of visitors who are able to obtain a reservation because it would disperse visitor use temporally and spatially in a manner that reduces vehicle congestion and crowding and maintains spontaneity for visiting sites once inside the park. This alternative would also eliminate the need for temporary closures at the main entrance. Visitor use and experience would improve under alternative C compared to the no-action alternative because the reservation system would be designed to achieve and maintain desired conditions in the park. While alternative C would reduce visitor access during periods and times of day when reservations are required, this impact would be mitigated by allowing visitor access without reservations outside these times. While some visitors may experience

adverse impacts because of the limitations associated with the reservation system, overall cumulative impacts on visitor access, use, and experience would be beneficial under alternative C.

Comparative Conclusion Across Alternatives

The no-action alternative would result in substantial long-term, adverse impacts on visitor access, use, and experience because continued high visitation and concentrated visitor use may lead to unpredictable temporary entrance station closures, excessive entrance gate queues with long wait times, vehicular congestion around parking areas, visitor-created parking outside established and/or signed parking areas, impacts on park facilities and staff operations, and visitor crowding along trails and at key sites. This alternative would result in conditions that most resemble park conditions between 2016 and 2019, prior to implementation of the timed entry pilots. The implementation of a reservation system under either alternatives B or C would benefit visitor access, use, and experience in varying degrees compared to the no-action alternative.

The reservation system proposed under alternative B would degrade opportunities for unplanned access but would eliminate the need for temporary closures at the main entrance; guarantee entry for visitors with a reservation; and improve their experience once inside the park. In addition, visitors would be able to enter without a reservation for several months when timed entry is not in effect, and before or after timed entry windows when it is in effect. This alternative would result in conditions most similar to current conditions, or what is described in the "Affected Environment" section. Alternative C would have similar long-term impacts, but the number of available reservations would be reduced to achieve desired conditions in the park while accounting for the likelihood that daily permit holders would be more likely to arrive during a peak morning timeframe (e.g., 9:00 a.m.–11:00 a.m.), resulting in greater impacts on visitor access compared to alternative B. Because visitors would be able to enter at any time between 6:00 a.m. and 6:00 p.m., alternative C would offer more opportunities for flexibility and spontaneity. However, pulses in visitation (i.e., during peak hours) could resemble conditions similar to the no-action alternative. The reduction in wait times at the main entrance station and parking lot congestion may not occur to the same extent under alternative C, compared to alternative B, because pulses of visitors could arrive at the same time.

Alternative B, if all reservations are utilized, would likely result in a 15% increase in total visitation from April to October compared to the no-action alternative (2019 volume); and alternative C, if all reservations are utilized, would result in an 11% decrease in April to October visitation compared to the no-action alternative. Research suggests that visitation during other seasons would increase and that the timed entry reservation system did not strongly impact annual visitation (Bioeconomics and RRC Associates 2023).

Under either action alternative, the establishment of VUM zones, desired conditions, and visitor capacities would provide management direction parkwide that would support high-quality visitor experiences while preserving park resources.

SOCIOECONOMICS

Affected Environment

Partners, stakeholders, visitors, and other interested parties play an important role in helping to shape the management of national park system units, and frequent collaboration is essential to planning. The socioeconomic analysis focuses on the following issues:

- Socioeconomics of gateway communities (including economic contributions of visitor spending and quality of life)
- Equitable access

The description of these elements includes the conditions related to these issues that existed during the timed entry period and is based on the best professional judgment of NPS staff, past and recent research, and scoping efforts.

Socioeconomics of Gateway Communities

The socioeconomic discussion focuses on Grand County and San Juan County, Utah, as explained in chapter 1. This area reflects the area of potential Arches National Park visitor management impacts because the combination of large shares of public lands and high-profile, heavily used recreational sites in these two counties form the underpinnings of an economy that is heavily dependent on travel and tourism spending.

The park is located within Grand County, Utah, and sits in the south-central portion of the county; vehicular access is available at the intersection of US 191 and Arches National Park Road, approximately 5 miles northwest of downtown Moab (see figure 1-1). Grand County includes another high-profile NPS unit, Canyonlands National Park, and a heavily visited state park, Deadhorse Point State Park, with over one million visits in 2022 (Bioeconomics and RRC Associates 2024). Moab is the county seat and the largest city in Grand County with a population of 5,366 according to the 2020 Census (US Census Bureau 2020). US 191 serves as a major transportation route for visitors from the bordering states of Colorado and Arizona, surrounding counties within Utah, and the metropolitan areas of Provo and Salt Lake City to the northwest. Tourism is the largest economic driver for Grand County residents and business owners (Utah State Library n.d.a).

San Juan County is located immediately south of Grand County and encompasses the entire southeast corner of the state of Utah. US Route 191 is the major transportation route that connects San Juan County with Grand County and the park. It also serves as a major transportation route for visitors from the bordering states of Colorado and Arizona, and it connects Grand County to the northern and southeastern portions of Canyonlands National Park in San Juan County. The county comprises small, dispersed cities and towns, with the city of Monticello serving as the county seat with 1,824 residents; the largest population center is Blanding with 3,394 residents (US Census Bureau 2020). Similar to Grand County, tourism is the largest economic driver for San Juan County residents and business owners (Utah State Library n.d.a); however, because of its small and dispersed population, remote location, tight water supply, and limited availability of private land, San Juan County has less industry than Grand County.

Grand and San Juan Counties include large percentages of public lands (table 3-1). Lands managed by the Bureau of Land Management account for the highest share of land ownership in both counties and offer a wide range of camping and dispersed recreational opportunities. In 2022, Moab District Bureau of Land Management lands received three million recreational visits (25% of the statewide total). Utah State Parks also offer a wide range of local recreational opportunities. This large share of nearby public land provides a disproportionately greater opportunity for public recreational activities (outside Arches National Park) compared to most other national park gateway regions (Bioeconomics and RRC Associates 2024).

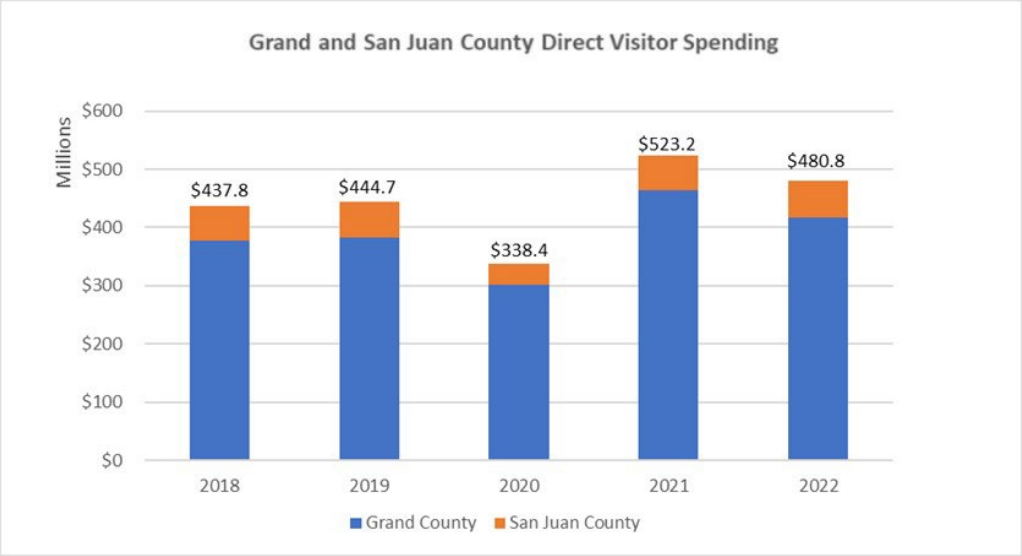
TABLE 3-1. PERCENT OF LAND OWNERSHIP IN GRAND AND SAN JUAN COUNTIES

Percent of Total Land Ownership	Grand County	San Juan County	Combined Counties	Utah
Private Lands	4.6%	7.9%	6.9%	24.8%
Federal Lands	**72.1%**	**61.4%**	**64.8%**	**61.4%**
Forest Service	2.4%	8.9%	6.8%	14.4%
Bureau of Land Management	65.8%	41.0%	48.8%	40.0%
National Park Service	3.7%	11.6%	9.1%	3.7%

Percent of Total Land Ownership	Grand County	San Juan County	Combined Counties	Utah
Military	0.1%	0.0%	0.0%	3.2%
State Lands	14.9%	5.3%	8.3%	9.5%
State Trust Lands*	13.8%	5.1%	7.9%	5.9%
Other State	1.1%	0.1%	0.4%	3.5%
Tribal Lands	8.4%	25.4%	20.0%	4.2%

Source: Bioeconomics and RRC Associates 2024

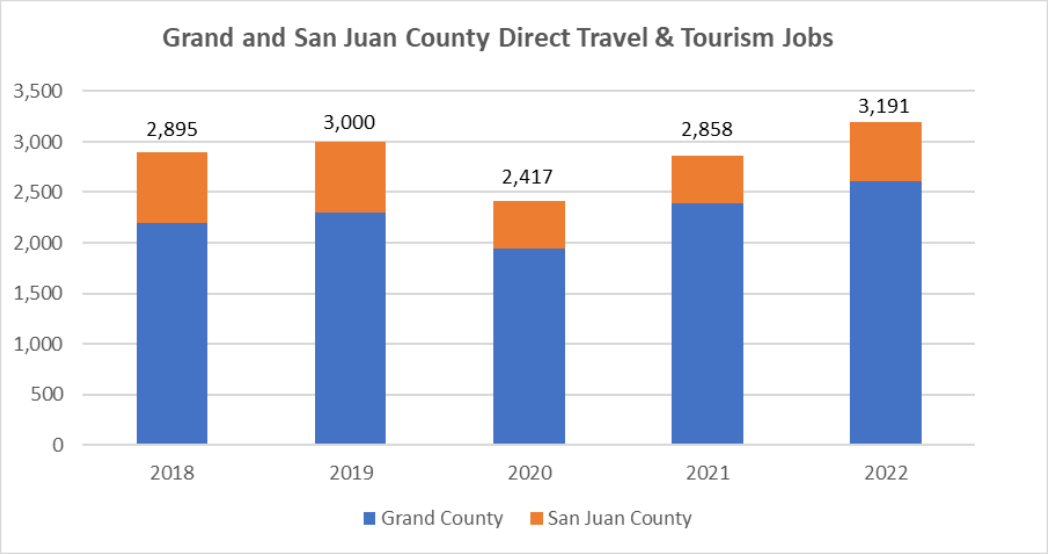
Figures 3-5 through 3-7 report on measures of economic activity in Grand and San Juan Counties between 2018 and 2022. Figure 3-5 reports 2018–2022 direct visitor spending from all visitors to Grand and San Juan Counties (University of Utah 2024). As shown in figure 3-5, direct visitor spending was higher in 2022 ($480.8 million), the first year of timed entry pilots at the park, than it was in the comparison years of 2018 and 2019, with $437.8 million and $444.7 million, respectively, in spending (University of Utah 2024).



Source: University of Utah (2024), Travel and Tourism County Profiles

FIGURE 3-5. 2018–2022 GRAND AND SAN JUAN COUNTY DIRECT VISITOR SPENDING

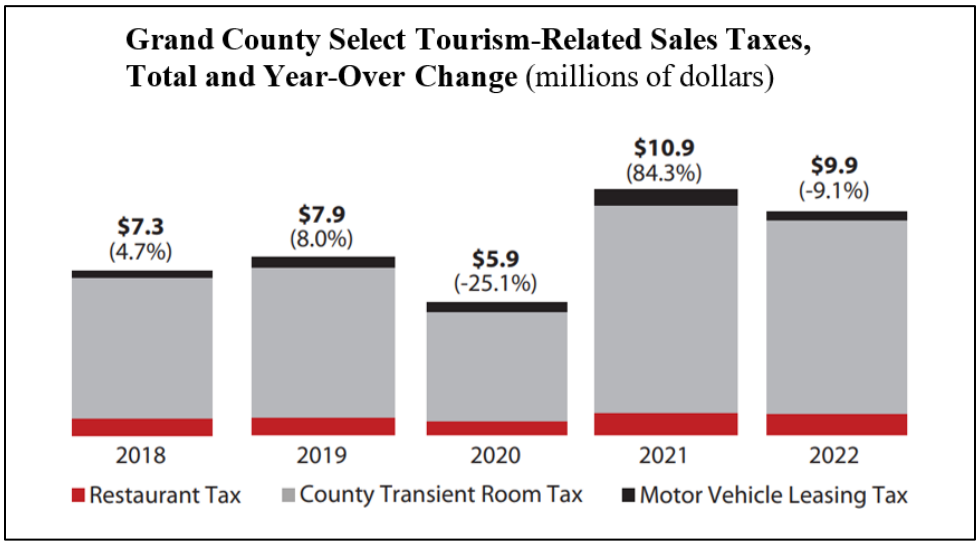
Figure 3-6 shows 2018–2022 direct travel- and tourism-related jobs in Grand and San Juan Counties (University of Utah 2024). In 2022, the top direct travel and tourism job sectors were in accommodations (45%), food services (31%), recreation (10%), and retail (5%) (University of Utah 2024). Accounting for indirect and induced jobs in Grand and San Juan Counties, travel and tourism accounted for 4,124 jobs (University of Utah 2024). As shown in figure 3-6, the number of direct travel- and tourism-related jobs in Grand and San Juan Counties were higher (3,191 jobs) in 2022, the first year of timed entry pilots at the park, than during the comparison years of 2018 and 2019, with 2,895 jobs and 3,000 jobs, respectively (University of Utah 2024).



Source: University of Utah (2024), Travel and Tourism County Profiles

FIGURE 3-6. 2018–2022 GRAND AND SAN JUAN COUNTY DIRECT TRAVEL AND TOURISM JOBS

Figure 3-7 shows 2018–2022 select tourism-related sales taxes for Grand County (University of Utah 2024). As shown in figure 3-7, tourism-related sales taxes in Grand County were higher ($9.9 million) in 2022, the first year of timed entry pilots at the park, than in both 2018 ($7.3 million) and 2019 ($7.9 million).



Source: University of Utah (2024), Travel and Tourism County Profiles

FIGURE 3-7. 2018–2022 GRAND COUNTY SELECT TOURISM-RELATED SALES TAXES

Arches National Park Visitation. Figure 3-2 illustrates the rapid increase in visitation to the park beginning in 2014 along with the 2020 decline in visits at the beginning of the global COVID-19 pandemic and the 2021 record high of 1.8 million visits following COVID-19 lockdowns. The no-action alternative level of annual recreation visitation ranged from 1.54 to 1.66 million visits with an average of 1.61 million visits for the 2016–2019 comparison period (figure 3-2). Annual recreation under current conditions in 2022–2023 averaged 1.47 million visits (1.46 million visits in 2022 and 1.48 million visits in 2023). The 9.2% decline in 2022 visits compared to the 2016–2019 average visitation level was similar to declines in visitation compared to pre-COVID-19 visitation levels seen at other national park system units in the region. These declines at parks across the region were due to several external factors including the slow return of international visitors and higher travel costs (Bioeconomics and RRC Associates 2024).

The 2022 NPS Visitor Spending Effects annual report estimated that visitors to Arches National Park spent $274.2 million in the local gateway region (Flyr and Koontz 2023). This level of spending accounted for approximately 62% of the $480.8 million in 2022 total visitor spending in Grand and San Juan Counties shown in figure 3-5. While park visitors contribute substantially to the local economy, the decline in 2022 visits compared to the 2016–2019 average visitation level did not negatively impact 2022 overall tourism spending or jobs in Grand and San Juan Counties compared to 2018 or 2019 (figures 3-5 and 3-6). Similarly, tourism-related sales taxes in Grand County also increased in 2022 compared to 2018 and 2019 levels. The proximity of other high-quality recreation sites (Canyonlands National Park and Utah State Parks, as well as dispersed recreation on Bureau of Land Management and US Forest Service lands), and a growing and increasingly diverse economy likely help insulate overall travel and tourism businesses in Grand and San Juan Counties from fluctuations in park visitation (Bioeconomics and RRC Associates 2024).

Results from the recent visitor surveys also indicate that visitor spending and tourism in Moab, Grand County, and San Juan County is not completely dependent on visitation levels at the park. In the 2022 visitor survey, 80% of park respondents indicated that trips to Arches National Park were made in conjunction with at least one visit to another local recreation area (Otak, 2023). Additionally, approximately 90% of park visitors stayed overnight (an average of two nights) in lodging or camping in the local area, indicating that most park visitors are not likely as sensitive to the time restrictions if they were unable to secure a reservation. Visitors who are visiting other area attractions may have the flexibility to modify the timing of their park visit to secure an entry reservation on their trip to the area or visit the park before or after the daily time restrictions (Bioeconomics and RRC Associates 2024). A majority of park visitors (77%) plan their trip to the park a month or more before their visit; meaning visitors who prioritize visiting the park should have opportunities to learn about and secure an entry reservation prior to their trip to the area.

Quality of Life. Another key consideration is the quality of life for residents in Grand County, particularly Moab, and San Juan County. When discussing impacts related to quality of life, research indicates that the impacts of tourism can vary, and increases in tourism can shift resident attitude and overall quality of life from positive to negative (Uysal et al. 2016). For example, concentrated private vehicle use by visitors can lead to traffic congestion in gateway communities (Miller et al. 2023), which in turn can result in externalities such as degraded air quality, increased noise, and traffic safety concerns. When traffic congestion occurs, residents must plan activities outside their homes around peak visitation times of day and season. Larger concentrations of short-term rental listings also tend to positively correlate with higher amounts of tourism. The number of short-term rental listings in Grand County increased from 903 in 2019 to more than 1,000 in each year between 2020 and 2022 (University of Utah 2024). The rise of short-term rentals can have an impact on community quality of life as they replace long-term rentals in gateway communities, consequently reducing the availability of housing for residents and driving up the cost of living.

