



# General Management Plan and Environmental Assessment

February 2024



This page intentionally blank.



## ABSTRACT

The Tule Springs Fossil Beds National Monument was the 405th unit of the national park system that was established through the Carl Levin and Howard P. “Buck” McKeon National Defense Authorization Act for Fiscal Year 2015 (Public Law [Pub. L.] 11-291, 128 Sta. 3861, Sec. 3092) and the transfer of 22,650 acres of land from the Bureau of Land Management to the National Park Service. As a newer unit in the national park system, a general management plan has not been developed to guide its development. The purpose of this general management plan and environmental assessment is to articulate a vision and overall management philosophy for the Tule Springs Fossil Beds unit that will inform long-term decision-making by current and future managers.

This document examines two possible management strategies or “alternatives”: an action alternative (alternative A) and a “no action” alternative (alternative B). The document also analyzes the impacts of their implementation. The preferred alternative (alternative A) addresses resource protection and preservation, education and interpretation, visitor use and facilities, land protection and boundaries, and long-term operations and management and responds to issues identified during a preliminary planning process.

The preferred alternative complies with National Park Service (NPS) planning requirements and is the NPS preferred alternative to guide future management of the unit.

Alternative A would establish management zones to guide use and management activities, and the park’s organizational structure would reflect the scientific, resource protection, and operational needs of the park and support an interdisciplinary staff with varied experience, education, and skillsets that highlight and showcase the unique paleontological and other resources within the park’s boundary. Alternative A would provide guidance for fostering consultation and coordination with governmental and nongovernmental stakeholders to reduce redundancy and leverage partnerships to create a living laboratory for the public that is of both local and global significance. Tule Springs Fossil Beds National Monument would help preserve a dynamic perspective of resources that are part of a changing ecosystem spanning the Late Pleistocene, including the Last Glacial Maximum, which was a period of dramatic climatic and palaeoecological change. Park staff would emphasize collaboration with conservation partners and actively field test new practices and methods for conserving sensitive natural and cultural resources. Science is one part of the park’s visitor experiences, and this hands-on approach to experiencing resources would demonstrate to visitors the need to protect these rare resources. The park would offer formalized science and education programming, while also offering other traditional NPS programming to the public so that visitors could experience the park in a way that best suits their needs and preferences. Under alternative A, a boundary adjustment would be considered to include additional property, if acquired.

Alternative B, the no-action alternative, would maintain current management conditions without the establishment of management zones. No further direction would be given regarding desired natural and cultural resource conditions, appropriate types and intensities of visitor use and development, desired visitor experiences, and park partnerships. Other

visitor use management tools, such as visitor capacity, indicators, and thresholds, would not be implemented. Park management would be based solely on the park's enabling legislation, foundation document, the NPS Organic Act of 1916, NPS regulations and policies, existing agreements with the park's partners, and other plans that contribute to the park's planning portfolio. Functionally, the park would continue to be managed as it is today, with no major change in management direction. Visitors would continue to experience the park's programming, amenities, events, signage, recreational opportunities, and historic resources. Park managers would continue to preserve and maintain historic features as fundamental resources and values in accordance with applicable laws and policies, standards, and guidelines. Partnerships would remain important to the success and management of the park. Under alternative B, no boundary adjustments would be considered. The National Park Service would continue to work with surrounding landowners and partners to identify opportunities for preserving resources that extend beyond the park boundary.

This plan articulates the overarching management vision for the park and addresses the statutory requirements for general management planning at a programmatic level, which are the following:

- measures for resource preservation
- indications of the types and general intensities of development (visitor circulation and transportation patterns, systems, and modes), including general locations, timing of implementation, and anticipated costs
- identification and implementation of commitments for visitor carrying capacities
- indications of potential boundary modifications and the reasons for the modifications

The plan does not describe how particular programs or projects should be implemented but rather provides direction for the park that supports the National Park Service's valuable relationships with their legislated and community partners.

This document integrates the National Environmental Policy Act (NEPA), implementing regulations found in 40 Code of Federal Regulations (CFR) Parts 1500–1508, Director's Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-Making* (NPS 2011), and the NPS *NEPA Handbook* (NPS 2015).

The National Park Service must comply with laws and policies to protect environmental quality and resources, preserve cultural resources, and provide public services. Applicable laws and policies related to resource management include the National Historic Preservation Act of 1966, as amended; the Archaeological Resources Protection Act of 1979; the Native American Graves Protection and Repatriation Act of 1990; the Clean Water Act of 1972; the Endangered Species Act of 1973; and Executive Order 11990, "Protection of Wetlands." Laws and policies related to public services and access include the Americans with Disabilities Act of 1990, the Architectural Barriers Act Accessibility Act Standards, the Final Outdoor Developed Area Guidelines, and the Rehabilitation Act of 1973.



# CONTENTS

Chapter 1: Introduction to the Plan .....	1
Background and Overview .....	1
Park Description .....	1
Tribal Engagement Guiding Principles .....	2
Foundation Elements .....	3
Park Purpose and Significance .....	4
Purpose and Need for the General Management Plan .....	5
Rationale for General Management Planning .....	5
Tule Springs National Monument General Management Plan .....	5
Scope .....	6
Planning Issues and Opportunities.....	7
Resource Protection .....	7
Experiencing the Park.....	8
Responding to Climate Change and a Dynamic Environment.....	9
Partnerships .....	10
How Tule Springs Fossil Beds National Monument Is Addressing the Four Statutory GMP Requirements .....	11
Resource Preservation .....	11
Types and General Intensities of Development.....	11
Visitor Capacity .....	12
External Boundary Modifications .....	12
Chapter 2: Alternatives.....	13
Introduction.....	13
Mitigation Measures and Best Management Practices .....	13
Alternative A: NPS Preferred Alternative Management Vision .....	14
Management Zones .....	14
Desired Conditions.....	16
Strategies to Achieve Desired Conditions.....	26
Parkwide Management Actions.....	26
Aliante Loop and Durango Loop Trails.....	30
Visitor Use Management Elements .....	30
Visitor Capacity .....	32
Consideration of Boundary Adjustments .....	33

Boundary Modifications .....	34
Alternative B: No Action.....	35
Chapter 3: Affected Environment and Impact Analysis.....	37
Introduction.....	37
Potentially Impacted Resources .....	37
Federally Listed Species .....	37
Special Status Species and Habitat.....	44
Paleontological Resources .....	49
Geologic Features (Tufa) .....	53
Archeological Resources.....	56
Cultural Resources – The Tule Springs Archeological Site (Location of the 1962–1963 Tule Springs Expedition) .....	58
Visitor Use and Experience .....	60
Chapter 4: Consultation .....	65
Consultation with Native American Indian Tribes.....	65
Consultation Under Section 7 of the Endangered Species Act .....	66
Consultation Under Section 106 of the National Historic Preservation Act .....	66
Consultation With the Advisory Council .....	66
Civic Engagement .....	67
Appendix A: Foundation Elements.....	A-1
Appendix B: National Park Service General Management Planning and Other Applicable Laws and Policies .....	B-1
Appendix C: Indicators, Thresholds, Objectives, and Visitor Capacity.....	C-1
Appendix D: Analysis of Boundary Modification.....	D-1
Appendix E: Mitigations and Best Management Practices .....	E-1
Appendix F: Impact Topics Considered but Dismissed .....	F-1
Appendix G: References .....	G-1
Appendix H: Preparers.....	H-1

## FIGURES

Figure 1. Map of Tule Springs Fossil Beds National Monument.....	2
Figure 2. Proposed Management Zones for Tule Springs Fossil Beds National Monument.....	15
Figure 3. Potential Boundary Amendments for Tule Springs Fossil Beds National Monument .....	34

## TABLES

Table 1. Parkwide Desired Conditions.....	16
Table 2. Management Zone Desired Conditions.....	20
Table 3. Federally Listed Threatened, Endangered, or Candidate Resources Occurring or Potentially Occurring in Tule Springs Fossil Beds National Monument.....	38



**This page intentionally blank.**



# Chapter One: Introduction to the Plan

---

# 1





This page intentionally blank.



# CHAPTER 1: INTRODUCTION TO THE PLAN

## BACKGROUND AND OVERVIEW

### Park Description

Tule Springs Fossil Beds National Monument (the park) was established as the 405th unit of the national park system on December 19, 2014, through the Carl Levin and Howard P. “Buck” McKeon National Defense Authorization Act for Fiscal Year 2015 (Pub. L. 113-291, 128 Stat. 3861, Sec. 3092) and the transfer of 22,650 acres of land from the Bureau of Land Management (BLM) to the National Park Service (NPS).

Within the geology of the park, ancient deposits preserve one of the largest and most diverse late Pleistocene vertebrate fossil assemblages in the southern Great Basin and Mojave Deserts. The Tule Springs local fauna includes large mammals and other vertebrates that dates from approximately 100,000 to 12,500 years ago. Invertebrates, plant microfossils, and pollen also are present in these deposits. The extensive and complex paleospring deposits of the park record vast desert wetland ecosystems that covered much of the Las Vegas Valley during the late Pleistocene. The depositional history of these marsh, wet meadow, and flowing stream environments provides the baseline climate record that serves as a standard of comparison for similar deposits throughout the American Southwest. The park preserves thousands of fossils that help tell the story of an ever-changing ecosystem. Some of the animals of the ancient Tule Springs are still alive today, including the coyote, jackrabbit, and aquatic snails.

The park sits in the upper Las Vegas Wash (figure 1). The park is a key open space to the neighboring communities in the Las Vegas area and is made up of two distinct areas termed the south unit and north unit. The south unit of the park is an easy access point for neighboring communities and provides important open space immediately adjacent to a densely populated urban area. The north unit is situated farther from the Las Vegas developed areas, and a large portion of it has less visitation than the south unit.

Neighbors of the park include the cities of Las Vegas and North Las Vegas, Clark County, Tribal lands of the Las Vegas Paiute Tribe, federal lands managed by the Bureau of Land Management and the US Fish and Wildlife Service, lands owned by the State of Nevada, and Nellis and Creech Air Force Bases, which use the airspace over the park for training missions.

At an elevation between 2,000 and 3,000 feet, the park landscape is situated on gently sloping bajadas (alluvial slopes) that occur along the front of the Sheep Mountain Range and Las Vegas Range. Receiving less than 5 inches of precipitation per year, the sandy soils support a desert scrubland of widely spaced creosote and white bursage shrubs and various cacti, as well as saltbush scrub in the park’s north unit.

Human use of the Las Vegas Valley stretches back more than 10,000 years (NPS 2019). The area’s natural springs and resources were vital to the Southern Paiute, other Native American Tribes, and eventually, European Americans who traveled and resided in the area. Archeological resources found throughout the park are representative of the diverse cultural

heritage of the region's inhabitants and present a valuable record of human use and adaptation to changing environmental conditions throughout the area. Many of these sites and the landscapes upon which they reside hold enduring cultural and spiritual significance to Native American Tribes.