The increase in short-term rentals could contribute to inflation that increases the cost of living and may contribute to economic disparities, particularly in Moab. The City of Moab participated in a Utah

Wellbeing Survey Project in 2022. The study was designed to assess the wellbeing and local perspectives of city residents and to provide information to city leaders to inform their general planning process for 33 cities across Utah. According to the study, Moab had the lowest wellbeing score in the state in 2022. Seventy-four percent of Moab residents indicated community wellbeing declined since 2021. Affordable housing was the top concern, with 91% of respondents stating it as either a major or moderate concern (Flint 2022). Five-year estimates from the US Census American Community Survey show that the cost of living as a percentage of income for homeowners increased dramatically in Grand County from 2019 to 2022. In 2019, 46.7% of Grand County homeowners were spending less than 20% of their income on living expenses while only 25.3% of homeowners were spending 35% or more of their income on living expenses. In 2022, 31.1% of homeowners were spending less than 20% of their income on living expenses and 33.4% of homeowners were spending 35% or more of their income on living expenses (see table 3-2; US Census Bureau 2019a,b; 2022a,b). The number of renters in Grand County spending less than 20% of their income on rent decreased from 36.8% in 2019 to 24% in 2022 (see table 3-3). Furthermore, the data show that approximately 60% of renters in 2019 were paying less than $1,000 per month, while fewer than 50% of renters were paying less than $1,000 per month in 2022. This reflects an overall increase in rent prices in Moab (US Census Bureau 2022a,b).

TABLE 3-2. COST OF LIVING AS A PERCENTAGE OF INCOME FOR HOMEOWNERS IN GRAND COUNTY, 2019 AND 2022

Cost of Living as % of Income, Homeowners	2019		2022	
	Grand County	Utah	Grand County	Utah
<20%	46.7%	46.8%	31.1% (-33%)	48.6% (+4%)
20-24.9%	15.4%	17.8%	13.0%	16.5%
25-29.9%	5.1%	11.6%	10.3%	10.8%
30-34.9%	7.5%	7.1%	12.1%	6.7%
35%+	25.3%	16.6%	33.4% (+32%)	17.4% (+5%)

TABLE 3-3. COST OF RENT AS A PERCENTAGE OF INCOME IN GRAND COUNTY, 2019 AND 2022

Cost of Rent as % of Income	2019		2022	
	Grand County	Utah	Grand County	Utah
<20%	36.8%	29.0%	24.0% (-35%)	27.8% (-4%)
20-24.9%	11.8%	14.5%	19.9%	13.9%
25-29.9%	5.2%	11.9%	17.7%	12.4%
30-34.9%	11.4%	9.3%	4.5%	9.8%
35%+	34.7%	35.3%	34.0% (-2%)	36.1% (+2%)

Increased visitation, concentrated visitor use, and pulsing visitation patterns have positive effects on business revenue to an extent but can decrease the quality of life for nearby residents, particularly for residents of Moab. Data from the Arches National Park gateway communities suggest that as the number of people visiting the park increases, the quality of life for residents in these gateway communities decreases (Otak, Inc. 2023).

Equitable Access

Constraints or barriers to visitation are another important socioeconomic issue. Understanding these barriers can help inform NPS managers of how best to serve populations. In this case, equitable access means access to a "healthy, sustainable, and resilient environment in which to live, play, work, learn, grow, worship, and engage in cultural and subsistence practices" (Executive Order 14096, 2023). A recent study suggests that the top barriers for non-visitors to national parks are the travel distance from home to a national park, associated costs of travel, lack of transportation options, and the cost of entrance fees at national parks (Institute for Tourism and Recreation Research et al. 2022). Non-visitors are defined in the NPS Comprehensive Survey of the American Public as individuals who have not visited a valid national park system unit over the past two years (RSG and WYSAC 2019).

Entrance fees at Arches National Park are $30 per vehicle, $25 per motorcycle, and $15 per person/bicycle for a seven-day pass. In addition to entrance fees, visitation to the park typically requires a personal vehicle to get to Moab. Visitors who travel from out of state typically need to pay for a flight or fuel for their private vehicle, lodging accommodations, a rental car (if applicable), and food and beverage, all of which contribute to financial constraints. In many cases, national park regions and gateway communities may have higher than typical costs for services, thus increasing the cost of a trip. Furthermore, research suggests that as income rises, so does the intention to visit a national park system unit, which illustrates the socioeconomic disparities among non-visitors and visitors to national park system units (Institute for Tourism and Recreation Research et al. 2022). Other potential barriers discussed in the research include lack of knowledge of what to do in national park system units, the perception that national park system units are too crowded, personal health issues, lack of accessibility options for people with disabilities, lack of connectivity in parks that prevents communication with friends and family, and concerns about crime or vandalism. However, the research also indicates that overall, most respondents felt neutral about these potential barriers or disagreed that they were barriers to visitation (Institute for Tourism and Recreation Research et al. 2022).

During the timed entry pilots, an additional fee was required for visitors to book a timed entry reservation. While this system adds an additional cost to visitation, the $2 fee per reservation is nominal compared to the other associated costs of traveling to and visiting national park system units and is not a deterrent or barrier to access. The timed entry pilots may pose other barriers for potential visitors who do not have internet access or are not comfortable navigating an online reservation system, do not have the flexibility to take time off work to book a reservation, or have language barriers. To help reduce some of the barriers associated with reservation systems, the park developed a flier providing information on timed entry in English, French, Spanish, Italian, German, Dutch, Korean, Japanese, Chinese, Hebrew, and Czech. The Moab Information Center in downtown Moab assisted visitors with booking timed entry reservations during operating hours, most often using the visitors' own phones, thus offsetting potential adverse impacts of the timed entry pilots.

A lack of information and interpretive messages in other languages can be a barrier to non-English-speaking visitors (Vermeer 2021). The current online reservation system only presents information in English, which can deter potential visitors from trying to obtain a reservation. Longer planning horizons for securing a reservation also could serve as a barrier as many visitors have shifted to planning more than six months in advance for their trip to the park (Miller et al. 2023). There were no differences or exclusionary effects found between race, ethnicity, income, local residency, or education level when comparing visitors before and during the timed entry pilots. Although these new barriers to access exist, the sociodemographic characteristics of the people visiting the park during the timed entry pilots was unchanged (Miller et al. 2023).

Trends and Planned Actions

The NPS has implemented strategies at the park to address constraints or barriers to visitation. The park has the same fee free days as all other national park system units when entrance fees (but only entrance fees) are waived. Consistent with NPS policy, the park offers education fee waivers for accredited academic institutions bringing in student groups. The park offers an orientation brochure in French, Spanish, Italian, German, Dutch, Korean, Japanese, and Chinese. Paper copies are distributed at the entrance booth and visitor center, and pdfs are available on the park website. All exhibits at the visitor center (indoor and on the patio) have audio description available through the NPS mobile application. Phones with the app loaded onto them are available to borrow at the front desk. The park film, geology video exhibit, and Fiery Furnace orientation film that play in the visitor center are open captioned for those with hearing disabilities. Information on trails that are more accessible for those with disabilities is listed on the park website alongside trail access data (width, grade, cross-slope, obstacles), which is also posted on physical signs at trailheads. This information helps visitors with mobility devices make informed choices. Only one trail at Arches is partially paved (Balanced Rock), and a few trails may be considered barrier-free up to a point.

Other trends and ongoing or planned actions that would affect socioeconomic conditions in gateway communities include establishment of Utahraptor State Park, which opened in 2021 and continues to undergo development in Grand County, west of Arches National Park. Visitation to Utahraptor State Park could increase visitation to Arches National Park via Willow Springs Road by those with vehicles capable of traversing this road. Visitation to this state park could also increase overnight and long-term tourism in Grand and San Juan Counties, which could increase economic activity in the region and local traffic.

The effects of climate change could result in socioeconomic changes throughout southeastern Utah. Temperatures in Utah have risen by more than 2.5°F since 1900 (Natural History Museum of Utah n.d.a). As noted above, under "Visitor Access, Use, and Experience," visitation at the park has been increasing faster in the shoulder seasons compared to the summer months, and visitation could continue to shift or expand to other times of the year as temperatures in the summer continue to rise. While a reduction in vehicular activity in the summer could improve the overall quality of life for residents in the region, climate change could result in a shift in overall activity from the current peak season to the current shoulder seasons. There is also a possibility that visitation could increase in both the summer and the shoulder seasons, resulting in increased visitation throughout the year (NPS 2015b).

Climate change may also result in ecological disturbances that could deter people from visiting the region. As the region continues to get warmer, winters are expected to become milder with less snowfall, which would reduce snowpack, snow cover, and river flows. Drought and aridification are expected to increase in the state, increasing the risk of wildfires. Smoke from nearby wildfires and fires as far away as California and Canada already affects air quality and viewscapes. Over the past 65 years, Utah and other southwestern states have seen an increase in the intensity and severity of precipitation events as the amount of rain falling during heavy storms has increased. These extreme precipitation events are projected to continue to increase (Climate Change Response Program 2024; NPS 2024g). Ecological disturbances, such as wildfires and floods, could increase hazards to visitors, complicate search-and-rescue and emergency response actions, and result in temporary park or area closures for safety reasons, resulting in less visitation at times, especially during the spring, summer, and fall, which could reduce economic and vehicular activity in the park and throughout Grand and San Juan Counties.

In summary, socioeconomics conditions can change annually depending on various factors (e.g., national economic trends and social factors, natural disasters, visitation patterns). Economic health in the gateway communities of Grand County and San Juan County is consistently improving. However, unsustainable growth in tourism can have negative impacts on residents and their quality of life (Uysal et al. 2016). While the NPS has implemented strategies nationally and at the park to reduce barriers to visitation, national economic trends such as increased cost of living and economic disparities can exacerbate some

of the primary barriers identified in the research. Planned actions in the park, such as ongoing accessibility and circulation improvements, routine trail and facility maintenance, and technological improvements are unlikely to have substantial impacts on the socioeconomic trends described above.

Environmental Consequences

Common to All Alternatives

Most of the actions common to all alternatives, such as technological improvements; providing visitor information, visitor orientation, and enforcement; zoning and desired conditions updates; minor facility upgrades to maintain or improve access; and Tribal Nation access would not have additional impacts on socioeconomics.

Alternative A: No Action

Under the no-action alternative, park staff would manage visitor access similar to the way it was managed before implementing the pilots (i.e., before 2022). The park would be accessed on a first-come, first-served basis, and the NPS would close areas of the park or implement temporary entrance station closures when visitor demand exceeds capacity. As a result, impacts on socioeconomics would be similar to conditions before the implementation of the timed entry pilots.

Visitation levels under the no-action alternative could shift back to trends seen between 2016 and 2019 before the timed entry pilots were implemented. Continued high visitation trends in 2016 and 2019 when compared to conditions under the 2022 and 2023 timed entry pilots may provide economic benefits to businesses in gateway communities. However, given trends in growing visitation to the park over the past decade, it is not unreasonable to predict that absent some method of control of visitor use at the park in the future, higher levels of gate closures used between 2018 and 2021 are likely to occur under the no--action alternative (Bioeconomics and RRC Associates 2024). Visitor displacement resulting from these gate closures could have adverse or beneficial impacts on the economy. Some visitors may spend less time and money in the area and leave the area earlier than intended, while others may spend more time and money in the area as they are forced to adjust or make new plans.

Temporary entrance station and area-specific closures would be unpredictable and could occur more frequently, commensurate with increases in visitation, as observed before 2022. These closures could displace visitors and increase congestion outside the park, which could degrade quality of life for residents in the region. Temporary entrance station closures occurred as few as 2 times and as many as 118 times between 2018 and 2021, lasting typically between 2 and 4 hours. When this happens, cars in the entrance queue are turned away, and these visitors are asked to return later. According to the 2022 Moab Wellbeing Study, 68% of Moab residents voiced concern over the roads and transportation in the area, and 74% of Moab residents voiced concern over air quality. Traffic and air quality conditions in the vicinity of the park could get worse under the no-action alternative because congestion would increase at the park entrance and in the park. Concentrated use during the weekends and the peak season would lead to traffic congestion that may impede the ability of residents to complete basic errands or access private property and businesses, resulting in adverse impacts to residential quality of life (Bioeconomics and RRC Associates 2024).

The requirement to obtain a reservation and the associated reservation fee would be discontinued under the no-action alternative during periods when timed entry reservations are currently in effect, eliminating these potential barriers to access. Otherwise, continuing pre-2022 pilot management strategies would result in little-to-no other impacts on equitable access. As noted above, recent studies indicate that travel distance to a national park, financial costs, and lack of transportation options serve as the primary barriers to visitation. These barriers would likely continue under the no-action alternative. However, temporary

entrance station closures and temporary area-specific closures would prevent access to all visitors when the closures are in effect.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the "Trends and Planned Actions" section. Socioeconomic conditions can vary annually, but general trends have been improving in the gateway communities (e.g., increased tourism spending, jobs, and sales tax revenue). When combined with impacts from past, present, and reasonably foreseeable future actions, there would be overall beneficial cumulative impacts under the no-action alternative; however, the no-action alternative would also result in increased traffic congestion that would adversely affect quality of life in gateway communities. While the NPS and the park strive to better understand key barriers to visitation (e.g., travel distance to a national park, financial costs, and lack of transportation), broader economic trends such as inflation that increases the cost of living may contribute to economic disparities that could hinder low-income populations from being able to afford a trip or take time off from work to visit parks.

Conclusion. Although the overall economic health of gateway communities under the no-action alternative would likely be similar to conditions seen in the 2016–2019 comparison period, businesses may experience adverse impacts from concentrated visitation that prevents visitors from stopping in town due to congestion. As noted above, the local tourism economy is not dependent solely on minor fluctuations in park visitation, and various other factors influence economic health in the area. Additionally, quality of life for residents under the no-action alternative may be adversely impacted because of increased congestion within the community compared to conditions under the timed entry pilots between 2022 and 2024. While the reservation fee would be discontinued under the no-action alternative, this change is not expected to substantially affect barriers to visitation. Overall, cumulative impacts on socioeconomics would be beneficial, despite some adverse impacts as discussed above.

Common to Action Alternatives B and C

Based on conditions that resulted from the implementation of the timed entry pilots at the park, implementation of a reservation system as proposed under alternatives B or C is not anticipated to negatively impact the socioeconomics (e.g., economies and quality of life) of gateway communities.

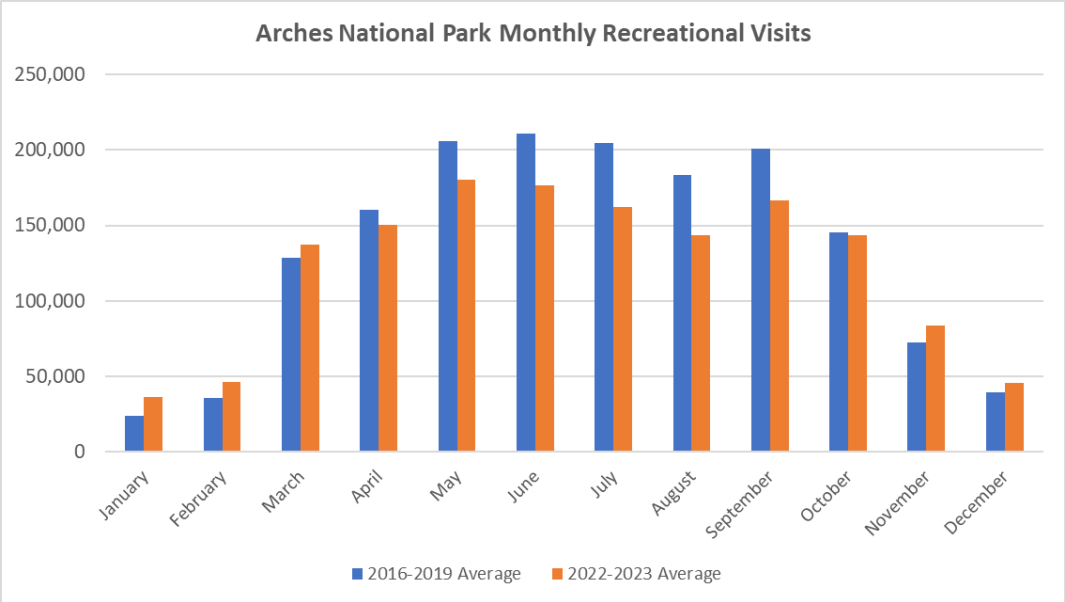
The timed entry pilots at the park dispersed visitor use throughout days, weeks, and months, which could benefit the quality of life for Grand County and San Juan County residents due to reduced congestion at peak times (Otak, Inc. 2023). Consistent visitation patterns during the 2022 and 2023 timed entry pilot period provided business owners with more predictability, increased the chances of consistent business throughout the day, and allowed them to staff accordingly (Otak, Inc. 2023). Implementation of a reservation system under either alternatives B or C would result in similar benefits, with some differences between alternatives as discussed in the following sections. There would be no additional impacts on quality of life or socioeconomics during times of year when the system is not in place. If the reservation system were expanded to the shoulder or winter weekend season, impacts would be similar to what is described above. Therefore, there would likely be no additional impacts on economic health. For an analysis of impacts on visitor access to the park, see the "Visitor Access, Use and Experience" section.

The additional nominal fee associated with the reservation systems proposed under alternatives B and C is unlikely to affect equitable access for visitors when compared to the overall costs of traveling to and visiting national parks, including the park entrance fee. Due to the timing in which reservations are released and how quickly they can sell out, visitors may need to acquire their reservations during work hours. Depending on a visitor's occupation, this may pose added difficulties for some and may favor visitors who have more flexibility. Additionally, reservations would be made available online, meaning visitors would need internet access to obtain a reservation, although staff at the Moab Information Center could assist visitors in obtaining online reservations the day of their visit, if reservations are available. If the reservation system were expanded to the shoulder or winter weekend season, impacts on equitable

access could be similar to those described above for the majority of the year. These impacts would be mitigated by allowing visitors to access the park via private vehicle outside of reservation hours and months when the reservation system is in effect, and via foot or bicycle at any time to avoid the requirement to obtain a reservation.

Alternative B

As described in the "Affected Environment" section, under the timed entry pilots between 2022 and 2024, the economic health and quality of life in Grand County and San Juan County improved even with a 2022 decline in visitation compared to 2016–2019 average visitation, and these benefits are expected to continue under alternative B. The 2024 Arches National Park Economic Regional Data and Analysis report found that the timed entry pilots in 2022 did not disproportionately affect overall visitation at the park when compared with parks without reservation systems (Bioeconomics and RRC Associates 2024). It is clear, as shown in figure 3-8, that on a monthly basis, visitation changes (compared to the 2016–2019 period) are more pronounced in the summer when the reservation system is operating than in the shoulder seasons. In the 2022–2023 timed entry pilot period, there appears to be some shifting of use from the April–September reservation period to the October–March non-reservation period (figure 3-8). This shift to more visitors in the offseason provides business owners with increased chances for extending business operations beyond the summer season. While park visitors contribute substantially to the local economy, the decline in 2022 visits compared to the 2016–2019 average visitation level did not negatively impact the overall tourism economy Grand and San Juan Counties. In fact, economic activity (as measured by total overall tourism spending, jobs, and tourism-related taxable sales) in gateway communities increased relative to total visitation during the period of the pilots (see figures 3-5, 3-6, and 3-7). The proximity of other high-quality recreation sites and a growing and increasingly diverse economy likely help insulate overall local travel and tourism businesses from fluctuations in park visitation (Bioeconomics and RRC Associates 2024).