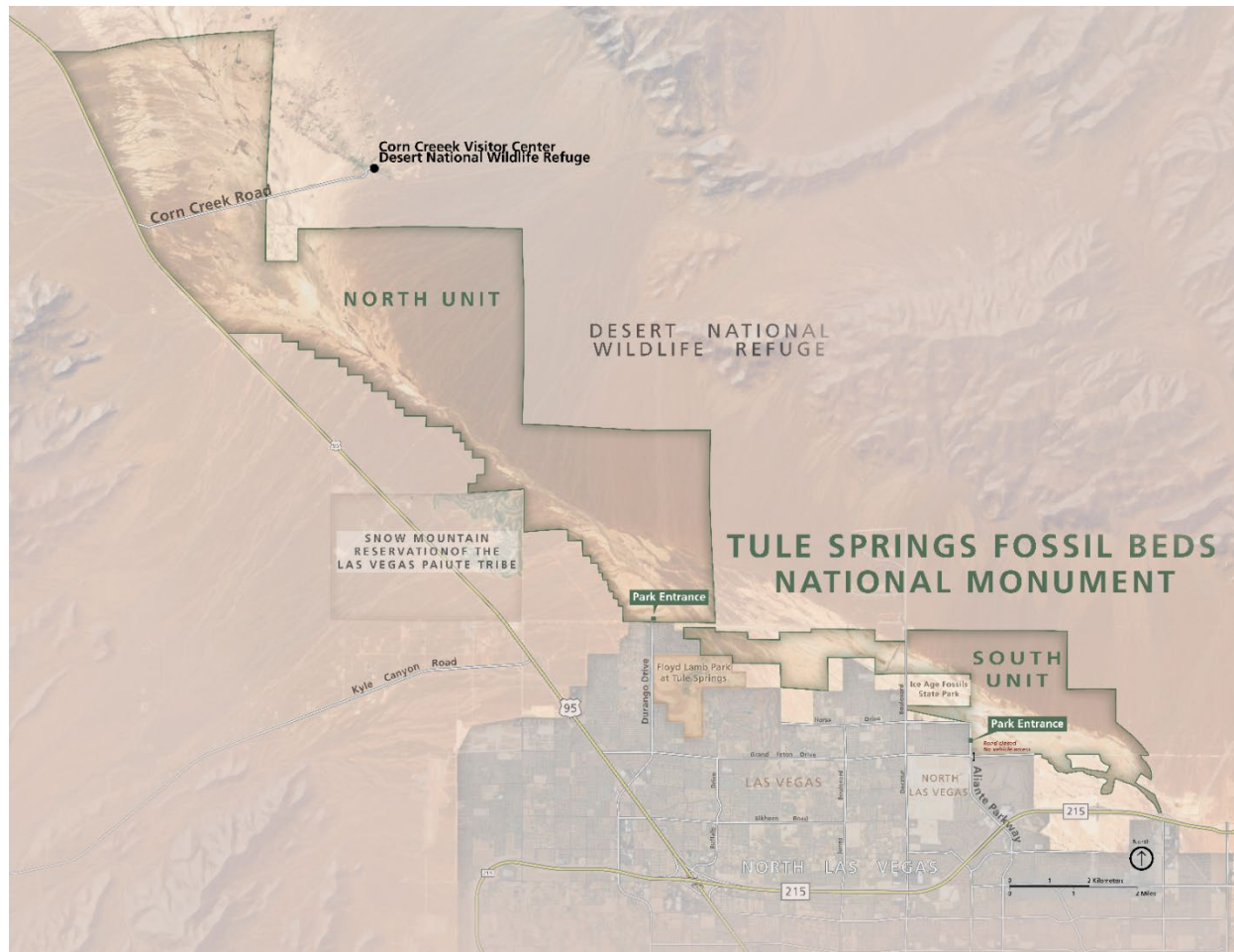


FIGURE 1. MAP OF TULE SPRINGS FOSSIL BEDS NATIONAL MONUMENT

## Tribal Engagement Guiding Principles

To understand the landscapes within Tule Springs Fossil Beds National Monument, one must consider the insights of culturally affiliated Tribal Nations about how the land is considered alive with feelings and purpose since the beginning of time when the world was new. Tribal representatives of Nuwu/Nuwuvi (Southern Paiute/Chemehuevi) Tribal Nations (from the federally recognized Las Vegas Paiute Tribe) met with NPS, Portland State University, and Southern Nevada Conservancy staff in February 2023 to discuss proposed Nuwu/Nuwuvi engagements with Tule Springs Fossil Beds National Monument at this early stage in the park's establishment. The following preliminary guiding principles are based on Tribal perspectives obtained during the February 2023 workshop. They will serve as a basis for future discussions between the Nuwu/Nuwuvi and the National Park Service, including the discussions and decision points outlined in this general management plan (GMP):

- The land at Tule Springs Fossil Beds National Monument and everything in it is alive with feelings and a purpose. Nuwu/Nuwuvi Tribal Nations in Nevada, Utah, Arizona, and California are human relatives of the land since the beginning of time when the world was new. For Nuwu/Nuwuvi, there is no division between natural and cultural resources. The land requires Nuwu/Nuwuvi interactions to remain in balance, which was mandated by the Creator.
- The fossils and geologic features at Tule Springs Fossil Beds National Monument represent resources that Nuwu/Nuwuvi ancestors interacted with thousands of years ago that continue into the present and future.
- The land at Tule Springs Fossil Beds National Monument requires healing. Collaboration between Nuwu/Nuwuvi, the National Park Service, and other partners is critical to the healing process. Healing needs to be rooted in Indigenous knowledge and braided with other ways of knowing, such as western science, when required.
- Tribal–NPS engagements need to be proactive and not reactive. Rapport and trust can be cultivated through mutual respect, transparency, and open communication. Sharing information about Indigenous relationships with the park landscape requires rapport and trust built over time. New NPS staff and the next generation of Nuwu/Nuwuvi Tribal leaders and representatives need to be folded into the Tribal program accordingly to avoid losing momentum in the collaborative process.
- Progressive and adaptive information sharing, applied ethnographic research, resource co-stewardship/management, and public education are paramount to healing the land and sustaining meaningful Tribal engagements.

## Foundation Elements

The *Tule Springs Fossil Beds National Monument Foundation Document* (NPS 2019) provides the underlying basis for the general management plan (the plan), including core components that are intended to remain constant over time. These components are the park’s legislated purpose, significance, interpretive themes, and fundamental resources and values. In addition, the foundation document contains dynamic components (special mandates and administrative commitments, key issues, and associated planning and data needs) that can be updated as park conditions change. Appendix A provides the following sections of the foundation document, as they contain information pertinent to the general management plan:

- fundamental resources and values
- special mandates

Access the full foundation document at

[https://www.nps.gov/tusk/learn/management/upload/TUSK\\_FD\\_508.pdf](https://www.nps.gov/tusk/learn/management/upload/TUSK_FD_508.pdf).



## Park Purpose and Significance

The purpose statement conveys the reasons that the area was set aside as a national monument. Grounded in an analysis of park legislation and legislative history, purpose statements also provide primary criteria against which the appropriateness of plan recommendations, operational decisions, and actions are tested.

The purpose of Tule Springs Fossil Beds National Monument is as follows (NPS 2019):

The park conserves, protects, enhances, and interprets late Pleistocene fossils, their geologic context, and other scientific values in the upper Las Vegas Wash through education, research, community collaboration, and appropriate public use.

Significance statements capture the essence of the national park system unit's importance to the nation's natural and cultural heritage. They describe the unit's distinctiveness and describe why an area is important within regional, national, and global contexts. These statements help managers focus their efforts and limited funding on protection and enjoyment of attributes that are directly related to the purpose of the park unit.

The following significance statements have been identified for Tule Springs Fossil Beds National Monument. (Please note that the sequence of the statements does not reflect the level of significance.)

- **Fossils.** Tule Springs Fossil Beds National Monument encompasses one of the largest and most diverse late Pleistocene vertebrate fossil assemblages in the southern Great Basin and Mojave Deserts. The Tule Springs local fauna include large mammals and other vertebrates and date from approximately 100,000 to 12,500 years ago. Invertebrates, plant microfossils, and pollen also are present in these deposits.
- **Geologic Context.** The extensive and complex paleospring<sup>1</sup> deposits of Tule Springs Fossil Beds National Monument record vast desert wetland ecosystems that covered much of the Las Vegas Valley during the late Pleistocene. The depositional history of these marsh, wet meadow, and flowing stream environments provides the baseline climate record that serves as a standard of comparison for similar deposits throughout the American Southwest.
- **Evidence of a Fluctuating Climate.** The Pleistocene deposits at Tule Springs Fossil Beds National Monument provide a significant record demonstrating that desert wetland ecosystems expanded and contracted repeatedly in response to abrupt climatic fluctuations (on the scale of hundreds to thousands of years) and that this response was in step with the warm and cold cycles documented in global climate records. The continued study of these responses has current and future implications for understanding how modern desert wetland ecosystems respond to changes in climate.

---

1. A paleospring is a spring that existed in the distant past. In this case, the spring existed during the Pleistocene epoch, approximately 573,000 to 8,500 years ago.

- **Scientific Discovery at Tule Springs.** Tule Springs Fossil Beds National Monument has been a place of significant scientific research and discovery since the early 1900s. As a part of the Tule Springs Expedition,<sup>2</sup> the park became a notable site in North America where radiocarbon dating was used for the first time in a large-scale field study. Research at the park has provided a solid base for future studies, new discoveries, and the use of new technologies.