Source: Bioeconomics and RRC Associates 2024

FIGURE 3-8. ARCHES NATIONAL PARK RECREATIONAL VISITATION ACROSS MONTHS OF THE YEAR

A timed entry reservation system for the park would reduce vehicular and pedestrian congestion in gateway communities and improve the quality of life for gateway community residents. Furthermore, reduced traffic (compared to the 2016–2019 period) would allow residents to complete day-to-day errands in a timelier manner. This alternative would have similar nominal impacts on equitable access and visitation as described above under "Common to Action Alternatives B and C." Temporary entrance station closures and temporary area-specific closures are not expected to be needed during periods when the reservation system is in effect because the number of reservations made available would be managed to meet desired conditions, including parking capacity. Managing the availability of reservations to meet desired conditions would allow predictable access to the park for all visitors.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in "Trends and Planned Actions" section. Socioeconomic conditions can vary annually, but general trends have been improving in the gateway communities (e.g., increased visitor spending, jobs, and sales tax revenue). Actions under alternative B would result in beneficial cumulative impacts on the socioeconomics of both Grand County and San Juan County. This alternative, when combined with ongoing actions and actions common to alternatives B and C, would result in conditions that are similar to current conditions. As a result, overall cumulative impacts on socioeconomics would be beneficial under alternative B.

Conclusion. Alternative B would not negatively affect the overall economic health of gateway communities (compared to the 2016–2019 period) associated with consistent visitation patterns, which have been shown to provide business owners with more predictability, increase the chances of consistent business throughout the day, and allow them to staff accordingly. Additionally, quality of life for residents may be beneficially affected compared to the 2016–2019 period because visitor use would be dispersed throughout days, weeks, and months, thereby decreasing traffic congestion throughout the community. While the reservation fee would be implemented under this alternative, it is not expected to substantially change barriers to visitation. If the reservation system were expanded to the shoulder or winter weekend season, impacts would be similar. Overall, cumulative impacts on socioeconomics would be beneficial under alternative B compared to the no-action alternative.

Alternative C

Under alternative C, a daily reservation system would be implemented. The daily reservations would allow more opportunities for flexibility and spontaneity because visitors with reservations could arrive at any time between 6:00 a.m. and 6:00 p.m. A daily reservation system for the park would have nominal impacts on equitable access and visitation. Alternative C is intended to distribute visitor use temporally throughout the week or season and achieve desired conditions, while allowing visitors with reservations to enter at any time of the day. However, this could lead to larger pulses of visitors on a given day and time compared to the 2022 to 2024 timed entry pilot period, potentially leading to concentrated use and congestion in the surrounding gateway communities during certain times of the day, thus adversely impacting residential quality of life.

Cumulative Impacts. The impacts of past, present, and reasonably foreseeable future actions are described above in the "Trends and Planned Actions" section. As noted above, conditions in socioeconomics can vary annually, but general trends have been improving in the gateway communities. Actions under alternative C would result in a mixture of beneficial and adverse impacts on the socioeconomics of both Grand County, particularly residents and business owners in Moab, and San Juan County. This alternative, when combined with ongoing actions and actions common to alternatives B and C, would result in beneficial cumulative impacts on socioeconomic conditions. As a result, overall cumulative impacts on socioeconomics would be beneficial under alternative C.

Conclusion. The overall economic health and quality of life in gateway communities under alternative C would likely experience beneficial and adverse impacts associated with allowing visitors with

reservations to enter at any time of the day. Alternative C could result in larger pulses of visitors on a given day and time, and shift economic activity and congestion in the surrounding gateway communities during certain times of the day. While the reservation fee would be included in this alternative, it is not expected to substantially change barriers to visitation. If the reservation system were expanded to the shoulder or winter weekend season, impacts would be similar. Overall, when combined with ongoing actions and actions common to alternatives B and C, cumulative impacts on socioeconomics would be beneficial under alternative C compared to the no-action alternative, but not as beneficial when compared to alternative B.

Comparative Conclusion Across Alternatives

Socioeconomic conditions under the no-action alternative would most resemble conditions between 2016 and 2019, prior to implementation of the timed entry pilots. Unpredictable temporary entrance station and area-specific closures could occur more frequently compared to conditions between 2016 and 2019, commensurate with increases in visitation. Concentrated visitor use could lead to more traffic congestion and air pollution compared to the 2022 and 2023 timed entry pilot period, which would degrade the quality of life for residents who cannot access their property or place of employment or complete day-to-day errands in a timely manner. Although the reservation fee would be implemented under alternatives B and C and not under the no-action alternative, the nominal fee is not expected to substantially change barriers to visitation. Cumulative beneficial impacts on socioeconomics are expected; however, they would be reduced by adverse impacts caused under the no-action alternative.

Compared to the no-action alternative, the implementation of a reservation system from April through October under either alternatives B or C would not have noticeable negative impacts on the economies of gateway communities. As discussed previously, implementation of a reservation system would reduce traffic congestion in gateway communities and is not expected to negatively affect economic activity (as measured by total overall tourism spending, jobs, and tourism-related taxable sales). If the reservation system were expanded to the shoulder or winter weekend seasons, impacts on socioeconomic conditions could be similar to those described above for most of the year (Bioeconomics and RRC Associates 2024). Some barriers to equitable access and visitation would continue under alternatives B and C, but park managers would continue to mitigate these barriers through partnerships, technological improvements, and other means.

Alternative B would not result in negative impacts on socioeconomics compared to the no-action alternative because the proposed timed entry reservation system would maximize the number of visitors who can be accommodated and encourage an even distribution of visitors throughout the day and peak season. Alternative C would not result in negative socioeconomic impacts compared to the no-action alternative, but the daily reservation system would result in fewer reservations sold per day to account for visitors arriving at the same time within the daily window (e.g., noon–1:00 p.m.). Impacts on equitable access and visitation under alternative C would be similar to those under alternative B. Overall, the beneficial impacts of alternative C would not be as substantial as the beneficial impacts of alternative B.

CHAPTER 4: CONSULTATION AND COORDINATION

The NPS consulted with and received input from various agencies, traditionally associated Tribal Nations, organizations, and interested persons that was used in preparing the plan/EA. The process of consultation and coordination is an important part of the planning process. This chapter describes the engagement and consultation with federal and state agencies, Tribal Nations, and other stakeholders during this process.

CIVIC ENGAGEMENT

Prior to initiating the NEPA process, the NPS conducted a civic engagement period in fall 2021 and 2023 to gather feedback on the timed entry pilot programs and on long-term management strategies the park may consider to balance visitor access with resource protection and quality experiences.

A press release and open comment period was published on September 6, 2021, and was open through October 5, 2021. During this comment period, the NPS released information about visitation at the park and the need for strategies to manage traffic congestion and crowding at the park entrance as well as at popular hotspots within the park. A total of 283 pieces of correspondence were received during the comment period. Information was posted on the NPS's Planning, Environment, and Public Comment (PEPC) website, available at https://parkplanning.nps.gov/ARCHvisitoruse, as well as through a story board, available at https://arcg.is/18PLT8.

In 2023, the park issued a news release on October 24, 2023, with a link to the project website, which initiated a public comment period that ended on December 1, 2023. The project website provided a newsletter and a summary of key issues, the history of visitation and VUM in the park, and instructions for how to formally submit comments.

A total of 221 pieces of correspondence were received during the public comment period. The Comment Summary Report available on the NPS Planning, Environment, and Public Comment (PEPC) system (https://parkplanning.nps.gov/ARCHvisitoruse) summarizes the concerns expressed during the public comment period. The NPS considered all comments from members of the public in development of this plan/EA, including comments received directly by the park through US mail or email, and those entered in the PEPC system.

TRIBAL AND AGENCY CONSULTATION

The NPS consulted with and received comments from various agencies, traditionally associated Tribal Nations, organizations, and interested persons in preparing this document. Copies of correspondence between the NPS and other agencies, and responses from the agencies, if applicable, will be provided in the decision document. The following Tribal Nations, state and local agencies, and elected officials were consulted during this process.

Tribal Nations

- Hopi Tribe of Arizona
- Las Vegas Tribe of Paiute Indians of the Las Vegas Indian Colony, Nevada
- Moapa Band of Paiute Indians of the Moapa River Reservation, Nevada
- Navajo Nation, Arizona, New Mexico, and Utah
- Rosebud Sioux Tribe of the Rosebud Indian Reservation, South Dakota
- Southern Ute Indian Tribe of the Southern Ute Reservation, Colorado

- Ute Indian Tribe of the Uintah and Ouray Reservation, Utah
- Ute Mountain Tribe
- White Mesa Ute
- Zuni Tribe of the Zuni Reservation, New Mexico

State and Local Agencies

- City of Moab
- Grand County
- San Juan County
- Moab Chamber of Commerce
- Moab Travel Council
- Utah Department of Transportation
- Utah Office of Tourism
- Utah Division of Wildlife Resources
- Utah State Historic Preservation Office
- Utah Public Lands Policy Coordinating Office

Elected Officials

- US Senator Mike Lee
- US Senator Mitt Romney
- US Rep. John Curtis (Third Congressional District)
- Governor Spencer Cox
- Lieutenant Governor Deidre Henderson
- Attorney General Sean Reyes
- Mayor of Moab Joette Langianese
- Moab City Council Members: Tawny Knuteson-Boyd, Kaitlin Myers, Jason Taylor, Colin Topper, and Luke Wojciechowski
- Utah Rep. Phil Lyman (House District 69)
- Utah Senator David Hinkins (Senate District 3)
- Grand County Commissioners: Bill Winfield, Kevin Walker, Mike McCurdy, Evan Clapper, Jacques Hadler, Mary McGann, Trisha Hedin
- San Juan County Commissioners: Bruce Adams, Jamie Harvey, Silvia Stubbs

Section 106 of the National Historic Preservation Act

During public scoping, the NPS contacted the Utah State Historic Preservation Office and Tribal Historic Preservation Officers regarding the proposed action and the determination that, because this action would be administrative in nature, there is no potential to cause effects on cultural resources.

Section 7 of the Endangered Species Act

The Endangered Species Act mandates that all federal agencies consider the potential effects of their actions on species listed as threatened or endangered. If the NPS determines that a proposed action *may affect* or *is likely to adversely affect* any federally listed species, formal consultation with the US Fish and Wildlife Service is required. NPS *Management Policies 2006* states that the NPS will survey, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act, and proactively conserve listed species and prevent detrimental effects on these species (NPS 2006). Because the proposed action would be administrative in nature, there is no potential to cause effects to any federally listed species within the park.

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APPENDIX A: DESIRED CONDITIONS FOR ARCHES NATIONAL PARK

The General Management Plan / Development Concept Plan / Environmental Assessment (NPS 1989) for Arches National Park (the park) was approved by the Rocky Mountain regional director in August 1989. That plan required that a visitor use management plan be completed when visitation exceeded the projected visitation for the year 2005. The requirement was met by the Visitor Experience and Resource Protection (VERP) implementation plan completed in 1995 (NPS 1995). The VERP process started in 1992 and was developed with considerable public input. The VERP document is an approved implementation plan for the General Management Plan / Environmental Assessment.

As part of the VERP plan, the park developed visitor experience zones and desired conditions for those zones. To support multiple current and upcoming planning efforts, the park revisited and updated the original VERP language to better reflect current challenges and opportunities. This appendix includes updated descriptions of desired conditions for each of the park's visitor experience zones and an updated zoning map (figure A-1, provided at the end of this document).

Note that for all the zones, access for traditionally associated groups granted under the American Indian Religious Freedom Act is prioritized.

PEDESTRIAN ZONE

As shown on the proposed zoning map (figure A-1), the Pedestrian Zone includes the high use trail corridors that access prime park features, including views of iconic arches. The zone includes the developed trails in the Windows area, the trail from Devils Garden trailhead to Landscape Arch, the Pine Tree and Tunnel Arch spur trail, the trail to Delicate Arch and Delicate Arch viewpoint, the trail to Skyline Arch, and the trail to Sand Dune Arch and Broken Arch. For monitoring purposes, pedestrian trail corridors are defined as extending 8 feet on each side of the trail centerline. This width accommodates most of the inadvertent trailside impacts caused by trail maintenance and by visitors momentarily stepping off the trail to take photographs or to move out of the way of other users.

Visitors have the opportunity to experience connections to fundamental park resources through universally accessible, highly developed, maintained, and marked trails or trail segments within this zone. To experience this zone, visitors make a short to moderately short time commitment and physically exert themselves to some degree. Although conveniences may still be relatively far, visitors generally are not far from vehicles and basic facilities (e.g., restrooms, parking areas). Visitors should expect to regularly encounter other visitors; however, off-peak visitation provides opportunities for less crowding.

The areas in this zone are predominately natural, but evidence of people and human-created sights and sounds is common. At times, visitors have the opportunity to experience natural sights and sounds. Visitors can see, touch, smell, and hear park resources as they walk along a well-defined trail. Park staff are seen on trails, facilitating understanding and protection of park resources.

Visitors experience the beauty of the Colorado Plateau ecosystem and the deep cultural history of the zone through the presence of intact natural processes and limited modern human influence beyond the trail corridor. The park reflects a continuum of human interaction with the land, and visitors have an opportunity to experience and understand that relationship through the interpreted cultural sites of the Ute Panel and Wolfe Ranch Homestead at the trailhead to Delicate Arch. The Delicate Arch Trail takes visitors from the cultural history of the Ute Panel and Wolfe Ranch Homestead over slick rock interspersed with tenacious juniper and ephedra to one of the most iconic features in the national park system—Delicate Arch. Farther on, the final turn on the trail to Delicate Arch reveals for the first time the

iconic arch with the La Sal Mountains in the distance and offers people, as it has for millennia, a truly transcendent moment of awe and revelation.

Visitors should expect a relatively facilitated experience within this zone. Visitors may encounter park staff, park infrastructure, and management tools and techniques to ensure visitor access, visitor safety, and resource protection (e.g., fences, hard trail delineations). The landscape can be modified for essential visitor and park operational needs, but it is changed in a way that harmonizes with the natural environment and aligns with its value as a shared cultural heritage resource. No vehicles or stock are permitted in this zone.

HIKER ZONE

This zone is applied to trail corridors and areas of a somewhat more primitive nature than those in the Pedestrian Zone. With the exception of the Fiery Furnace (which is a subzone due to its special qualities), the Hiker Zone includes narrow, moderate to high use trail corridors. The Hiker Zone includes the trail to Tower Arch, the Broken Arch connector trail, the Park Avenue trail, the Windows primitive loop trail, the Devils Garden primitive loop trail, the Double O Arch and Dark Angel trails, and the Navajo and Partition Arch spur trails. The hiker trail corridor width extends up to 6 feet to take into account impacts caused by trail maintenance work and by occasional visitor movements off of the trails.

The Hiker Zone provides a sense of being immersed in a natural landscape and feels somewhat distant from most comforts and conveniences. Once on the trail, visitors experience the sights and sounds of Colorado Plateau ecosystems. From the blooms of the prickly pear cacti and the Harriman's yucca, to the feelings of reverence inspired by monumental stone arches that tower overhead, to the sparseness and beauty of the red slickrock, visitors are provided with opportunities to experience the diversity of the landscape along unpaved trails. Facilities beyond trail signs and occasional wayside exhibits are limited. Visitors have opportunities to experience challenge and adventure, facilitated by maintained trails that take them away from main road corridors and into the heart of many of the primary geologic, ecologic, and cultural features of the park.

Visitors must commit a block of time, have some outdoor skills, and engage in some physical exertion to experience this zone. Because this zone provides access to highly recognized and relatively accessible landscapes, arches, and viewsheds, visitors are likely to encounter other groups or visitors. However, visitors seeking opportunities for occasional solitude and moderate self-reliance are still afforded these experiences within this zone. Visitors may encounter park staff engaged in resource education and protection activities. Stone arches, windows, and spires sacred to Indigenous people cultivate a sense of reverence. Historic inscriptions of early European explorers foster a sense of discovery but require minimal wayfinding skills to safely reach.

This zone frequently provides visitors the opportunity to experience a land of stark beauty and contrast. The distant, storm-fed, snowy peaks of the La Sal Mountains juxtaposed with stunning views of red rock arches against often cloudless bluebird skies exemplify this contrast and some of the very elements that are fundamental to the park experience.

Visitors may encounter park infrastructure and management tools or techniques to ensure visitor access, visitor safety, and resource protection (e.g., fences, hard trail delineations). Resources may be modified for essential visitor and park operation needs, but they are changed in a way that harmonizes with the natural environment. No vehicles or stock are permitted in this zone.

DEVELOPED ZONE

The Developed Zone includes areas with visitor and administrative facilities, including the park visitor center, headquarters, and administrative areas; and the Devils Garden campground and picnic area. The

area contiguous to the campground that campers use for family recreation activities is also included in this zone.

This zone provides visitors with opportunities to access high quality information, orientation, and facilitated visitor experiences, such as 24-hour information kiosks, interpretive waysides and trails that focus on natural and cultural resource values and key park issues, and a high degree of interaction with knowledgeable park staff. This zone also provides a high level of accessible experiences including trails and developed facilities that provide opportunities for all visitors, focusing on universal design principles and accessible features on trails, waysides, and visitor facilities. Visitors have opportunities to learn about Arches National Park and the natural and cultural resources of the Colorado Plateau without venturing too far from facilities, services, and their vehicles. Visitor information will encourage a desire to learn and experience more.

Visitors encounter areas for social interaction, gatherings, and facilitated, visitor-centered experiences (e.g., flush toilets, picnic areas, covered gathering spaces, and experiences facilitated by park or partner staff). The likelihood of encountering other visitors and park staff in this zone is high. Intact natural resources (e.g., native plant communities and scenic vistas) and cultural resources (e.g., Old Spanish Historic Trail, Old Ute Trail and the Rock House, Custodian's Residence) provide a backdrop for visitor engagement and orientation. Due to the juxtaposition of critical park resources and high numbers of visitors in this zone, visitors may observe management actions such as fencing and well-defined, hardened trails and other surfaces used to mitigate vegetation and soil trampling and vector-based introduction of invasive species.

MOTORIZED SIGHTSEEING ZONE

The Motorized Sightseeing Zone is a substantially developed area that includes the paved roads, pullouts, overlooks, associated short trails and small picnic areas, parking areas, and other facilities that support visitor touring. This zone is a fairly narrow corridor and similar to the Developed Zone.

In this zone, visitors of all abilities have opportunities to experience sweeping vistas of the La Sal Mountains, iconic red rock skylines, cultural landscapes, and plant and animal communities native to the Colorado Plateau. Visitors drive well-maintained roads and find signs and exhibits that provide orientation and information as well as opportunities to learn about and connect to the park's resources through interpretive media. Scenic overlooks, pullouts, and short walks introduce visitors to the desert landscape, its habitats, geology, and cultures, without venturing too far from a vehicle or bicycle. Individual visits within this zone may be short, but they collectively promote an understanding of critical park resources and a connection to the remote wildness of zones beyond the roadside. Visitors gaze at dark night skies from pullouts, overlooks, and short trails within this zone.

This zone provides experiences for park visitors that are universally accessible, focusing on accessible facilities, short trails, wayside exhibits, and visitor information that exhibit best practices in accessibility and universal design. Opportunities to connect with, learn about, or understand the fundamental resources and values of the park are important because for some visitors, their entire visit is spent within this zone.

The likelihood of encountering other visitors and park staff in this zone is high. Intact natural and cultural resources provide a backdrop for visitor engagement and orientation. Visitors will see management actions intended to mitigate the impacts from visitors (e.g., vegetation and soil trampling, graffiti, and vector-based introduction of invasive species).

Visitors are able to enjoy a road-based park experience that embodies the look and feel of a national park including the visual quality of the roadway, pullouts, and scenic overlooks. The road itself fosters a connection to the deep cultural history of the park and is a contributing element to the cultural landscape. Traffic is predominantly free flowing with occasional congestion at acceptable levels that usually abate on their own and do not compromise safety or emergency response. Visitors in private vehicles find parking

spaces at destinations most of the time with minimal to moderate delays. Pullouts within this zone offer visitors an opportunity to easily connect with resources, engage with interpretive material (e.g., waysides), enjoy vast vistas of other zones, and spend time with friends and family.

BACKCOUNTRY ZONE

The Backcountry Zone encompasses lightly used areas of the park where visitors hike cross-country, along washes, or on primitive trails or marked routes. Low levels of use in the Backcountry Zone are desirable to protect views seen from adjacent zones (such as the views from the main park road, Salt Valley Road, and scenic overlooks), pristine resource areas (such as Herdina Park, Eagle Park, and the Petrified Dunes area), and areas of the park that are difficult to access. Key areas in this zone include Courthouse and Salt washes. This is the largest zone in the park.

Like the Hiker Zone, the Backcountry Zone provides a sense of being immersed in a natural landscape but feels farther away from comforts and conveniences than the Pedestrian and Hiker zones. Visitors in the Backcountry Zone have the opportunity to experience challenge, independent adventure, self-reliance, and a closeness and connection to the natural environment. Experiences in this zone require a high level of physical exertion and time commitment. Visitors who commit the time to visit this zone can experience a closeness to nature, tranquility, and natural sights and sounds. Primitive facilities, characterized by limited cairned routes and primitive trails, emphasize a sense of self-reliance. Visitors engage in exploration through untrailed canyons and over slick rock and experience a landscape with minimal impacts or evidence of other visitors. The natural and cultural landscapes of the zone captivate visitors, provide opportunities to learn about the history of human use of park lands, and foster understanding of human-kind's inextricable relationship with their landscapes. The probability of encountering other visitors and NPS staff is low, and a sense of remoteness is key to the experience.

This zone provides visitors with immersive experiences at iconic locations featuring textbook examples of the geologic processes that are fundamental to the park. Visitors experience the interconnectedness of natural and cultural systems such as perennial water sources that support a diversity of plant and animal life and past human lifeways.

To experience natural soundscapes and dark night skies, as well as to facilitate a sense of remoteness and independence, visitors have opportunities for backcountry camping in this zone by permit and at designated backcountry sites.

Visitors may encounter some evidence of management actions (e.g., trail edges delineated with rocks, permitted or limited use in some locations, and efforts to ensure understanding of the environmental sensitivity and critical resources of the zone) addressing visitor impacts such as vegetation and soil trampling, proliferation of social trails, graffiti, and vector-based introduction of invasive species. Few resource modifications may be evident, but they harmonize with the natural environment. Vehicular use is not permitted, but stock use may be permitted in certain environments. To preserve the off-trail environment and protect sensitive resources, stock use (except in the wash bottoms of Seven Mile Canyon, Courthouse Wash, and Salt Wash above the Delicate Arch Road) and maintained trails are not present within this zone.

Management for resource protection and safety within the Backcountry Zone is limited; the area is managed in such a way that on-site controls and restrictions are minimized and those that are present are subtle. However, to preserve the ability of visitors to experience a sense of solitude and remoteness, and to ensure the visibility and impacts from visitors remains low in this zone, regular on-site monitoring of visitor behavior and offsite management of visitors may be intensive (e.g., permit systems for research and/or recreation, incorporation of commercial uses and concessions for guided experiences, and reservation requirements).

SEMI-PRIMITIVE MOTORIZED ZONE

This Semi-Primitive Motorized Zone includes the maintained, unpaved, two-wheel-drive Salt Valley Road and the short spur to the Tower Arch trailhead. Like the other motorized zones, the Semi-Primitive Motorized Zone encompasses the roads and the narrow areas alongside the roads.

Along with the Primitive Motorized Zone, the Semi-Primitive Motorized Zone adds to the diversity of visitor experiences in the park. Visitors have the opportunity to experience primarily two-wheel-drive, unpaved routes that offer less interaction with other visitors and park staff than the main park road with expansive views over desert grasslands with red rock outcrops and the distant peaks of the La Sal Mountain Range. Although opportunities exist for nonmotorized recreation (e.g., bike touring), the roads primarily provide a motorized recreation experience that give visitors a sense of remoteness.

Although the areas are predominately natural, there is evidence of the sights and sounds of people. Visitors are largely self-sufficient, experiencing few support facilities such as vault toilets and primitive pullouts. Visitors usually do not need to physically exert themselves, use outdoor skills, or make a large time commitment to use this zone, although that depends on the method of travel and length of stay within the zone. Visitors may encounter park infrastructure and management tools to provide for resource protection and visitor safety (e.g., signs, barriers, and temporal restrictions). Resource modifications are evident, but they harmonize with the natural environment.

Within this zone, visitors experience a defined roadway with road prism widths not exceeding the guidance in the Programmatic Categorical Exclusion for Routine Maintenance and Repair of Non-paved Roads. To maintain a sense of remoteness, preserve the cultural values of the road prism, and preserve the natural environment outside the road, additional pullouts and infrastructure require careful consideration.

PRIMITIVE MOTORIZED ZONE

The Primitive Motorized Zone encompasses the four-wheel-drive roads in the park, including the West Valley Jeep, Willow Springs, and Cache Valley Roads, and two other short spurs along the west boundary. Like the other motorized zones, the Primitive Motorized Zone encompasses the roads and narrow areas that parallel the roads.

Along with the Semi-Primitive Motorized Zone, the Primitive Motorized Zone adds to the diversity of visitor experiences in the park. Visitors have the opportunity to experience relatively primitive, unpaved, four-wheel-drive roads that provide a sense of being in wildlands. The lack of facilities in this zone and the primitive nature of the roadways provide challenge for visitors and promote a sense of adventure, offering the opportunity for visitors to venture away from paved roads and other conveniences found along the main travel corridors in the park. Visitors with the driving, cycling, or hiking skills to navigate these roads, including navigating on slick rock and other technical sections of the road, experience wide open vistas characteristic of the Colorado Plateau ecosystem, including rock outcrops, distant mountain peaks, and arid shrublands. Although visitors in vehicles usually do not need to physically exert themselves, they may need to use outdoor skills and make a relatively large commitment of time to engage with resources in this zone. This zone also provides access to remote backcountry locations, furthering the opportunities for challenge and adventure.

The four-wheel-drive roads offer visitors the experience of encountering relatively low numbers of other visitors compared to traveling on the main park road while still having access to intact natural and cultural resources. Some resource modifications may be evident, but they harmonize with the natural environment.

Within this zone, visitors experience a defined roadway with road prism widths not exceeding the guidance in the Programmatic Categorical Exclusion for Routine Maintenance and Repair of Non-paved

Roads. To maintain a sense of remoteness, preserve the cultural values of the road prism, and preserve the natural environment outside the road, maintenance is limited. However, visitors may encounter minimal management actions for resource protection and visitor safety (e.g., berms, rocks, vegetation) and to provide for the enjoyment of high quality viewsheds along the roadway.

SENSITIVE RESOURCE PROTECTION ZONE

The Sensitive Resource Projection Zone encompasses critical viewsheds or sensitive resource areas where the NPS's tolerance for additional resource degradation due to public use is low. As shown on figure A-1, this zone includes areas surrounding Dark Angel, Double O Arch, Landscape Arch, Skyline Arch to Sand Dune Arch, Fiery Furnace, Balanced Rock, Mouth of Courthouse Wash/Moab Panel, Ute Panel, and Windows to Garden of Eden. Many of these areas have been severely impacted by past use and intensive restoration activities or area restrictions may be required.

The Sensitive Resource Protection Zone provides visitors the opportunity to experience protected viewsheds and minimal modern human influences within critical viewsheds and sensitive areas. Visitors primarily experience this zone from the periphery or as viewed from other zones, allowing visitors to experience fins and towers of red rock and arches interspersed with pinyon, Utah Juniper, and blackbrush shrublands and sweeping views of distant mesas and plateaus and the La Sal mountains. Access for research, restoration, and use by traditionally associated groups, and access granted under the American Indian Religious Freedom Act are prioritized. The management focus in this zone is to protect, and in some cases restore, the geologic and cultural resources as well as the ecosystem functions and most impacted sensitive resources in these areas. Visitors experience and encounter management actions that prioritize these goals (e.g., fences, visitor education efforts, permit systems, and restricted access areas) and they experience protected viewsheds and minimal modern human influences.

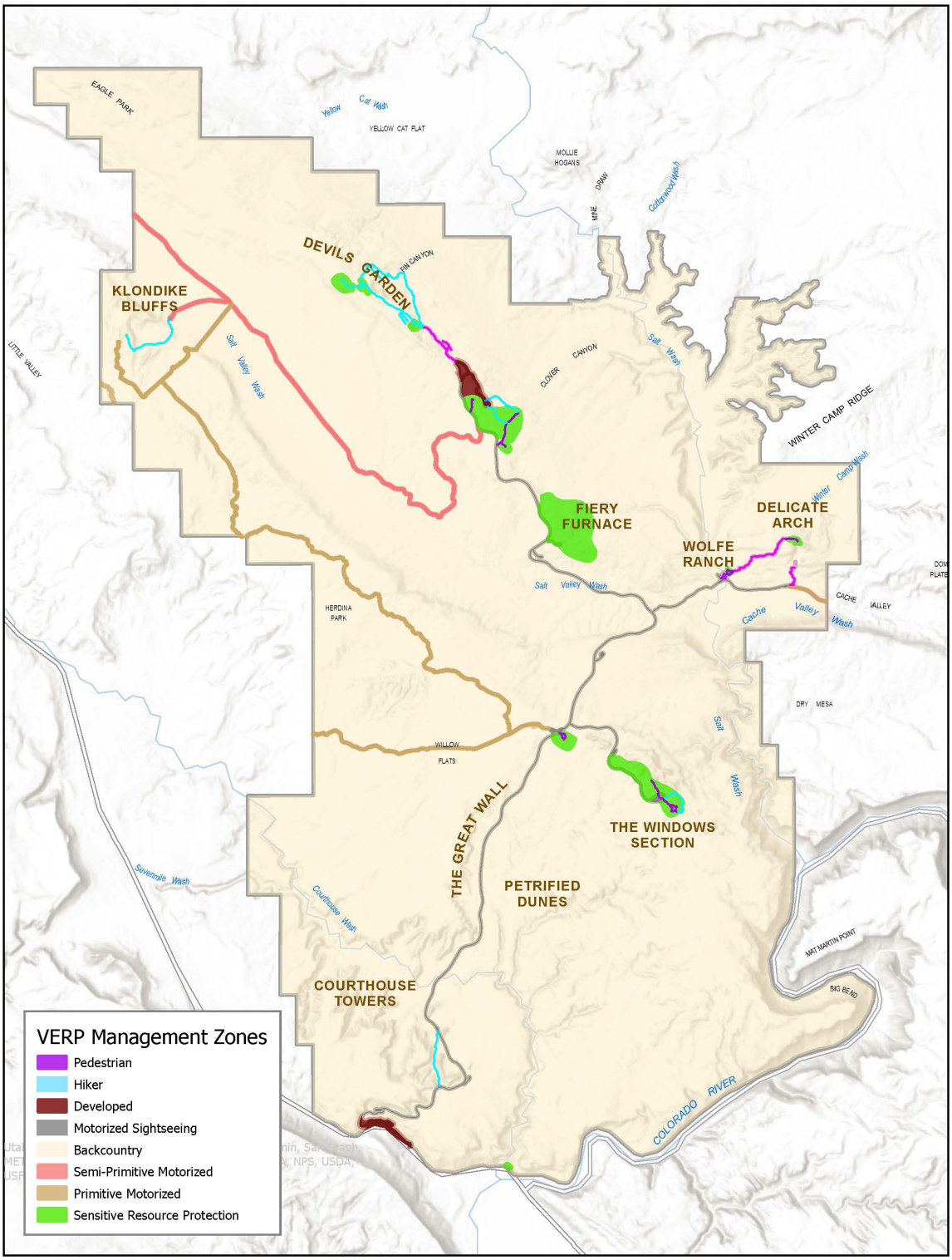

FIGURE A-1. PROPOSED ZONING UPDATES

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APPENDIX B: INDICATORS AND THRESHOLDS

INTRODUCTION

Establishing indicators and thresholds are key components of the Visitor Use Management Framework (IVUMC 2016) applied by the National Park Service (NPS). Indicators operationalize aspects of desired conditions by measuring conditions that are related to visitor use and experience, and monitoring conditions over time. Condition quality is evaluated using thresholds, which are the minimally acceptable conditions for each indicator. Conditions beyond these thresholds are considered unacceptable impacts and must be addressed (NPS *Management Policies 2006* 8.2.1, 1.4.7). Monitoring results ensure that strategies and actions implemented within this planning effort achieve and maintain desired conditions. This may include the implementation of actions that manage to an identified visitor capacity. Visitor capacity is identified as the maximum amount and type of use that can be accommodated while maintaining desired conditions, including the likelihood of maintaining acceptable conditions. See "Appendix C: Visitor Capacity," for information on visitor capacity related to the visitor use management framework for the Arches National Park Visitor Access and Experience Plan (the plan).

Potential management strategies are described for each of the following indicators and would be applied in conjunction with the actions presented in the plan. This iterative practice of monitoring, implementing adaptive strategies, and then continuing to monitor to gauge effectiveness of management actions allows park managers to maximize benefits for visitors while achieving and maintaining desired conditions for resources and visitor experiences in a dynamic setting.

This appendix presents indicators that will be monitored over time at Arches National Park (the park). It also identifies associated thresholds for those indicators and potential adaptive management strategies that could be used when thresholds are reached.

Indicators

Indicators translate desired conditions into measurable attributes (e.g., people at one time at key locations, number of visitor-created trails) that can be tracked over time to monitor change in those conditions. The planning team considered many potential issues and related indicators that would operationalize desired conditions, but those adopted below are considered the most meaningful, given the importance and vulnerability of the resource and/or visitor experience affected by visitor use.

Thresholds

Thresholds that represent the minimum acceptable condition for each indicator were established, taking into consideration the qualitative descriptions of the desired conditions, data on existing conditions, relevant research studies, and staff management experience. Although defined as "minimally acceptable," thresholds still represent acceptable conditions. Establishing thresholds does not imply that no action would be taken prior to reaching the threshold. For some indicators, triggers have been developed. A trigger reflects a condition of concern for an indicator that is enough to prompt a management response to ensure that desired conditions continue to be maintained before the threshold is crossed (figure B-1).

Management Strategies

Strategies to manage within identified thresholds are included in chapter 2. If it is determined through monitoring that thresholds are being approached or exceeded, the NPS would use one or more of the management strategies listed in the "Strategies Common to Action Alternatives B and C" section of chapter 2. Some management strategies vary across alternatives described in this environmental assessment and would be implemented on completion of the plan to ensure thresholds are maintained and

desired conditions are achieved. The direct implications of indicators, thresholds, and potential management strategies are considered as part of the actions common to alternatives B and C (and described in chapter 2) and, therefore, are analyzed as part of the alternatives in chapter 3. If additional strategies are needed to manage within thresholds beyond those listed in chapter 2, details of their application would be developed, and environmental analysis completed, as appropriate, when the need, location, and scope of that action are identified.

Other Considerations

Because the transportation infrastructure and associated systems serve as the primary mechanism for trail access in many locations, it is important to ensure that the transportation system does not deliver more people to a trail than the trail can accommodate, given its desired conditions and related thresholds. Exploring active and passive management strategies to disperse visitors to different locations served by the transportation systems as thresholds are approached is a part of the iterative process of visitor use management.

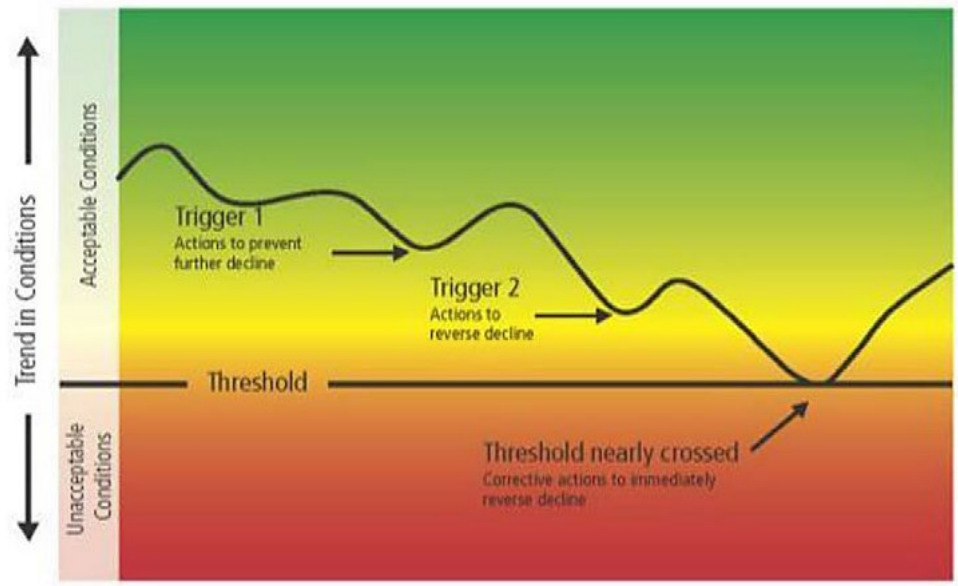

FIGURE B-1. MANAGEMENT TRIGGERS AND THRESHOLDS IN RELATION TO TREND IN CONDITIONS

Future Updates

This analysis uses the best available information to make decisions for current management of visitor use. Should there be meaningful changes, such as those outlined below, the park may reevaluate and update the following thresholds. The following criteria may warrant reevaluating thresholds or updating strategies to manage within thresholds:

- evidence that thresholds are being approached is present;
- evidence that park conditions are trending away from desired conditions is present;
- the park has meaningful new knowledge or understanding of the relationship between visitor use and impacts on resources or visitor experiences; and
- changes to the desired conditions have occurred.