## PURPOSE AND NEED FOR THE GENERAL MANAGEMENT PLAN

### Rationale for General Management Planning

The National Parks and Recreation Act of 1978 and NPS *Management Policies 2006* require each unit of the national park system to have a general management plan. Director's Order 2: *Park Planning* (2021) specifies that a general management plan refers to (1) a stand-alone general management plan or (2) the planning documents in a park's planning portfolio that collectively meet the statutory requirements for a general management plan. A general management plan is needed to address legal and policy requirements and fulfill park planning priorities for resource protection, access, use, and development identified in:

- Pub. L. 113-291, 128 Stat. 3861, Sec. 3092, which established Tule Springs Fossil Beds National Monument; and
- 54 United States Code (U.S.C.) 100502 (general management plans). The statutory requirements, as described in the National Parks and Recreation Act, are the following:
  - measures for resource preservation
  - indications of the types and general intensities of development (visitor circulation and transportation patterns, systems, and modes), including general locations, timing of implementation, and anticipated costs
  - identification and implementation of commitments for visitor carrying capacities
  - indications of potential boundary modifications and the reasons for the modifications

For additional information regarding NPS general management planning and other applicable laws and policies, see appendix B.

### Tule Springs National Monument General Management Plan

The Tule Springs Fossil Beds National Monument General Management Plan builds on park legislation, laws, and policies and on the park's foundation document to develop a management vision for the park. The general management plan provides needed guidance

---

2. The Tule Springs Expedition of 1962–1963, also known as “The Big Dig,” was an extensive, multidisciplinary investigation of the natural and cultural history of Tule Springs.

for addressing parkwide issues and opportunities in the context of the park's purpose, significance, and special mandates, including cultural and natural resource preservation, facilities and infrastructure planning, climate change response, visitor use and experience, and partnerships.

Through civic engagement with the public, the plan provides a management vision based on a shared understanding of the conditions and level of development that would best achieve the park's purpose and conserve its fundamental resources and values. A general management plan is comprehensive and parkwide, addressing critical issues; for example, connected conservation beyond park boundaries, climate change adaptation and sustainability, socioeconomic environment, and equity and inclusion.

The purposes of this general management plan for Tule Springs Fossil Beds National Monument are as follows:

- Create a vision and clear direction for the future management of the park.
- Provide management guidance for the park's fundamental resources and values, including paleontological resources.
- Provide guidance for supporting and managing use of the park.
- Establish desired conditions and management zones.
- Establish priorities for allocating resources.
- Set and achieve goals for management to foster cooperative partnerships.
- Comply with public law and policies.

## SCOPE

This plan articulates the overarching management vision for the park and addresses the statutory requirements for general management planning at a programmatic level. The plan does not describe how particular programs or projects should be implemented but rather provides direction for the park that supports the National Park Service's valuable relationships with their legislated and community partners. This plan provides high-level guidance for the management of the park's natural, cultural, geological, and paleontological resources. The plan supports partnerships and co-stewardship to achieve and maintain desired conditions for all resources and visitor experiences. The plan is comprehensive in nature and provides broad strategies for addressing issues and opportunities in the context of the park's purpose, significance, and special mandates. The scope of the plan includes the entire park for zoning purposes. Where management differences between the north and south unit exist, those differences are explained.

The approval of this plan does not guarantee that the funding and staffing needed to implement all elements of the plan would be forthcoming. The implementation of the approved general management plan would depend on future funding, and it could be affected



by factors such as changes in NPS staffing, visitor use patterns, and unanticipated environmental changes. Full implementation could occur many years into the future.

Once the general management plan has been approved, more detailed planning, environmental compliance, consultations, and studies would be completed, as appropriate, before certain actions in the plan would be carried out. Future program and implementation plans that describe specific park management actions would be derived from the desired conditions and long-term goals set forth in this plan.

## **PLANNING ISSUES AND OPPORTUNITIES**

In 2019, preliminary project planning identified key issues with input from NPS staff; the Tule Springs National Monument Advisory Council; representatives from county, state, and city agencies and various organizations; and the public. It was determined that these issues would best be addressed with long-term, comprehensive guidance and management strategies. In 2022, the National Park Service invited park stakeholders and the public to provide comments, concerns, and ideas about Tule Springs National Monument at public meetings, through planning newsletters, and through the National Park Service's online public comment platform. Over the course of this comprehensive planning effort, the following issues emerged: the preservation of cultural, natural, archeological, paleontological resources; experiencing the park; responding to climate change and a dynamic environment; and partnerships. These issues are described in more detail below.

### **Resource Protection**

The park's fundamental resources include, but are not limited to, Pleistocene fossils; scientific research; cultural resources; museum collections; the paleoecosystem, geologic processes, and features; and public understanding and education.

Currently, research into the full extent and conditions of these tangible fundamental resources and values within the park boundaries is still in progress. The park may need to update its approach to resource management as new information becomes available. Previous and future surveys and studies completed before and after this general management plan will include documentation and specific guidance for resource management, visitor experience programming, and facility needs, as appropriate. Completed studies and assessments include the completion of vertebrate paleontology, stratigraphy, and paleohydrology (field guide); biological inventories (birds, bats, and large mammals); baseline conditions inventories (e.g., soundscape), and native and invasive plant inventories, and a climate change exposure report. Other surveys, assessments, and studies are ongoing and include the ethnographic overview and assessment; a climate change exposure report (NPS Climate Change Response Program); a scope of collections statement to define the scope of the park's museum collection holdings; an environmental remediation plan

following the completion of the Comprehensive Environmental Response, Compensation and Liability Act<sup>3</sup> (CERCLA) site inspection; and continued wildlife inventories.

The fossil resources at the park the primary purpose for the establishment of the park. Research conducted at Tule Springs Fossil Beds National Monument has been collaborative, involving scientists from other agencies and institutions across the country. More than 100 years of research and fossil collection prior to national monument designation have generated widely dispersed paleontological collections. Additionally, there are currently over 700 known fossil sites that are preserved in place at the park within soft, unlithified sediments. The upper Las Vegas Wash, which courses through the park, has the greatest potential for disturbances to these fundamental archeological and paleontological resources, such as damage or loss from weathering, erosion, and flash floods.

The park is located at a wildland-urban interface and near US Highway 95, making it easily accessible to the public. Before Tule Springs Fossil Beds became a unit of the national park system, the Bureau of Land Management authorized activities in the area, such as the use of firearms and off-highway vehicles and the collection of rocks and invertebrate fossils. These activities are not permitted under NPS law and policy; regardless, they continue to occur and have caused resource and environmental degradation. Additionally, park staff have documented incidents of illegal trash dumping and vandalism or theft of NPS property and resources. In some areas of the park, soils are contaminated with lead from accumulated bullets and expended shells/casings, with mercury from improperly disposed electronics and a variety of other pollutants associated with trash dumping. While remediation of 50 years' worth of trash dumping and ammunition debris is a long-term process, managing visitor issues and establishing new expectations for public use of these areas are critical resource protection steps.

## Experiencing the Park

Park managers need comprehensive guidance on providing for and managing visitor access and opportunities, particularly for connecting visitors with the park's fundamental resources and values, as outlined in the foundation document. This is particularly important given the park's proximity to a major metropolitan population of nearly 2.3 million people (Las Vegas metropolitan statistical area; US Census American Community Survey Data 2020). The wildland-urban interface at Tule Springs Fossil Beds National Monument presents numerous opportunities and challenges to balance resource protection and conservation with meaningful educational and recreation opportunities. The abundance of unique natural, cultural, archeological, and paleontological resources could provide a wealth of experienced-based learning and stewardship opportunities in the future as the park develops new educational programs, partnerships, and facilities to support visitor learning. A need also exists to help current and potential visitors better understand the transition of the park lands from former BLM management practices to those of a national park system unit. Further, as noted above, public neighboring lands are managed with differing missions, objectives, laws,

---

<sup>3</sup> The 1980 Comprehensive Environmental Response, Compensation, and Liability Act (EPA Superfund activities) provides a federal "superfund" to clean up uncontrolled or abandoned hazardous waste sites, as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.

and policies. Without clear boundaries and sufficient on-site information, the distinctions between management regulations are difficult for the public to understand. Finally, while park staff have acquired some data to understand patterns of visitor use, a need exists to further understand the number of visitors and their destinations within the park to inform future management.

## **Responding to Climate Change and a Dynamic Environment**

Tule Springs Fossil Beds National Monument provides a record of ecological change in response to shifts in global climate that spans hundreds of thousands of years. The National Park Service recognizes the importance of addressing the effects of current and future climate change in its planning and operations, an approach known as climate adaptation. Adaptation is a form of risk management that seeks to reduce climate-related vulnerabilities or take advantage of potential benefits. The NPS Climate Change Response Program prepared a climate futures summary for the park (NPS in prep.) examining plausible future climate conditions, including more than one climate scenario to help the park address uncertainty in how climate change might play out and develop forward-looking goals that account for changing conditions.

Tule Springs Fossil Beds National Monument has already experienced warming temperatures. The average annual temperature has increased over 2°F since 1900, and the rate of warming has increased dramatically since 1970. Precipitation has declined since 1970, and while annual precipitation totals remain highly variable, years with higher precipitation totals are occurring less frequently.

Over the coming years (2025–2055), climate projections for the park indicate that average annual temperature will increase between +1.8°F and +5.3°F compared to historical (1979–2012) annual averages. Extreme temperatures are expected to increase at the park, with a 243% increase in days exceeding the dangerous heat index threshold (when heat index >105°F) under a modest warming scenario and a 535% increase of those incidents under a more extreme warming scenario.

Climate projections indicate a range of annual precipitation change from -0.3 inches (-6%) to +1.5 inches (+29%) compared to historical (1979–2012) annual averages. However, extreme precipitation is expected to increase. Under a wetter climate scenario, the frequency of extreme rainfall events (where the park receives more than 1.5 inches of rain in a day) will increase, as will the amount of rain that falls during such events. Under a drier climate scenario, the frequency of extreme rainfall events would decrease; however, more rain would fall during those events than what the park experienced historically.

The combination of increasing temperatures and changes in precipitation patterns has implications for drought conditions. Drought frequency, severity, and duration would all remain similar to historical conditions under a wetter climate scenario. However, under a drier scenario, drought conditions will occur more often, be more intense, and last longer.

Climate change will likely increase the survivability and recruitment of certain invasive species as ecosystems and habitat conditions change. Invasive species compete with and

threaten native plants and wildlife, whose suitable habitat has already become degraded and condensed from urban development.

Climate change adaptation will play an increasingly important role in park resource management. Both historical trends and future projections suggest that park managers should prepare for increases in temperature, extreme precipitation events, and extreme heat and drought. These changes will compound many of the other issues described in this section and have direct implications on resource management, recreational facilities, park operations, and visitor use and experience. Some impacts are already occurring, and others are expected within the time frame of this plan. For example, temperature shocks may cause significant damage to future buildings and paved surfaces such as sidewalks. Extreme heat may impact visitor and staff safety as well. Much of the park sits in a wash that is prone to flash flooding, creating a constantly changing and dynamic environment. Climate change will exacerbate these processes, creating challenges for safely managing resources and visitor experiences in the park. This and future plans must consider that a dynamic landscape will continue to change and how park managers can proactively protect resources to the greatest extent possible.

This plan broadly establishes desired conditions based on the park's purpose and significance. More detailed studies on issues and associated facilities and services will be climate-informed and consider plausible climate scenarios. Although beyond the scope of this plan, park managers acknowledge the need to develop tools and strategies to adapt to climate change impacts on natural and cultural resources and visitor opportunities. The National Park Service will work in cooperation with federal agencies and states, counties, and communities to explore how best to model and adapt to the impacts of climate change on NPS-managed areas. Management strategies will be based on the best science available, conform to the mission of the National Park Service and relevant policies, and be within the park's available financial resources.

## **Partnerships**

The park shares boundaries with state, county, city, military, federal, Tribal, and private lands, creating an opportunity to increase collaboration and strengthen partner relationships. Partnerships can support the park by expanding the park's organizational capacity and providing expertise, resources, and collaboration for law enforcement activities. Some partnerships fulfill mutual needs for natural and cultural resource knowledge and field research opportunities, such as the US Geological Survey and the Desert Research Institute (Nevada System of Higher Education). Others facilitate multiagency efforts for resource protection, special projects, and law enforcement, such as Desert National Wildlife Refuge (US Fish and Wildlife Service); the Cities of Las Vegas and North Las Vegas, Clark County; and Nellis Air Force Base (US Air Force). A current key partner that supports operations is the park's friends' group, the Protectors of Tule Springs, which assisted in the designation of the national monument as a national park unit, and later was represented on the Tule Springs Fossil Beds Advisory Council. Tule Springs Fossil Beds National Monument also has a cooperating association, the Western National Parks Association, which supports NPS-led interpretation, education, and research activities through retail sales.

Tule Springs Fossil Beds National Monument places special importance on its partnerships with Tribes and other traditionally associated peoples who have a relationship to the lands within the park's boundary. The park has an existing relationship with the Las Vegas Paiute Tribe, but the park has opportunities to expand its partnerships with other Tribes and traditionally associated peoples. A lasting and meaningful partnership with all traditionally associated peoples ensures valuable Indigenous knowledge is applied where deemed appropriate by the holders of that knowledge and that those with ancestral connections to these lands are able to maintain that important relationship. Park managers and staff recognize that the lands within park boundaries are more than just a national monument but also the ancestral homeland to the original stewards of the land.