INDICATOR: FREQUENCY OF INSTANCES OF PARKING OUTSIDE ESTABLISHED OR SIGNED PARKING AREAS IN A GIVEN LOT PER MONTH

Thresholds and Triggers

- Four instances of parking outside established or signed parking areas in a given lot per month during the high-use season, (e.g., March–October). Indicator includes, but is not limited to, the following lots:
    - Delicate Arch parking lot
    - Windows area parking lot
    - Devils Garden area parking lot
    - Sand Dune Arch area parking lot
- During managed access hours:
    - Trigger 1: Three instances of parking outside established or signed parking areas per month during the high-use season
- Outside managed access hours:
    - Trigger 1: One parking lot closure per day during the high-use season
    - Trigger 2: Two parking lot closures per day during the high-use season

Rationale

This indicator is related to both natural resource conditions and visitor experience. It measures the need for parking in excess of available designated parking by tracking the number of individual vehicles parking outside established or signed parking areas (on the side of the road, outside the bounds of a designated parking lot or road pullout). Parking outside established or signed parking areas damages vegetation, contributes to an increase in bare soil (individual vehicles parking on unpaved areas not intended for parking degrade biocrust soil), and increases fire hazards from hot vehicles parking on dry vegetation. Additionally, parking outside established or signed parking areas decreases the roadway level of surface grade by creating hazards such as reduced road lane width, an increased number of pedestrians in the roadway, and at times, pavement damage at the road's edge. Parking outside established or signed parking areas also is related to a decreased quality of visitor experience because it detracts from scenic views along the roadway, creates difficult visitor mobility and circulation (see safety rationale above), and indicates a higher risk of surpassing other indicator thresholds (such as people per viewscape [PPV]). By monitoring where and when parking outside established or signed parking areas occurs, the NPS can make informed management decisions related to the timing and level of visitor use that occurs in an area.

INDICATOR: PEOPLE PER VIEWSCAPE AT KEY DESTINATIONS OR ALONG HIGH-DENSITY TRAIL CORRIDORS

Thresholds

- High-density trail corridors:
    - Devils Garden: No more than 18 PPV more than 10% of the time
- Viewsheds:
    - Windows: No more than 30 PPV more than 10% of the time
    - Delicate Arch: No more than 70 PPV more than 10% of the time
    - Sand Dune Arch: No more than 15 PPV more than 10% of the time
    - Broken Arch: No more than 11 PPV more than 10% of the time

Rationale

PPV is a measure often used by park managers and researchers to accurately and efficiently quantify visitor crowding (Lawson et al. 2011; Lawson et al. 2009; Manning et al. 2011; Lawson, Newman, and Monz, 2016). Crowded conditions have been documented to adversely affect the quality of visitor experience in national parks (c.f., Whittaker and Shelby 2012). Research suggests that visitors can identify site-specific standards for crowding (Manning et al. 2011). These visitor-based standards can be used to guide the development of social indicators and thresholds for crowding. PPV is also used by park managers and researchers to quantify visitor crowding impacts and density of visitor use along higher-use hiking trails, walking paths, and other scenic nonmotorized transportation corridors in national parks (Lawson et al. 2009; Lawson et al. 2011; Lawson, Newman, and Monz 2016).

This indicator allows NPS staff to evaluate the number of people visible at one time in a landscape and compare those numbers to desired conditions for the area. An understanding of the number of people in one area can contribute to an evaluation of risk to visitor safety and experience quality at any one time, allowing managers to better make safety-related decisions. Furthermore, monitoring PPV informs park managers about visitors' trail experiences and related crowding levels. This indicator provides details on how heavily trails are being used and how use levels may affect trail destinations, which can drive larger management decisions and strategies regarding visitor experiences. PPV is also used by park managers and researchers to quantify visitor crowding impacts to natural resources (such as bare soil from trail widening as visitors leave the trail to pass other parties), along higher-use hiking trails, walking paths, and other scenic nonmotorized transportation corridors in national parks. By monitoring and protecting visitor safety and experience at key destinations, the effectiveness of management strategies that influence specific destinations can be assessed and adjusted as needed to allow visitor certainty regarding ability and timing to enter the park. Additionally, monitoring the densities of visitors at key destinations, park managers can gain insights into the trail conditions that lead to these destinations. Therefore, by ensuring that desired conditions are met at destinations (by managing within thresholds), park managers can reasonably assume that desired conditions are being met along the trail segments that lead up to these sites.

This indicator is an important factor in the visitor experience at high-use areas in the park. It can be easily and accurately monitored and has potential to overlap with other indicator topics (i.e., soil loss, parking accumulation). Many of the park's social indicator standards were based on more than 1,500 visitor

responses to surveys conducted between July and October 1993 (Lime et al. 1994).[1] Due to the differing relationships between the number of visitors entering a trail and the number of visitors at a trail's destination, this indicator and its thresholds are not uniform across the different areas of the park.

The above locations were selected as sites to monitor this indicator after rigorous discussion with park staff and analysis of studies and professional experience in the park. The specific rationale for each location is detailed below:

- Devils Garden: Although there is no single iconic view or single viewing area where visitors congregate, park staff agree that the trail is the main experience itself. It is more useful for park staff to monitor visual and physical crowding along trail sections to maintain quality visitor experiences.
- Sand Dune Arch and Broken Arch: These areas are useful to monitor because of their high use levels among individuals, families, and other groups, all with varying skill levels. These short, connected trails lead to popular destinations below arches that sometimes become crowded and can be a negative visitor experience for some. Monitoring along the trail and at the viewscapes below the arches gives park staff a better understanding about how trail crowding and crowding at the trail destination relate. Historical data on this area are not available; thus park staff would spend the first year collecting data to confirm or update these thresholds based on desired conditions.
- The Windows and Delicate Arch: As some of the most popular destinations in the park, it is critical to ensure the park maintains quality visitor experiences in these locations. These locations are below and surrounding primary park features.

INDICATOR: SOIL LOSS

- Percent increase of rills and gullies in comparison to reference areas
- Percent increase in number of pedestals at plant bases in comparison to reference areas
- Percent change in area of bare ground from baseline conditions of reference areas established in summer 2022

Thresholds and Triggers

The thresholds below are separated into tiers to dedicate monitoring resources in a prioritized manner. Tier 1 thresholds are monitored annually, while Tier 2 threshold monitoring is triggered when Tier 1 thresholds are exceeded.

[1] During the development of this plan, the NPS evaluated if this study should be repeated to update the visitor perceptions information. As a part of that evaluation, the NPS staff considered other public sentiment information (such as public comments) as well as the management goals for these areas (desired conditions). The range of conditions discussed in the 1993 study (from preferable densities to densities at which visitors would self-displace) were consistent with the ranges in the desired conditions. Additionally, there were concerns that a new study would be less representative of the visiting public given that some visitors have already "self-displaced" from these locations. Therefore, a new study would likely skew toward a more "crowd-tolerant" demographic.

- Tier 1 Bare Ground:
    - Trigger 1: No more that 5% increase in bare ground within a pixel (via remote sensing) in targeted monitoring area
    - Related Action: Triggers Tier 2 monitoring; Threshold: 15% more bare ground than reference area (via remote and on-site monitoring)
- Tier 2:
    - Trigger: Tier 1 indicators exceed threshold
        - Rills and Gullies:
            - Trigger 1: 5% more rills and/or gullies than reference area (via on-site monitoring)
            - Threshold: 15% more rills and/or greater than 2% increase gullies than reference area (via on-site monitoring)
        - Pedestals:
            - Trigger 1: No more than 5% more pedestals than reference area (via on-site monitoring)
            - Threshold: No more 15% more pedestals than reference area (via on-site monitoring)

Rationale

Biocrust and vegetation cover are indicative of ecological health at the park and are critical to the visitor experience, cultural landscape values, and natural resource health. Bare ground is defined as exposed mineral soil not covered by vegetation, gravel/rocks, visible biological soil crusts, or plant litter (Pellant et al. 2020). Percent cover of bare ground is used to determine the condition of a degraded area primarily due to increased off-trail visitor presence. Long-term vegetation monitoring plots can provide data on bare ground cover for desired conditions. These monitoring plots are compared to reference area plots that are representative of desired conditions for these resources. A variance between monitoring plots and reference plots indicates a departure from desired conditions that will be evaluated as noted in the triggers and thresholds identified above.

Vegetation and ground cover at all sites identified for monitoring (reference areas) are currently meeting desired conditions and their qualitative descriptions. These conditions, identified in summer 2022, are ideal for determining whether the park is departing from desired conditions related to vegetation and bare ground cover. Next steps include ensuring these desired conditions are quantified so that proper monitoring may continue. Rills, linear erosional features a few centimeters deep, and gullies, well-defined channels that can cut meters into the soil, are used to indicate hydrologic function and soil loss. Information about rills and gullies for desired conditions can be gleaned from Ecological Site Descriptions (edit.jornada.nmsu.edu), but specific data for the park need to be collected.

Pedestaling around plant bases or rocks gives the appearance of the feature being elevated above the ground but indicates accelerated erosion from wind or water. The amount and degree of pedestals provide information on the overall soil stability, hydrologic function of an area, and risk of vegetation loss. Information about pedestals for desired conditions can be gleaned from Ecological Site Descriptions (edit.jornada.nmsu.edu), but specific data for the park needs to be collected. Together, all three soil-related indicators help provide a holistic measure of erosion and soil health. These indicators will help NPS staff prioritize restoration efforts and prompt adaptive actions related to reducing off-trail use and parking outside endorsed parking areas. Monitoring bare ground helps determine whether natural resources are impacted by current patterns of visitor use and parking and will help track the effectiveness

of any management strategies aimed at reducing parking outside established or signed parking areas and off-trail use.

The specific percentages in the thresholds are based on standard statistical departures from normal distribution of variation in the system. Based on a normal statistical distribution, 15% is approximately one standard deviation from the average base condition, and approximately an additional 5% is two standard deviations away from the average base condition. Therefore, the trigger is set at 15% above average (one standard deviation), and the threshold is set at an additional 5% percent above average (two standard deviations).

VEHICLE USE LEVELS AT KEY INDICATOR LOTS

The key locations that may be monitored for this indicator include, but are not limited to the Windows, Wolfe Ranch, Sand Dune Arch, and Devils Garden. Locations may vary based on the selected alternative.

Thresholds

- Days during the reservation season: Vehicles per day do not exceed the design capacity of the lot more than 20% of the time
- Days outside the reservation season: Vehicles per day do not exceed the design capacity of the lot more than three days per week for three consecutive years

Triggers

For this indicator the NPS has identified triggers (e.g. conditions of concern) that quantify a departure from desired conditions and that thresholds are being approached. These triggers prompt a management response as described in reservation systems common to all actional alternatives in chapter 2.

- Trigger 1: Days during the reservation season: Vehicles per day do not exceed the design capacity of the lot more than 15% of the time.
    - Management response: Expand days of the year or times of day when reservations are required for entry.
- Trigger 2: Days outside the reservation season: Vehicles at one time exceed the design capacity of the parking lots or authorized roadside parking areas more than two days per week for three consecutive weeks
    - Management response: Expand days of the year or times of day when reservations are required for entry. Increase monitoring for trails and parking areas to ensure that desired conditions are being met in those areas.
- Trigger 3: Days outside the reservation season: Vehicles at one time exceed the design capacity of the parking lots or authorized roadside parking areas more than two days per week for two consecutive years.
    - Management response: Expand days of the year or times of day when reservations are required for entry.

Rationale

Crowding, conflicts, and congestion at key destinations lead to natural resource damage, diminished visitor experience, limited access and egress for emergency vehicles, and impacts on routine facility maintenance. During peak times, vehicle levels in these areas exceed parking capacity. Prior to the pilot timed entry reservation systems, staff closed the main entrance station or specific areas to visitor traffic until sufficient parking became available. This management strategy (temporarily restricting vehicle

access) was sometimes needed outside the times that the reservation system was in effect, such as on weekends and holidays, to manage the area consistent with desired conditions and within identified visitor capacities. To better understand visitor use levels and the delivery of visitors to associated trails in some areas, park staff monitored vehicle use at key destinations for many years. This indicator is included to help monitor if vehicle volumes, outside the reservation system days or hours, are consistent with management goals. The action alternatives take a proactive and conservative approach to managing access to the most popular areas of the park. Per the action alternatives, reservations would only be required during the highest-use time of day and days of the year for areas of the park (as described in the alternatives). Should monitoring of the parking areas during times when reservation systems are not in place reveal that the desired conditions for roadway flows (ability for visitors and staff to safely enter and egress) and visitor experiences of these areas are not being met, park staff would expand times of day or days of the year when reservations are needed to maintain desired conditions. In the event of fire, global pandemics, or other anomalies outside normal operations, park managers may take other actions, but allowing triggers to include multiple years allows smaller single-year events to be factored out.

These triggers reflect conditions of concern for this indicator that are enough to prompt a management response to continue to maintain desired conditions before the threshold is crossed. These triggers set up a series of management progressions that aid park managers in identifying changing conditions and prompting when action should be taken to address trends that are departing from desired conditions and approaching thresholds. These management responses are further described in chapter 2, in the "Strategies Common to Action Alternatives B and C" section.

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APPENDIX C: VISITOR CAPACITY

OVERVIEW

This section provides additional information about the visitor capacity identification as it relates to the visitor use management framework for the Arches National Park Visitor Use, Access and Experience Plan (the plan). For a full description of the Interagency Visitor Use Management Council (IVUMC) Framework and additional resources, please visit https://visitorusemanagement.nps.gov.

The IVUMC defines visitor capacity as the maximum amounts and types of visitor use that an area can accommodate while achieving and maintaining the desired resource conditions and visitor experiences that are consistent with the purposes for which the area was established (IVUMC 2016). By managing amounts and types of use, the National Park Service (NPS) can help ensure that resources are protected and that visitors have the opportunity for a range of high-quality experiences. Visitor capacities would be used to inform and implement the management strategies selected as part of this plan.

Identifying visitor capacity is directed by legal mandates that require the NPS to identify visitor capacities and implementation commitments for all areas of a park unit per the National Parks and Recreation Act of 1978. The analysis for this plan focuses on specific areas described below that are relevant to the scope of the plan. Other areas of the park (trails, summits, and other destinations) are subject to this legal requirement to define visitor capacity; however, decisions about the management of these areas are outside the scope of this plan. Therefore, consistent with NPS policies for portfolio planning (Director's Order 2), these capacities would be addressed, as appropriate, through other planning.

The approach for identifying visitor capacities is based on the IVUMC's Visitor Use Management Framework and Visitor Capacity Guidebook (IVUMC 2016), as well as other IVUMC supporting guidance.

The process for identifying visitor capacity follows four guidelines: (1) determine the analysis area, (2) review existing direction and knowledge, (3) identify the limiting attribute, and (4) identify visitor capacity and implementation strategies. This appendix outlines the considerations and processes used to identify visitor capacity for key destinations.

This analysis uses the best available information to make the decision for current management of visitor use. Should there be meaningful changes, such as those outlined below, the park may reevaluate and update the visitor capacity. The factors that may warrant a reevaluation of capacity or updating strategies to manage to capacity are as follows:

- evidence that thresholds are being approached is present;
- evidence that park conditions are trending away from desired conditions is present;
- the park has meaningful new knowledge or understanding of the relationship between visitor use and impacts on resources or visitor experiences; and
- changes to the desired conditions have occurred.

Visitor Capacity Analysis Areas

Analysis areas are destinations where visitor use is concentrated and impacts on resources or visitor experiences are likely. Several studies have demonstrated that use of an area will impact many of the values for which the area was established. For these locations, a detailed analysis was conducted to identify the appropriate level of use. Current use levels are informed by relevant studies and data, and the actions contained in this plan were considered as part of the visitor capacity identifications.

The sites listed below where the majority of use in the park occurs (i.e., trailheads, viewpoints, areas within a short distance from parking areas) were selected to have defined visitor capacities. Where applicable, specific management strategies outlined in this plan that will be used to implement visitor capacities are included. Indicators (see "Appendix B, Indicators and Thresholds") will be monitored to ensure desired conditions and visitor capacities are met as described, and if associated thresholds are exceeded, adaptive management strategies will be implemented to ensure that desired conditions are maintained. The following analysis areas in the park that have an identified capacity through this planning effort:

- The Windows
- Delicate Arch
- Devils Garden
- Sand Dune and Broken Arch
- Salt Valley Road
- Willow Springs Road

Following guidance from the IVUMC, the level of analysis that occurs during visitor use management planning and visitor capacity identification is determined on a sliding scale, depending on the complexity and context of the plan. The sliding scale of analysis is used to ensure that the investment of time, money, and other resources for identifying visitor capacity is commensurate with the complexity of the project and the consequences of the decision. The sliding scale focuses on four criteria: issue uncertainty, impact risk, stakeholder involvement, and level of controversy/potential for litigation (IVUMC 2016). Future monitoring of use levels and indicators will inform the NPS if use levels are nearing visitor capacities. If so, adaptive management strategies, as outlined in this plan, will be taken.

Methodological Considerations

Park managers must understand multiple inputs and use sound professional judgment to identify visitor capacities (IVUMC 2019; Whittaker et al. 2011). Resource inputs include sensitivity of the surrounding natural and cultural resources such as rare plants, cultural sites, and wildlife. Social inputs include crowding, safety, soundscape, conflict between visitor uses, wildlife-human conflict, trail conditions, and quality of view (IVUMC 2019). Monitoring visitor use to understand if existing use levels and visitation patterns are achieving desired conditions for resource protection and visitor experience is an important component of identifying visitor capacity. This is often true in Arches National Park, where the sensitivity of natural and cultural resources and recommended wilderness prevent parking lot expansion in some areas. When appropriate, alternative transportation is also considered. Arches National Park has visitor use data, social science, and ongoing resource monitoring to inform decision-making for this plan.