## **HOW TULE SPRINGS FOSSIL BEDS NATIONAL MONUMENT IS ADDRESSING THE FOUR STATUTORY GMP REQUIREMENTS**

This plan articulates the overarching management vision for the national monument and, at a programmatic level, addresses the four statutory requirements: resource preservation, types and general intensities of development, visitor carrying capacity, and external boundary modifications. Given the dynamic nature of park operations and issues, the descriptions for each requirement include references to subsequent planning needs to better meet the statutory requirements through the park's planning portfolio. The general management plan would be complemented by the collective of existing and subsequent plans in the park's planning portfolio. These complementing plans can be programmatic, strategic, or direct/implementation. Subsequent plans would be consistent with the approved general management plan and the *Tule Springs Fossil Beds National Monument Foundation Document*; they would require additional analysis and compliance for implementation.

### **Resource Preservation**

This plan identifies desired conditions for natural, cultural, paleontological, and archeological resources in the park's management zones. Subsequent plans, inventories, surveys, and assessments would be consistent with the approved general management plan and would include specific recommendations for the preservation of the park's resources—for example, the park's north unit archeological survey, historic resource study, and others.

### **Types and General Intensities of Development**

Through identifying zoning and establishing desired conditions, this plan indicates the types and general intensities of development to support appropriate public enjoyment and use. While this plan does not propose any facility development, it does establish desired conditions in each management zone that would inform and direct any potential future facility development. Subsequent management direction and implementation plans, which would be consistent with the approved general management plan, would include more extensive details and analysis to support the park's future strategic facility investment needs.



## Visitor Capacity

This plan identifies desired conditions for visitor use and experience, as well as indicators, thresholds, objectives, and a range of potential management strategies that would respond to changes in visitation (appendix C). The plan also identifies general intensities of use and activities associated with public enjoyment and use of the park. Visitor use data are limited for the park due to its recent establishment; therefore, this plan does not identify visitor capacities but rather establishes baseline conditions for visitation and indicators and thresholds, as well as actions for data acquisition that would support the identification of visitor capacities in future implementation plans. With a local population of more than 2 million people and a local tourism and hospitality industry that draws 40 million tourists annually, potential visitation to the park could grow rapidly as public awareness increases. As needed, subsequent plans would be developed that include more detailed management strategies to support visitor use and experience.

## External Boundary Modifications

The National Park Service, in accordance with the National Parks and Recreation Act of 1978 (Pub. L. 95-625), also requires that general management plans determine whether park boundaries are adequate for protecting resources or whether they need to be adjusted to carry out park purposes. National Park Service *Management Policies 2006* states that the National Park Service will conduct studies of potential boundary adjustments and may make boundary revisions to include significant resources or opportunities for public enjoyment related to the purposes of the park; to address operational and management issues, such as boundary identification by topographic or other natural features; or to protect park resources critical to fulfilling park purposes. National Park Service policies also instruct that any recommendation to expand park boundaries be preceded by determinations that the added lands will be feasible to administer considering size, configuration, ownership, cost, and other factors and that other alternatives for management and resource protection have been considered and are not adequate.

Activities adjacent to the park's boundaries have the potential to impact park resources. Resources don't stop at the park's boundary. The general management plan will address how to best protect the park's resources and evaluate whether any boundary changes should be recommended.

# Chapter Two: Alternatives

# 2

---



This page intentionally blank.



## **CHAPTER 2: ALTERNATIVES**

### **INTRODUCTION**

This environmental assessment analyzes one preferred alternative (NPS preferred alternative) and the no-action alternative. The action alternative presents a different approach than current management to fulfill the plan's purpose and need, as described in chapter 1. The action alternative was developed by an interdisciplinary planning team, with recommendations from the Tule Springs Advisory Council, stakeholders, and public comments. The no-action alternative would continue current management and provide a basis for comparing the effects of the other alternative.

This chapter includes the following:

- the general management planning framework for Tule Springs Fossil Beds National Monument, Nevada
- desired conditions
- management strategies and actions
- management zones
- user capacity guidance
- boundary modifications guidance

The actions that will be analyzed under the National Environmental Policy Act (NEPA) in the following chapters are limited to those that have the potential to affect the human environment, are likely to be implemented in the foreseeable future, and are sufficiently developed. As strategies presented in this plan are further developed, additional compliance will be completed as necessary.

### **MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES**

Mitigation measures and best management practices have a central role in implementing planning actions and are designed to prevent or minimize adverse impacts or to contain impacts within acceptable limits during and after implementing a federal action. As a result, the National Park Service routinely evaluates resources and implements mitigation measures and best management practices whenever conditions are present that could adversely affect the sustainability of national park system resources.

The Council on Environmental Quality describes mitigation measures as the following (CEQ 2022):

- avoiding an impact through not taking an action or parts of an action
- minimizing impacts through limiting the degree or magnitude of an action

- rectifying impacts by repairing, rehabilitating, or restoring the affected environment
- reducing or eliminating impacts by preservation and maintenance operations during the life of the action and compensation for the impact by replacing or providing substitute resources or environments

Regardless of the alternative, should development be pursued in the future, mitigation measures and best management practices would be applied. Refer to appendix E for a detailed list of mitigations measures and best management practices that would be applicable to this planning effort.

### **Alternative A: NPS Preferred Alternative Management Vision**

Tule Springs Fossil Beds National Monument managers aspire to work closely with stakeholders and cultivate partnerships to meet the scientific, resource protection, interpretation, and operational needs of the park. Park managers envision the park as a living laboratory that supports scientific research with both local and global significance. Park staff collaborate with partners to explore new practices and methods for the conservation of sensitive natural and cultural resources. Science is integrated into the park experience, making research accessible to visitors to spark curiosity, understanding, and stewardship. Interpretive programs and media are designed to complement surrounding public land visitor experiences. Tule Springs Fossil Beds National Monument is a place where visitors feel connected to park stories and resources and understand how they are intertwined.

### **Management Zones**

The National Park Service uses management zoning to identify and describe the variety of resource conditions and visitor experiences to be achieved and maintained in different areas of a park unit. In most cases, zoning is the spatial application of statements of desired conditions, where they describe the conditions, outcomes, and opportunities for specific areas of a park.

Under alternative A, this plan would rely on three management zones to define specific desired conditions and visitor experiences to achieve and maintain in each area of the park—Resource Protection and Research, Visitor Experience, and Orientation and Development. Each management area would apply to a different geographic location (see descriptions below and figure 2). Each management zone would be associated with a general level of management guidance or direction, including the types of activities and facilities that are appropriate in that management area (table 1). The management zones would be consistent with and help achieve the specific purpose, significance, and special mandates for Tule Springs Fossil Beds National Monument. Descriptions of the management zones are in table 2.

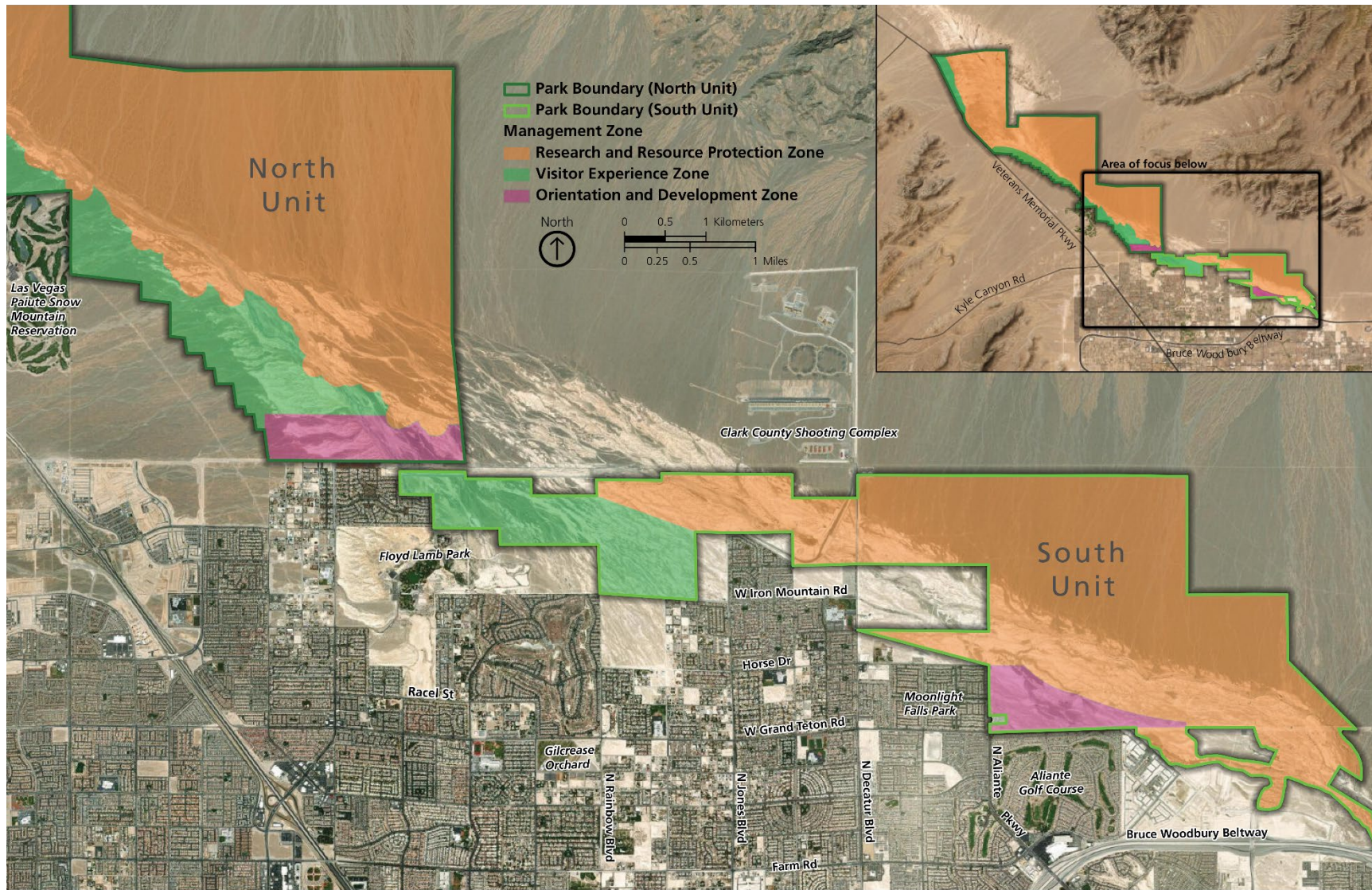


FIGURE 2. PROPOSED MANAGEMENT ZONES FOR TULE SPRINGS FOSSIL BEDS NATIONAL MONUMENT



## Desired Conditions

Desired conditions are statements of aspiration that describe resource conditions, visitor experiences and opportunities, and facilities and services that the National Park Service strives to achieve and maintain in a particular area (IVUMC 2016). Desired conditions help bring to life the vision for resources, visitor experiences and opportunities, facilities, and services that the National Park Service aims to provide and maintain, including the appropriate areas for potential facilities and services. Since desired conditions are aspirational by nature, they are written in the present tense and describe what an area strives to achieve. Desired conditions focus on fundamental resources and values (appendix A); the visitor experience and opportunities associated with them; and the types and levels of management, development, and access that would be appropriate throughout Tule Springs Fossil Beds National Monument or in a particular location in the park.

### Parkwide Desired Conditions

Table 1 lists desired conditions that apply parkwide.

**Table 1. Parkwide Desired Conditions**

Theme	Desired Conditions
<b>Paleontological Resources</b>	<ul style="list-style-type: none"> <li>Fossils and other paleontological resources are showcased and interpreted as the most fundamental resources and learning tools in the park that connect both visitors and researchers to the Pleistocene epoch.</li> <li>Paleontological resources are recognized and valued for their inherent value as teaching tools from the past that communicate themes related to extinctions and survival and promote to a sense of stewardship and conservation among those who interact with them today.</li> <li>The park is a leader in paleontology management programs by incorporating multidisciplinary techniques and Tribal involvement. New, traditional, and multidisciplinary approaches ensure the park incorporates multiple ways of understanding fossils and other paleontological resources.</li> <li>Researchers have opportunities to study paleontological resources and share information to better promote the importance of these resources in relation to changing environments and extinction.</li> <li>Park staff strive to fulfill the park's enabling legislation for on-site exhibition and the interpretation of paleontological resources.</li> <li>Paleontological collections from the park, including externally managed collections, are accessible to support research efforts. Tule Springs Fossil Beds National Monument's museum program maintains interdisciplinary records for paleontological collections to preserve its geologic and cultural context in perpetuity.</li> </ul>
<b>Cultural Resource</b>	<ul style="list-style-type: none"> <li>The park honors, values, and prioritizes the history of and relationships with Tribes and Indigenous peoples associated with lands in and around the park.</li> <li>All cultural resources, including archeological, ethnographic, historic, and other related resources, are managed to promote co-stewardship among the park and all with Tribes and Indigenous peoples associated with lands in and around the park.</li> <li>Tribes and Indigenous peoples associated with lands in and around the park continue to have access to collections to maintain cultural practices and deepen the public's understanding of the importance of sustaining these practices.</li> <li>Archeological resources found throughout the park are representative of the diverse cultural heritage of the region's inhabitants and present a valuable record of human use and adaptation to the changing environmental conditions of the area. These archeological resources are documented and managed consistently with archeological best practices and traditional knowledges deemed appropriate by those who uphold this knowledge.</li> </ul>