Park staff collect visitor use data, including traffic counts, trail counts, and campground visitation yearly. Resource conditions are also monitored. Since the early 1990s, a series of visitor studies have focused on crowding-related aspects of the visitor experience (cf. Lime et al. 1994; RSG 2020). Although some of this research was completed prior to the higher visitation numbers seen today, they provide an important baseline for decision-making. Research suggests that visitors can identify site-specific standards for crowding (Manning et al. 2011). These visitor-based standards can be used to guide the development of social indicators and thresholds for crowding, which inform capacity and have been identified as part of this planning process. Park managers and researchers also use people-per-viewscape (PPV) to quantify visitor crowding impacts along higher-use hiking trails, walking paths, and other scenic nonmotorized transportation corridors in national parks (Lawson et al. 2009, 2011; Lawson, Newman, and Monz 2016).

The action alternatives were assessed for the primary differences related to the amounts, timing, distribution, and types of use. The primary difference for visitor use issues between the alternatives would have little impact on the amounts and types of visitor use that can be accommodated in the analysis areas. Therefore, the visitor capacity would remain consistent across the alternatives.

Review of Existing Direction and Knowledge

Existing direction and knowledge come from a variety of sources, including (1) applicable law and policy; (2) prior applicable planning and guidance; (3) existing conditions in the analysis area; (4) existing indicators, triggers, thresholds, and objectives; (5) applicable existing management strategies and actions; and (6) use patterns for commercial and other allocation categories. An overview of visitor use issues and current use levels for each key area can be found below under each analysis area.

The amount, timing, distribution, and types of visitor use in Arches National Park influences both resource conditions and visitor experience.

Visitation to Arches National Park increased by 74% between 2011 and 2021, with record high visitation of 1.8 million visits in 2021 (see figure C-1). Nearly all visitors arrive by vehicle, with daily arrivals during the busiest months averaging 2,500 vehicles; on peak days more than 3,000 vehicles enter the park. More than 96% of visitors enter the park through the main entrance accessed via US Route 191, 4 miles north of Moab, Utah. Once inside the park, 96% of visitors in private vehicles visit at least one of the primary attraction sites: Delicate Arch, the Windows, or Devils Garden. The growth in visitation and visitor use patterns have resulted in long wait times at the entrance station and parking congestion that have diminished the quality of visitor experience at key attraction sites in the park accessed from the scenic drive corridor. In the past, these conditions resulted in periods of temporarily restricted access to the park until congestion lessens, with the main entrance closed for as long as 3 to 5 hours.

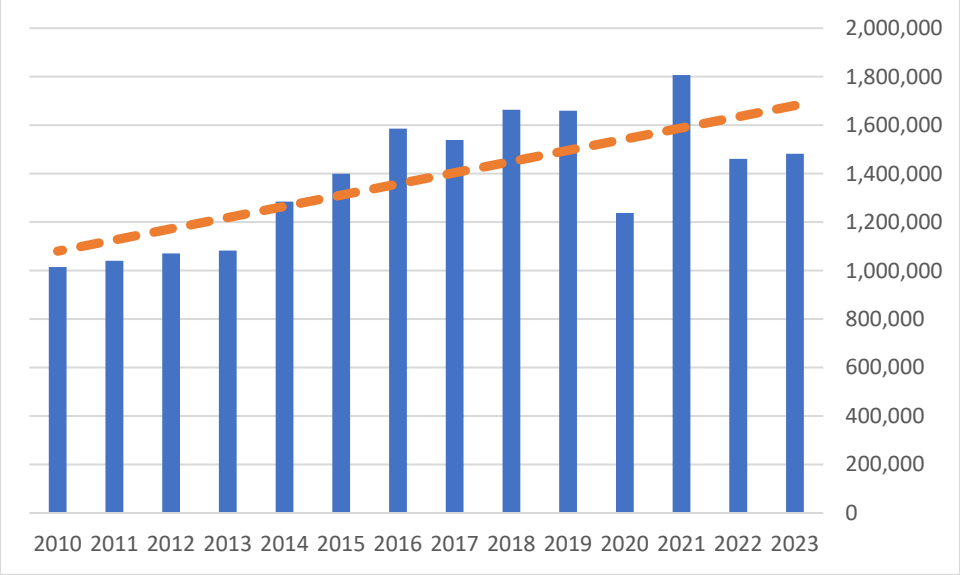

FIGURE C-1. ANNUAL VISITATION ARCHES NATIONAL PARK FROM 2010 TO 2023 (NPS VISITOR USE STATISTICS)

The NPS implemented pilots in 2022, 2023, and 2024 to study the effectiveness of timed entry into the park. Piloting provides an opportunity for the park to test temporary actions and learn from systematic evaluation of the actions. The systematic evaluation included testing, data collection, and monitoring. Additionally, operational changes were made to see how visitor access and flow could be improved at the entrance station. The outcomes of the timed entry pilots will inform long-term actions and future planning processes undertaken at the park.

Notable changes between timed entry pilots include: extending the reservation season from April 3 to October 3 in 2022 to April 1 to October 31 in 2023 and 2024, shortening the daily timed entry window from 6:00 a.m. to 5:00 p.m. in 2022 to 7:00 a.m. to 4:00 p.m. in 2023 and 2024, removing the ID requirement at the booth, allowing for online park pass sales, and shifting more ticket allocations to day-before sales.

Visitors arrive at Arches National Park in a variety of ways, including by personal vehicle, authorized commercial services, and alternative transportation. The levels and patterns of visitor use are causing negative impacts on visitor experience and resources and are influencing the ability of the NPS to maintain desired conditions. Identifying visitor capacity can direct managers on how and when visitors access the park. Appropriate management strategies can then be selected and implemented to maintain desired resource conditions and visitor experience consistent with the purposes for which the park was established.

Arches National Park and research partners have conducted recent studies informing park management on a variety of topics related to visitor use management, including visitor studies, visitor use studies, recreation ecology, and transportation. General reports and studies relevant to this visitor capacity analysis include the following:

- Arches National Park Visitor Use, Access, and Experience Study (RSG 2020)
- Arches National Park Visitor Spending and Experience Study (Otak 2023)
- Pilot Timed Entry System at Arches National Park in 2022: Comparing visitor use data before and after a pilot managed access system (Tendick, Meyer, and Miller 2023)

In addition to the park's data collection efforts, the project team used the following relevant planning efforts to help inform the capacity analyses:

- General Management Plan (NPS 1989)
- Visitor Experience and Resource Protection Plan (NPS 1995)

Identify the Limiting Attribute

Step three requires the identification of the limiting attribute, defined as the specific resource or experiential attribute(s) that most constrains the analysis area's ability to accommodate visitor use. The limiting or constraining attribute(s) may vary across the analysis area and is described under each key area. This is an important step, given that a key area could experience a variety of visitor use challenges.

Identify Visitor Capacity

To determine the appropriate amount and types of use at key areas, data were reviewed to understand current conditions compared to goals and objectives for the area. Annual visitation data collected by NPS staff include levels of visitor use parkwide and by area. Park managers also collect detailed visitor use data, including traffic counts, trail counts, campground visitation, resource conditions, and other data that show trends in conditions over the years. Where applicable, the person-per-vehicle multiplier can be used

to help calculate capacity; however, the analysis focuses on desired conditions for resources and experiences along trails because the person-per-vehicle multiplier is subject to change.

Visitor capacity includes consideration of the amount and types of visitor use, including the timing and distribution of visitor activities and behaviors as they relate to desired conditions. Visitor capacity also takes into consideration management objectives, desired conditions, and other management actions for an area. For Arches National Park, visitor capacities are most frequently expressed as people at one time. Delineations of sites may vary depending on the specific location, and monitoring can be done in a variety of ways but should serve to approximate as best as possible the total number of people present at a location. The visitor capacities and strategies to manage to capacities would be implemented as part of this planning effort. The strategies to manage to visitor capacities are described in chapter 2 of this document. For all visitor capacity analysis areas, park managers would monitor indicators to ensure desired conditions are being achieved, as described in "Appendix B: Indicators and Thresholds" or other appropriate monitoring protocols (e.g., tube sensors).

IDENTIFICATION OF VISITOR CAPACITY BY ANALYSIS AREA

The following section presents the analysis for each area, using the process described above. The outcome is the identification of a visitor capacity for each analysis area and associated strategies for implementing the capacity.

The Windows

Review of Existing Direction and Knowledge

The Windows section is located east of the main travel corridor, approximately 12 miles from the park entrance station. It is one of the most scenic locations in the park with a large concentration of arches in just over 2 square miles, including North Window, South Window, Turret Arch, and Double Arch, as shown on figure C-2. These arches are a short walk from the designated parking area and trailhead. This analysis area also includes the Windows primitive loop trail. This analysis area is within the Pedestrian, Hiker and Sensitive Resource Protection zones.

The Windows is one of the mostly highly visited areas of the park, with approximately 66% of visitors coming to this area (RSG 2017), and a majority of visitors (47%–56%) stating that visiting the Windows is "very" or "extremely" important to their trip to Arches overall (Otak 2022). Daily visitor arrivals during the peak season at the Windows trail counter are fairly consistent, between 1,000 and 2,000 visitors per day, regardless of the day of week. Visitor use to this area, prior to the timed entry pilots, peaked between 11:00 a.m. and 1:00 p.m. and then slowly declined throughout the afternoon. During peak times, up to 190 hourly visitors arrived in this area. Approximately 84% of visitors spent less than one hour at the Windows and 58% spent less than 40 minutes there. Patterns of use in the parking areas were similar to those observed on trails and at viewpoints.

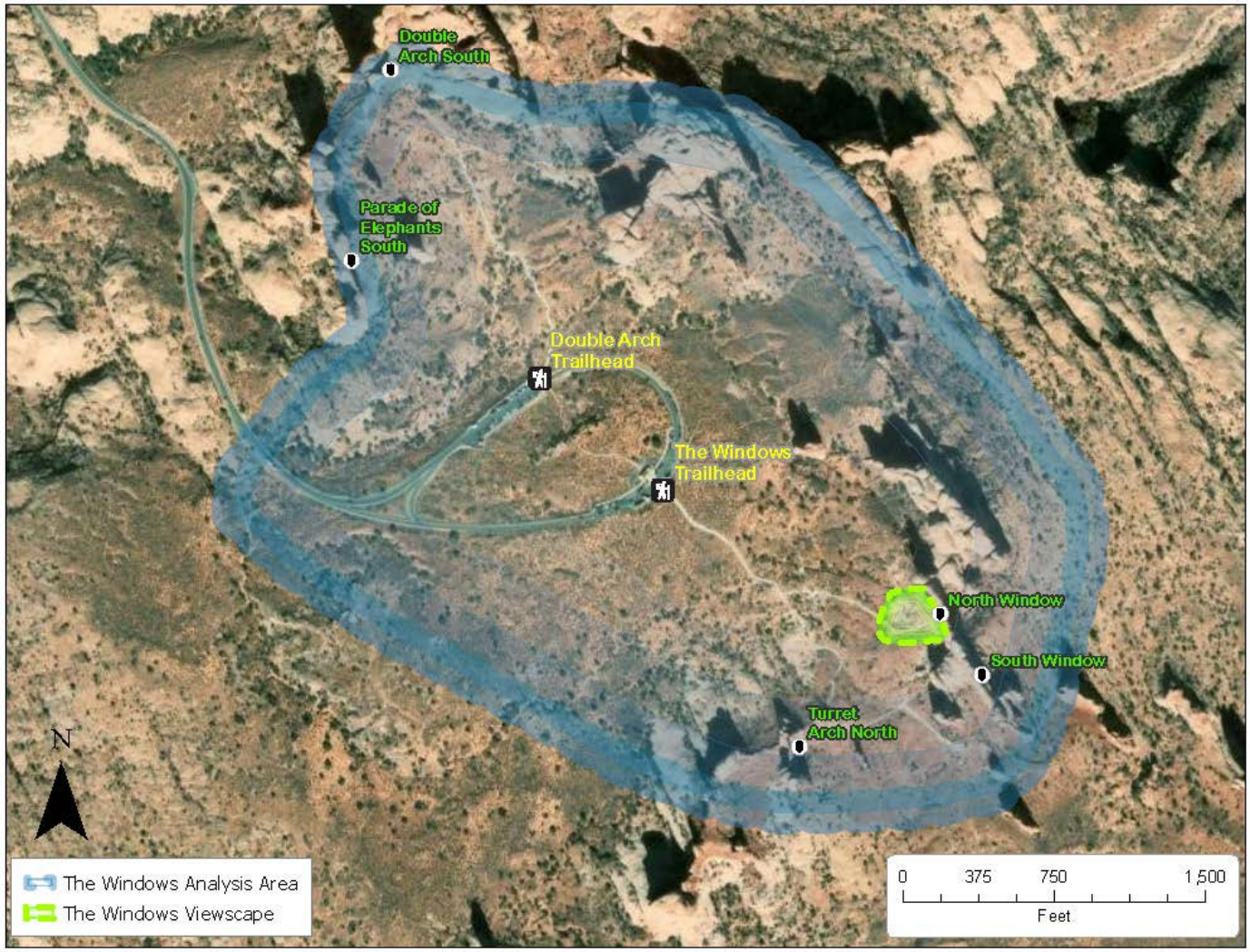

FIGURE C-2. THE WINDOWS ANALYSIS AREA

These high levels of use are felt by visitors and distract from their experience. When visitors were asked in a survey before the timed entry pilots about their experience in this area, 43% of visitors surveyed reported feeling "extremely" and "very" crowded at the Windows section and 21% of those who experienced parking problems reported these issues at the Windows section (RSG 2017). During the 2019 Visitor Use, Access, and Experience (VUAE) study (RSG 2020), the Windows parking lot was at or above capacity by 11:00 a.m., but then cleared up after 2:00 to 3:00 p.m. The daily mean vehicles at one time (VAOT) at the Windows parking lot ranged from 61 to 119 VAOT and daily maximum VAOT ranged from 97 to 154 VAOT. Simulation models based on 2019 peak visitation levels illustrate that VAOT at the Windows exceeds the effective capacity of the parking lot approximately 25% of the time across the day.

To better understand visitor densities and visitor crowding, this location was included in the 2019 VUAE study, based on previous studies (NPS 1995) and reports on visitors' perceptions of crowding (RSG 2017). To ensure desired conditions for visitor experience are met now and into the future an indicator and threshold was established (this plan, see appendix B) to monitor PPV in this location. The daily mean PPV in the Windows monitoring viewshed ranged from 15 to 23 PPV and was similar in range between weekdays, weekend days, and holidays. During peak times, the indicator level in this area reached as high as 57 PPV, well above the 30 PPV threshold, indicating a need for action to align use levels in this area with desired conditions. During the 2022 timed entry pilot, this threshold level was only exceeded 8% of the time (Tendick, Meyer, and Miller 2023). Therefore, use levels during the summer 2022 pilot were within thresholds for this area.

Limiting Attribute and Relevant Indicators

Considering the size of the Windows area, crowding below primary geologic features, available parking, and the trails system are some of the most constraining limiting attributes. The Windows section is a wide, open area and there is little in the viewshed to block visitors' view of others. This means views can quickly become filled with other visitors, distracting from the natural landscapes. The trails in this section are relatively short and this makes it difficult for visitors to spread out along designated trail corridors. Although there is more demand for parking in this area than is currently provided, expanding parking would likely negatively impact the viewshed because it would add more pavement to the viewscape and allow for more people to be in the viewsheds along trails and at viewpoints. Expanding parking may also impact the integrity of traditional cultural properties and activities related to ongoing Native American ceremonial practices and traditional use because it may expand into sensitive areas and/or push visitors into these areas. It is pertinent to maintain the integrity of these resources and activities because desired conditions state that the management focus of the majority of this area (Sensitive Resource Protection Zone) will focus on restoration and protection of sensitive resources most impacted in the park. Finally, the nature and capacity of the trails system makes management of the area difficult. There has been significant work to widen and harden the trail, but there are still numerous visitors who travel off trail, often because they are following social trails or cairns, looking for photo opportunities, or passing other visitors on crowded trails. The most relevant indicators to this area include the PPV and soil loss indicators.

Visitor Capacity and Implementation Strategies (for All Action Alternatives)

While assessing existing conditions and limiting attributes in relation to the desired conditions for the area, park staff identified that peak use levels observed during the 2019 season were too high to meet desired conditions. Staff observed use levels during the 2022 season to be consistent with desired conditions, and monitoring revealed that these use levels were consistent with identified thresholds. Taking into account the analysis above, the park identified a capacity of 330 people at one time in the Windows analysis area. For strategies to manage within this capacity see "Chapter 2: Alternatives."

Delicate Arch

Review of Existing Direction and Knowledge

The Delicate Arch analysis area is located in the northwest section of the park and just off the main travel corridor, approximately 13 miles from the park entrance station. This analysis area includes the Delicate Arch area, the Delicate Arch Viewpoint, Wolfe Ranch and their associated parking lots and trails, as shown on figure C-3. Visitors have the option to drive to the Delicate Arch/Wolfe Ranch parking lot and hike 3 miles roundtrip to experience the arch close up, or they can drive to the Viewpoint parking lot and see the arch in the distance from a 200-foot wheelchair-accessible path or hike a 1-mile roundtrip trail to see straight across at the arch from 1 mile away (RSG 2020). This analysis area is within the Pedestrian, Backcountry, and Sensitive Resource Protection zones. Desired conditions state that the area should be predominately natural, but evidence of people and human-created sights and sounds is common. Additionally, visitors may be far from conveniences but will still be relatively close by to vehicles and basic facilities. Visitors should expect a facilitated experience while enjoying the ecosystem, cultural history, natural processes, and limited modern influence. Much like the Windows area, visitors primarily hike and have the opportunity to experience protected viewsheds and sensitive areas with minimal modern influences in this area.

The Delicate Arch area is a popular area among visitors, with approximately 64% of visitors coming here (RSG 2017) and a large majority of visitors (67%–74%) stating that visiting Delicate Arch is "very" or "extremely" important to their trip to Arches overall (Otak 2022). During the 2019 VUAE study, daily visitor arrivals ranged from 500 to 3,000 visitors at Delicate Arch with an average of 1,500 visitors per day, while Delicate Arch Viewpoint ranged from 500 to 2,000 visitors per day with an average of 1,000 visitors. More than half (56%) of visitors spent between an hour and two hours at Delicate Arch. About one-third (38%) of visitors spent two or more hours at Delicate Arch (RSG 2020). However, at the Delicate Arch Viewpoint, nearly all visitors (99% on weekends and 98% on weekdays) were at this site for one hour or less (RSG 2020).

These high levels of use are felt by visitors and distract from their experience. When visitors were asked about their experience in this area, 38% of visitors surveyed reported feeling "extremely" and "very" crowded at Delicate Arch (RSG 2017). Delicate Arch is more popular with visitors on weekends and holidays, and during these times, visitors may have trouble finding a parking space.

Generally parking has only been an issue for visitors on weekends and holidays or in the early morning hours (before 9 a.m.). During the 2019 VUAE study (RSG 2020), the Delicate Arch parking lot was at or above capacity by 9:00 a.m. on weekends and holidays, but then cleared up throughout the midday hours. The parking lots did not exceed capacity on weekdays during the sampling period. In contrast, the parking lot for the Delicate Arch Viewpoint never exceeded capacity during the sampling period. The daily mean VAOT at the Delicate Arch parking lot ranged from 58 to 115 VAOT and daily maximum VAOT ranged from 106 to 238 VAOT. Consistent with parking shortages, daily mean and maximum VAOT were higher on weekends and holidays than weekdays. Simulation models based on 2019 peak visitation levels illustrate that VAOT at the Delicate Arch parking lot exceeds the effective capacity approximately 6% of the time across the day.

The daily mean PPV in the Delicate Arch monitoring viewshed in 2019 ranged from 21 to 63. During peak times, the indicator level in this area reached as high as 160 PPV, well above the 70 PPV threshold, and indicating a need for action to align use levels in this area with desired conditions. The daily mean and maximum PPV at Delicate Arch were higher on weekends and holidays than weekdays. During the 2022 timed entry pilot, this threshold was only exceeded 9% of the time. Therefore, use levels during the 2022 pilot were within thresholds for this area.

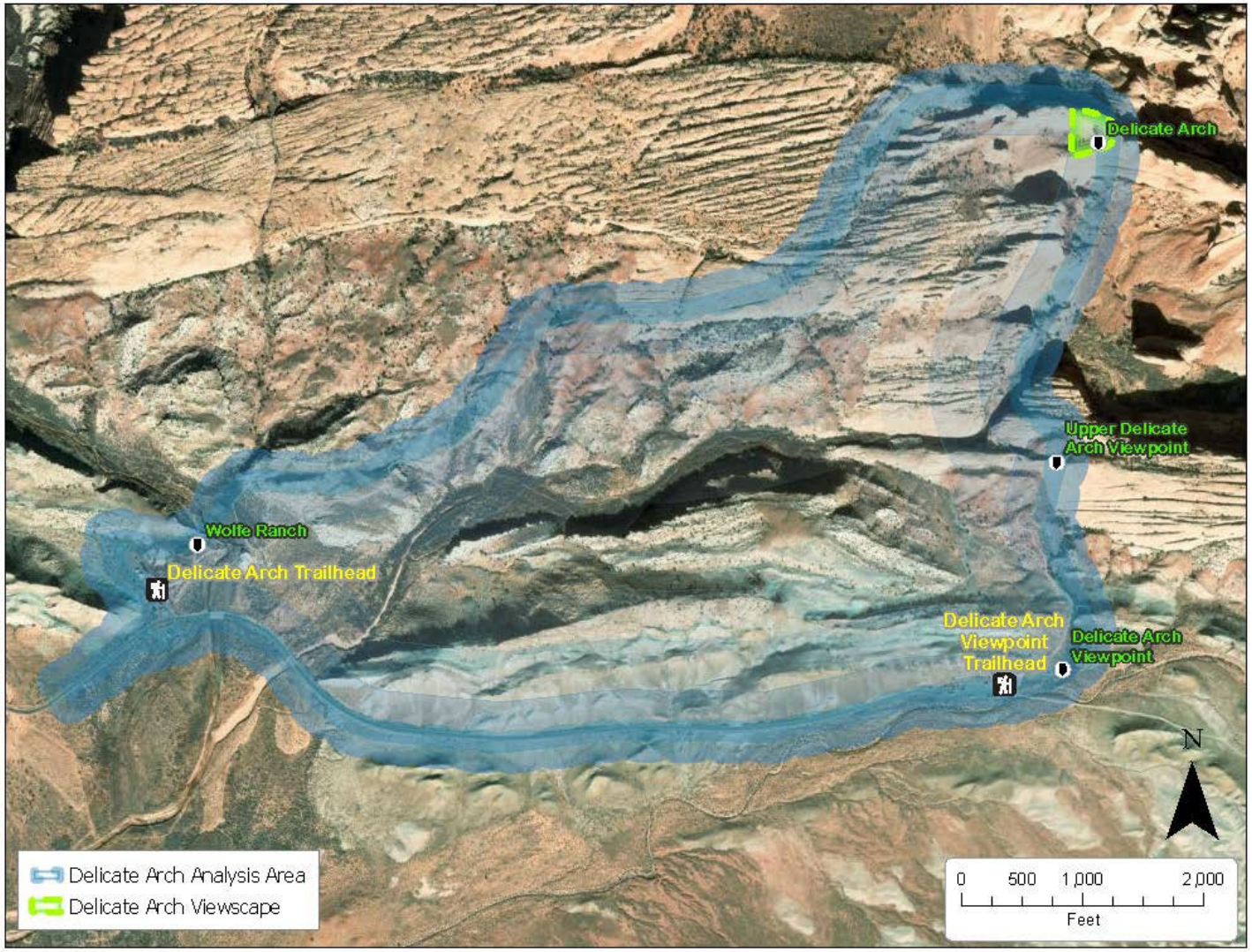

FIGURE C-3. DELICATE ARCH ANALYSIS AREA

Limiting Attribute and Relevant Indicators

Limiting attributes associated with this analysis area include the character of the historic district, trail difficulty, and crowding at the primary geologic feature and main viewpoints. Parking is already often near or at capacity, but expanding parking would impact the cultural landscape and historic district and compromise these important features. Though the parking lot is not considered a contributing feature of the historic district, additional parking in this area would adversely impact the integrity of the district's feeling and setting and distract from other desired conditions in the area. Furthermore, more parking and pavement would likely make the trails more crowded and add visitors to viewsheds. Additionally, it may interfere with use by traditionally associated peoples and activities in the area, which is prioritized throughout the entire park. Delicate Arch itself is an important site for many traditionally associated peoples and more visitors in this area limits how and when these groups would be able to use this site. The trails in this analysis area are difficult and narrow in some places. Visitors must be careful when passing because there are relatively high risks for going off trail in some areas. Near Delicate Arch, there is a landscape feature referred to as "the bowl" that can hold a limited number of visitors. As visitors accumulate in this area to view and get photos with Delicate Arch, long lines form, creating crowding, which may distract from the natural features in the area and is inconsistent with desired conditions related to experiencing natural sights and sounds. While in and around the bowl, it is nearly impossible to not see or photograph other visitors in the viewshed when it is crowded. Finally, high volumes of visitor use in this area degrade the soundscape, and this often becomes a noisy area, further distracting from the enjoyment of resources. Visitors often need to wait to enter and exit the bowl because the entrance is narrow and can only accommodate two single lanes of traffic safely. The most relevant indicator for this area is PPV. Given the importance to most visitors of visiting this feature, the threshold for this area is set at a higher level than other arches in the park to accommodate a higher level of demand and use while still protecting an experience that allows visitors to take in the landscape without crowding that would result in displacement or interfere with their ability to meaningfully connect with park resources.

Visitor Capacity and Implementation Strategies (for All Action Alternatives)

Considering the importance of the site to visitors, proper management here is critical for providing quality visitor experiences. Based on best judgment from park staff, the interdisciplinary team agreed that use levels during the 2019 season were too high to meet desired conditions. Use levels during the 2022 season were maintained at more manageable levels, with peak periods of crowding more markedly reduced and consistent with desired conditions and relevant thresholds. Taking into account the analysis above, the park identified a capacity of 450 people at one time in the Delicate Arch analysis area. For strategies to manage within this capacity see "Chapter 2: Alternatives."

Devils Garden

Review of Existing Direction and Knowledge

The Devils Garden analysis area is in the northern portion of the park, approximately 18 miles north of the entrance station. This analysis area includes the Devils Garden parking areas, connecting trails, and surrounding area. The Sand Dune Arch Trails and campgrounds are not included in this analysis area. Prominent features include Landscape Arch, Double O Arch, Navajo Arch, Pine Tree Arch, Dark Angel, and others, as shown on figure C-4. This analysis area is within the Pedestrian, Hiker, Backcountry, and Sensitive Resource Protection zones. Specifically, the trail corridors are within the Pedestrian and Hiker zones, and visitors have opportunities to be immersed in a natural landscape and feel somewhat distant from most comforts and conveniences. These unpaved trails provide a sense of occasional solitude, moderate self-reliance, challenge, and adventure. Much of the viewshed in the Devils Garden area is included in the Backcountry Zone. Like the Hiker Zone, it provides a sense of being immersed in a natural landscape but feels farther away from comforts and conveniences than the Hiker Zone.

Additionally, the Hiker Zone requires visitors to be comfortable with a high level of physical exertion and a large time commitment. Common activities in this zone include hiking, backpacking, and stargazing.

The Devils Garden area is a popular destination within the park; around 37% of visitors access Landscape Arch via the Devils Garden parking lot (RSG 2017), and a large number of visitors (46%–48%) state that visiting Landscape Arch is "very" or "extremely" important to their trip to Arches overall (Otak 2022). This area is noticeably busier on weekends and holidays compared to weekdays. During the 2019 VUAE study sampling period, Devils Garden received between 1,000 and 1,500 visitors per day with most arriving in the morning, and hourly arrivals declining in the late morning and afternoon hours. Visitors who traveled by private vehicle spent an average of 65.5 minutes at the site, while those who traveled by commercial vehicle spent an average of 86.5 minutes at the site. However, 45% of visitors overall spent less than one hour at the site (RSG 2020). These high levels of use are felt by visitors and distract from their experience. When visitors were asked about their experience in this area, 25% of visitors surveyed reported feeling "extremely" and "very" crowded on the Devils Garden Primitive Trail (RSG 2017).

Although the parking capacity here increased by 35% in 2013 (prior to the timed entry pilots), the lot still fills to capacity most of the day during busy season. On weekends, visitors park along the road shoulder (RSG 2017). Limited parking availability here is consistent with the area being more popular on weekends and holidays. Although parking capacity reaches or exceeds capacity in the morning hours on weekends and holidays, it generally does not exceed capacity during afternoon hours and weekdays. Vehicles usually parked here for about two hours during the sampling period. During the 2019 VUAE study (RSG 2020) (conducted prior to the timed entry pilots), the Devils Garden parking lot was at or above capacity by 11:00 a.m., but then cleared after 2:00 p.m. The daily mean VAOT in 2019 at the Devils Garden parking lot ranged from 70 to 141 VAOT, and daily maximum VAOT ranged from 121 to 209 VAOT. Simulation models based on 2019 peak visitation levels illustrate that VAOT at Devils Garden exceeds the effective capacity of the parking lot approximately 12% of the time across the day.

The daily mean PPV in the Devils Garden monitoring viewshed ranged in 2019 from 9 to 15. During peak times, the indicator level in this area reached as high as 35 PPV, well above the 18 PPV threshold, indicating a need for action to align use levels in this area with desired conditions. The daily mean and maximum PPV at Devils Garden were similar in range on weekdays weekends, and holidays. During the 2022 timed entry pilot, this threshold was exceeded less than 1% of the time. Therefore, use levels during the 2022 pilot were within thresholds for this area.

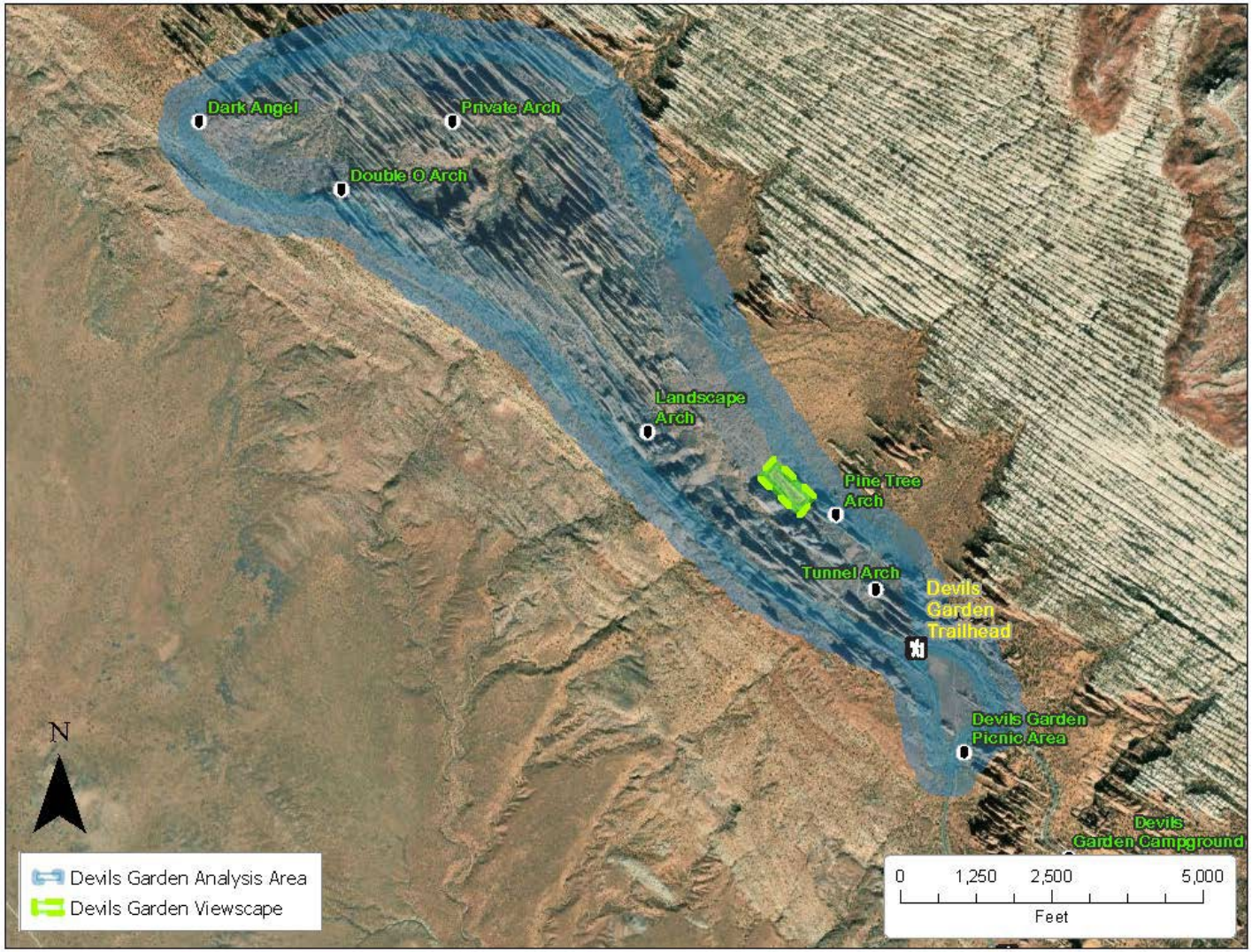

FIGURE C-4. DEVILS GARDEN ANALYSIS AREA

Limiting Attribute and Relevant Indicators

The trails and trail system are some of the main features that draw visitors to Devils Garden. Devils Garden is not a single destination, but rather visitors have the opportunity to have a variety of experiences, sights, and sounds. Although there are some destinations within Devils Gardens at the end of or along trails, like Landscape Arch, visitors are more likely to see crowding on trails between features rather than at key destinations since these features are numerous and spread out. The trails in this area have varying difficulty, meaning that visitors with a large range of skill levels can comfortably visit the area. This high use has also led to issues related to social trailing, often created so that visitors can find an easier path or one that avoids crowded sections. Crowding and visitor-created trailing are degrading visitor experiences and park resources. These visitor-created trails can create safety issues because visitors will often unknowingly follow the trails created by other visitors and then have difficulty getting back to the main trails. This problem is exacerbated in the winter because the snow often covers trails and cairns, which leads visitors to follow footprints of those who came before them on potentially incorrect and/or hazardous paths.

Visitor-created trails also have a negative effect on the landscape. This issue is more visually obvious in this area because of the damage caused to the biological soil crusts and vegetation and the significant soil loss attributable to high visitor use on erosive substrates. This soil loss and social trail proliferation even occurs in the winter because the snow-cover is not usually thick enough to protect soil and vegetation meaning new social trails can appear from winter use after the snow melts out. Loss of soil crust is leading to erosion in the area. Devils Garden, and specifically areas around Landscape Arch and Double O Arch, experiences some of the most severe soil erosion in the park and it is scarring the landscape and diminishing desired conditions related to maintaining a wild and primitive experience. The various types of impacts caused by high levels of visitor use can also be seen at the fin past Landscape Arch, a narrow point that physically limits the area's ability to accommodate more visitor use. Passing in this area takes care and can pose safety challenges under high use conditions. The PPV and soil loss indicators are most relevant to this analysis area.

Visitor Capacity and Implementation Strategies (for All Action Alternatives)

When considering use levels, limiting attributes, and observed conditions, park staff identified visitor use levels in 2019 to be unsustainable and will not allow the park to meet desired conditions. Based on observations, visitation levels during the summer 2022 season were manageable and should be maintained in order to meet desired conditions. Before the 2022 timed entry pilot, Devils Garden had the most out-of-bounds parking, with 20 to 30 additional vehicles regularly parked on the inside of the parking loop and along the road edges of inbound and outbound portions of the loop. These conditions improved under the timed entry pilots, with no documented occurrences of out-of-bounds parking. Taking into account the analysis above, the park identified a capacity of 390 people at one time in the Devils Garden analysis area. For strategies to manage within this capacity see "Chapter 2: Alternatives."

Sand Dune and Broken Arch

Review of Existing Direction and Knowledge

The Sand Dune Arch analysis area includes Sand Dune Arch, Broken Arch, and the associated trails as shown on figure C-5. It is located near Devils Garden, but its unique features, visitor use patterns, and other characteristics require it to be a separate analysis area. This a popular area, especially among families, because the large cliff-wall arch can be reached via a short trail and the loose sand does not contain biological soil crusts, so children can run around freely. The popularity and overall use of this area has increased in recent years, with 28% to 29% of visitors surveyed in 2021 stating that visiting Sand Dune Arch is "very" or "extremely" important to their trip to Arches overall (Otak 2022). Although many

conveniences are relatively far from this area, visitors will generally not be far from vehicles and basic facilities, thus making it relatively easy and safe to visit. The area is popular for hiking, sightseeing, and group visits and is characterized by high use trail corridors and sandy landscapes that allow visitors to explore and climb rocks. This analysis area is within the Pedestrian and Sensitive Resource Protection zones. Here, visitors have the opportunity to experience connections to fundamental park resources through universally accessible, highly developed, maintained, and marked trails or trail segments, making it a popular destination for people with a variety of skill levels. Although visitors have the opportunity to experience protected viewsheds and sensitive areas with minimal modern influences within the Sensitive Resource Protection Zone, access for research, restoration, and use by traditionally associated peoples will be prioritized.

Although popular, Sand Dune Arch is not a primary destination among visitors. The parking lot often becomes filled when other areas of the park are perceived as too crowded, and the visitor experience can sometimes be diminished by the level of crowding. The trail to and the areas around Sand Dune Arch are relatively confined and narrow as the arch sits between two sandstone fins, which magnifies the effects of crowding, and the rocks amplify anthropogenic sounds, which can often drown out the natural soundscape. Human-caused noises can take away from the experience of hearing predominately natural sounds as described in the desired conditions.

Crowding has caused social trials to develop and caused trail widening between Sand Dune Arch and Broken Arch, affecting both natural and cultural resources. Social trailing is most common on points of the main trial that are poorly defined. Signs describing revegetation and impacts to soils have not been effective in keeping visitors off sensitive soil crusts. Park staff frequently find graffiti on geologic resources in this area which not only degrades these resources but creates distractions and degrades the visitors' experiences.

Even with the Sand Dune Arch parking lot improvements completed in 2010, as recommended by the General Management Plan, the parking lot was frequently overparked prior to the timed entry pilots. Visitors sometimes found it difficult to find adequate parking, even in the overflow parking pullout across the street, which resulted in out-of-bounds parking along the adjacent roadside.

Limiting Attribute and Relevant Indicators

Trails around Sand Dune Arch lead to more primitive areas and this may cause the areas around and beyond Broken Arch to become more crowded. Additionally, Sand Dune Arch itself is a limiting feature. It is a relatively small and confined area that magnifies crowding impacts. This causes visitors to compete and sometimes wait extended periods of time to get a photo with or of the arch and impacts the natural soundscape. The most relevant indictors for this area include PPV and soil loss.

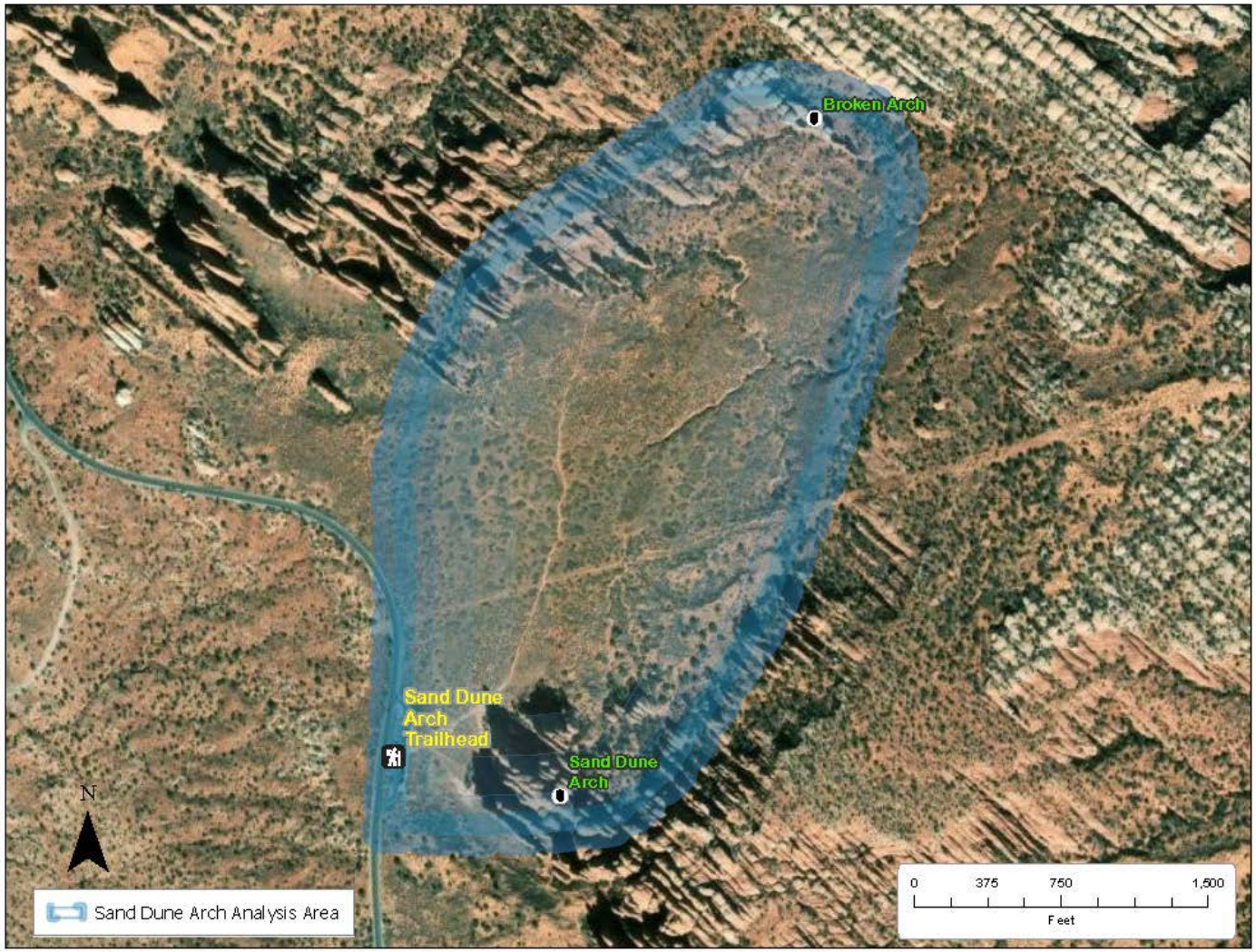

FIGURE C-5. SAND DUNE ARCH ANALYSIS AREA

Visitor Capacity and Implementation Strategies (for All Action Alternatives)

When considering similar use patterns and available data, park staff concluded that visitor use levels in 2019 were unsustainable and would not allow the park to meet desired conditions. Based on observations, visitation levels during summer 2022 season were manageable and should be maintained to meet desired conditions. Taking into account the analysis above, the park identified a capacity of 165 people at one time in the Sand Dune analysis area. For strategies to manage within this capacity see "Chapter 2: Alternatives."

Salt Valley Road

Review of Existing Direction and Knowledge

Salt Valley Road is an unpaved, gravel, two-wheel-drive road that leaves the park's main paved road near Sand Dune Arch. The road segment inside the park is about 9 miles and takes roughly 20 to 30 minutes to drive without stops. It is surrounded by grasslands, passes through Salt Valley, and exits at the north end of the park. Using this road, visitors can access Klondike Bluffs and the Tower Arch trailhead near the park's northwestern boundary. Driving on Salt Valley Road is a park experience in itself. Here, the speed limit is 25 miles per hour and, although unpaved, it is characterized as a relaxing way to see the park. Passing among vehicles is infrequent, and visitors can expect to have a generally quiet experience. There are typically about 0 to 2 cars in the viewshed. Desired conditions state that the road should maintain its primitive nature. The road is graded approximately once per year. This maintenance is more cyclical than response or incident-based.

Average daily traffic ranges from 10 to 65 vehicles per day. Typically, hourly vehicles arrivals are fewer than 10 vehicles per hour with some exceptions, with the rate of arrivals fluctuating throughout the day. Although mean hourly departures on the road were roughly similar on weekdays, weekends, and holidays, mean hourly arrivals were higher on weekends compared to weekdays and holidays, which indicates that visitors are exiting the park at different entrances during these days. During the 2019 VUAE study, arrivals usually peaked around 11:00 a.m., with another smaller peak around 4:00 p.m. Departures usually peaked at 10:00 a.m. on both weekdays and holidays, but only the weekdays had a secondary peak in departures at 2:00 p.m. (RSG 2020).

Limiting Attribute and Relevant Indicators

The road conditions on Salt Valley Road are a limiting factor for managing capacity. Tumbleweeds can pile up on the road, making it difficult for vehicles to pass through. Because the road is unpaved, it can only accommodate a limited amount of use before it needs to be regraded. Salt Valley is the largest grassland area in the park and provides high-quality wildlife habitat for various raptors, Utah prairie dogs, deer, pronghorn, and small mammals (badgers, foxes, burrowing owls, and others). Increased noise and traffic may have negative effects on wildlife and may impact wildlife behavior. The road itself is historic and a cultural resource. This road navigates through cultural sites that have been found eligible for the National Register of Historic Places. Spot surveys demonstrated that there is a moderate density of cultural resources in the area, so expanding/widening the road poses potential risks to these resources. If traffic were to increase further, there may be road widening because vehicles would be more likely to pass each other on a more frequent basis; and additional vehicles on the road would increase dust generation, which drives dust into the air and affects the viewshed and vegetation near roads.

Visitor Capacity and Implementation Strategies (for All Action Alternatives)

Because the primary use in this analysis area is vehicle-based, the capacity for this area is expressed in vehicles. To maintain vehicle spacing consistent with the desired driving experience, the park identified a capacity of 12 vehicles per hour on Salt Valley Road. Since approximately 60% of use on this road is

attributable to vehicle entries, the capacity for vehicle entries by way of Salt Valley Road is seven vehicles per hour. Additionally, studies of these road types (graded gravel) have shown that both cost and frequency of resurfacing increases exponentially when travel volumes exceed 200 vehicles per day; therefore, vehicle use levels on this road should not exceed this volume.

Willow Springs Road

Review of Existing Direction and Knowledge

Willow Springs Road is a dirt road that is infrequently used by the general visitor population because it requires high clearance, four-wheel drive vehicles, and the associated skill set to drive on this type of road. However, the road does connect with the main travel corridor in the park and provides access to hiking opportunities in remote areas of the park. The existing road surfaces include deep sandy two-tracks; bumpy, exposed slickrock; and narrow, sandy wash crossings. Willow Springs Road extends 8 miles from the Balanced Rock intersection to US 191, 13 miles north of Moab and 2 miles north of Route 313. Approximately 4.1 miles of Willow Springs Road are within the park, while the remainder travels through Sovereign, Bureau of Land Management, and Utah State Trust land.

During the 2019 VUAE study, average daily traffic ranged from 21 to 71 vehicles per day. Typically, hourly vehicles arrivals were less than seven vehicles per hour with few exceptions. Peak hourly vehicle arrivals were similar on weekends, holidays, and weekdays and usually started around 8:00 a.m. and fluctuated until they dropped off around 7:00 p.m. Across all days, mean hourly vehicle arrivals fluctuated at low levels throughout the day starting at 7:00 a.m., but departures were slightly higher on weekends and holidays compared to weekdays (RSG 2020). It is important to note that concessionaires use this road and their use can be concentrated.

Limiting Attribute and Relevant Indicators

Desired conditions are to maintain a primitive character and a quiet and remote visitor experience on the road. These desired conditions highlight and protect some of the important and unique experiences the park can offer but require the park to manage capacity differently from other parts of the park. To safely navigate the road, visitors need to have a four-wheel drive vehicle with 8 to 10 inches of clearance. Willow Springs Road and its entrance to the park are both historic resources. Although most of the original entrance station is gone, there are still remnants of this historic structure. This road navigates through cultural sites that have been found eligible for the National Register of Historic Places. Spot surveys demonstrated that there is a moderate density of cultural resources in the area, so expanding/widening the road poses potential risks to these resources. Additionally, the park must consider wildlife habitat to ensure visitor use does not adversely affect wildlife. Although vehicles still generate dust while driving, it is less of an issue here compared to Salt Valley Road because visitors must drive more slowly (5-15 miles per hour) on Willow Springs Road.

The driving experience is the main activity on this road corridor, as well as the road providing access to remote hiking opportunities in the park, and the park protects this unique experience with various management strategies. Willow Springs Road is a difficult driving experience that is very remote, requiring visitors to have a high degree of self-reliance. There are often obstacles in the road that slow down vehicles and can drive up encounter rates, which are sometimes higher on this road than on Salt Valley Road. Vehicle passing opportunities are limited, and passing vehicles have widened the road, causing impacts to cultural and natural resources. The remote nature of this road has also led to illegal all-terrain vehicle (ATV) use and incidents of illegal camping (reported approximately five to six times per year by concessionaires)and the creation of illegal campsites. ATVs and utility task vehicles are not allowed on the road, but visitors are allowed to ride dirt bikes on the road. Driving off-road is not permitted.

Visitor Capacity and Implementation Strategies (for All Action Alternatives)

Because the primary use in this analysis area is vehicle-based, the capacity for this area is expressed in vehicles. To maintain vehicle spacing consistent with the desired driving experience, the park identified a capacity of eight vehicles per hour on Willow Springs Road. Since approximately 75% of use on this road is attributable to vehicles entering, the capacity for vehicle entries by way of Willow Springs Road is six vehicles per hour. Additionally, as studies of these road types (graded gravel) have shown that both cost and frequency of resurfacing increases exponentially when travel volumes increase over 200 vehicles per day, vehicle use levels on this road should not exceed this volume.

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APPENDIX D: LIST OF PREPARERS AND CONSULTANTS

The names, qualifications, and roles of the NPS planning team and consultants who prepared this plan/EA are listed below.

Name	Title	Responsibilities	Qualifications
National Park Service – Arches National Park			
Lena Pace	Superintendent	Park lead official for the review of the EA and coordination among park staff and IDT members and led stakeholder involvement strategies	25+ years NPS experience in law enforcement, operations and policy, and Office of Public Trust. BS Environmental Studies, Whitman College; MA Organizational Leadership, Gonzaga University
Amy Tendick	Visitor Use Planner	Provided input and review; developed mandatory shuttle alternative analysis	7 years NPS NEPA and VUM planning experience. BS Renewable Natural Resources, Rangeland Science, University of Arizona.
Karen Henker	Acting Public Affairs Specialist	Provided input and review of the EA and informed public involvement strategies	21 years with NPS. BA Cultural Anthropology, Reed College; MS Environmental Science, Green Mountain College
Kimberly Hartwig	Resource Stewardship and Science Program Manager	Provided input and coordinated review of resource sections of the EA, desired conditions, zoning, and indicators and thresholds	25 years experience with public lands management. 18 years with NPS. BS Wildlife Ecology, University of Wisconsin.
Leslie Kobinsky	Concessions Management Specialist	Provided input and review on commercial services sections of the EA.	10 years NPS experience, 4 years in current commercial services position. BS Environmental Science, Westminster University; MS Natural Resource Management, Utah State University.
National Park Service – Intermountain Region			
Dan Niosi	Division Manager, Planning and Environmental Quality	Provided guidance, input, and review through all aspects of NEPA compliance and managed access systems.	25 years of experience with NPS NEPA and planning; B.A Environmental Studies
National Park Service – Washington Support Offices			

Name	Title	Responsibilities	Qualifications
Joshua Kleinman	Project Manager, Environmental Quality Division	NEPA project manager; provided input and review for all NEPA content; point of contact for project-related questions and concerns	15 years NPS NEPA and NHPA project management. BA Sociology and Anthropology, University of Redlands; MA Anthropology/Archeology, Northern Arizona University
Lynne Koontz, Ph.D.	Economist, Socioeconomics & Resource Recovery Division	Provided input and review for socioeconomic section of the EA.	11 years NPS & 25 years DOI Economic subject matter expertise PhD & MS Agricultural and Resource Economics, Colorado State University
Rachel Collins, Ph.D.	Visitor Use Management, Denver Service Center, Planning Division	IDT Member; VUM subject matter expert, Provided input and review on draft plan and EA (and associated drafts), developed appendices A, B, and C.	12 years NPS VUM subject matter expertise 5 years NPS VUM project management PhD Parks, Recreation, and Tourism MA Experiential Education BS Leisure Studies and Outdoor Education
Department of Interior – Solicitors Office			
Greg Hansen	Attorney-Advisor	Provided legal review	JD University of Utah (2011) Certificate in Natural Resources Law BS Wildlife Resources, University of Idaho (2006)
WSP Team			
Lori Fox, AICP	Project Manager / Vice President	Responsible for project management and senior technical review	24 years of experience. BS Environmental Policy, University of Michigan; MCP Urban and Land Use Planning, University of Maryland
Jessica Forbes	Deputy Project Manager / Lead Consultant/ Environmental Planner	Responsible for project management and oversight of NEPA analysis and documentation; lead author for chapters 1 and 2	16 years of experience, BA Environmental Studies, Randolph-Macon Woman's College; Certificate of Environmental Communication, Duke University Nicholas School of the Environment
Deborah Mandell	Senior Technical Editor	Responsible for document editing, formatting, and accessibility	32 years of experience. BA Government, Wesleyan University; MBA Finance and Marketing, Northwestern University

Name	Title	Responsibilities	Qualifications
Michael Lucia	Environmental Planner	Authored the Socioeconomics analysis	8 years of experience; MCRP, Rutgers University; BA Geography, University of South Florida
Leah Anderson	Environmental Planner	Authored the Visitor Access, Use, and Experience analysis and chapters 1 and 2	1 year of experience; BS Geography and Environmental Studies; Grand Valley State University, MS Environmental Policy, University of Denver
Ross Daniels, AICP	Senior Consultant	Assisted in authoring and QA/QC review of the Socioeconomics analysis	8 years of experience, BA Earth & Environmental Science, Vanderbilt University; MS Urban & Regional Planning/Master of Public Health, University of Wisconsin-Madison
Addison Schmidt	Planning Intern	Assisted with edits to the EA and administrative tasks	1 year of experience; BA Environmental Science, BA History, Wake Forest University (expected)
Steve Lawson, Ph.D., DJ&A	Subject Matter Expert – Visitor Use Management	Assisted in development of the mandatory shuttle alternative analysis; technical reviewer	24 years of experience; PhD Natural Resources Management; MS Resource Economics and Policy; BA Political Science