Theme	Desired Conditions
	<ul style="list-style-type: none"> <li>• Historic sites and cultural landscapes, including the Tule Springs Archeological Site, Las Vegas-Tonopah Railroad and Wagon Road, and Native American Salt Song Trail and other travel routes are preserved to the extent possible to reflect their period of significance given erosion, climate change, and other drivers of change. Historical information related to the Tule Springs area is researched to identify historic themes related to the park.</li> <li>• Artifacts from the Tule Springs expedition and other historic expeditions unearthed during archeological surveys speak to the historical significance of the park and communicate the history of science at Tule Springs and how perspectives change over time.</li> <li>• The historic landscape demonstrates the work and contributions of scientists and the role they played in supporting studies of Ice Age megafauna and their relationship with early peoples, in addition to the site's role in the early use and application of radiocarbon dating.</li> <li>• Archives related to the history of Tule Springs area are consolidated, well preserved and accessible to researchers and the public. This information is digitized, when possible, to further increase accessibility.</li> </ul>
<b>Natural Resource</b>	<ul style="list-style-type: none"> <li>• The park recognizes and celebrates that many of its unique natural resources are considered important traditional, cultural, and ethnographic resources by Tribes and Indigenous peoples associated with lands in and around the park. Co-stewardship and continued traditional access to the landscape and its resources is critical for not only the health of the resources, but the continuation of these partnerships and the park itself.</li> <li>• The park is prepared for the potential effects of global climate change on its local environment. The impact of changed hydrologic processes on park resources is well understood, and management decisions are informed by scientific findings. The park protects and maintains an important climate record and supports on-site research and collaboration to further understand the effects of climate change.</li> <li>• All natural resource management remains dynamic and adaptive and considers the potential impacts of climate change. Damage to natural resources is mitigated to the greatest extent possible given the effects of a changing climate.</li> <li>• The park functions as a gateway to al desert ecosystem from the surrounding urban environment. The interface between undeveloped and developed areas prioritizes resource protection and reflects the values of the National Park Service and the surrounding community.</li> <li>• Stewardship, resource protection, and innovation are not only promoted, but also celebrated.</li> <li>• Damaged sensitive resources and areas are mitigated so that they may be restored to their best possible condition so that they can continue to benefit the ecosystem, key cultural associations, park's mission and history, and visitor experience.</li> <li>• Wildlife research promotes region-wide conservation strategies for sensitive species.</li> <li>• The park prioritizes and promotes research, conservation measures, and regionwide conservation efforts for sensitive species to minimize negative impacts.</li> <li>• Wildlife, vegetation, and their habitats are left undisturbed to the highest degree possible to maintain a healthy ecosystem.</li> <li>• Habitat connectivity for native plants and wildlife, including threatened and sensitive species, is managed to enhance the conservation and well-being of these species to the extent possible, given the effects of climate change.</li> <li>• The health and growth of native plants is promoted in all parts of this zone to support the local ecosystem and natural setting and support connective habitat.</li> <li>• Designated preserves and conservation areas are managed and monitored with the highest levels of protection and conservation relative to other areas of the park. Some species and habitats in these areas are some of the most fundamental features.</li> </ul>

Theme	Desired Conditions
<b>Visitor Experience</b>	<ul style="list-style-type: none"> <li>• Tule Springs Fossil Beds National Monument staff provide an immersive experience where visitors feel a strong sense of place and time. Interpretive experiences highlighting the rich cultural and natural history of the park give visitors the opportunity to make connections to the past and include a human history and the fossil record.</li> <li>• Visitors of all abilities and outdoor skill levels have opportunities to experience and recreate in the park to make meaningful connections to its resources and become stewards.</li> <li>• Learning and understanding are key components of the visitor experience and can happen throughout the park and in the larger community. Interpretive media communications (on-site, virtual, and digital) and both self-guided and staff-guided experiences are designed to empower visitors to connect park resources with broader values and experiences, while being accessible and meaningful to diverse audiences.</li> <li>• Visitors experience various scientific and cultural perspectives, including emerging and traditional methods, that promote the conservation and enjoyment of the park and its resources while visiting.</li> <li>• The park links recreational, scientific, educational, and other critical park experiences to surrounding urban infrastructure for easier and more accessible visitation. The visitor experience at the park complements the experiences found in the surrounding area. Interpretive information about park resources can be found in the local community in the form of exhibits, waysides, and publications to connect overlapping interpretive themes.</li> <li>• Recreational opportunities are prioritized in areas that do not compromise sensitive resources and sites, and all applicable types of use are thoroughly analyzed for compatibility in a designated area to promote a range of visitor opportunities.</li> <li>• Wildlife enthusiasts can experience a sense of time transcendence knowing that some species found in the fossil record can be observed today.</li> <li>• Citizen science programming and educational conservation projects are supported, where applicable, and visitors have opportunities to report resource sightings/discoveries, understanding that their participation helps further resource conservation at the park.</li> <li>• The park creates a welcoming environment for neighbors, local communities, and the public to engage in various types of recreation for well-being and to experience the park's resources and scenery.</li> <li>• The park offers a variety of visitor facilities that support and enhance visitor enjoyment, learning, collaboration, and recreation. Visitor facilities, including, but not limited to, trails, waysides, parking, and contact facilities, are designed to make the facility or area as accessible as possible, given environmental and landscape constraints, and use context-sensitive designs to minimize contrast and intrusion to the natural setting.</li> </ul>
<b>Partnerships</b>	<ul style="list-style-type: none"> <li>• Partnerships remain critical for managing the park so that staff may accomplish the park's mission and do so in a sustainable, thoughtful, and meaningful way. Shared and collaborative interests allow the park to effectively maintain access for Tribes and Indigenous groups, manage resources, educate visitors, and create recreational opportunities.</li> <li>• Relationships with all interested Tribes and other traditionally associated peoples who call the area in and around the park their ancestral home are critically important. These partnerships are lasting and mutually beneficial relationships characterized by trust, transparency, and positivity.</li> <li>• Cultural practices of traditionally associated peoples continue to preserve their ties to the lands, resources, and stories in the park.</li> <li>• Park managers regularly consult with Tribes and other associated peoples to ensure original place names, histories, and stories and that ongoing uses are accurately represented and appropriately shared in interpretive materials.</li> <li>• As deemed appropriate by Tribes and other Indigenous peoples, traditional ecological knowledges and history are incorporated to maintain and improve resources to their healthiest state possible. This knowledge aids in the protection of historically, spiritually, and culturally significant sites and resources in the park, and park staff will prioritize procedures and practices in support of co-stewardship with Tribal Nations.</li> </ul>

Theme	Desired Conditions
	<ul style="list-style-type: none"> <li>• Research and co-stewardship opportunities for researchers and scientists of varied backgrounds are abundant in the park. These efforts help further the park's mission, protect its fundamental resources and values, and conserve its cultural and natural resources.</li> <li>• Park managers collaborate with and support the efforts of partner organizations, such as the Protectors of Tule Springs, to conduct educational programs, research, community involvement, youth engagement, recreation, and conservation.</li> <li>• Park managers maintain a collaborative network of Pleistocene research-focused institutions to further understand new scientific methodology and findings.</li> <li>• Park managers maintain positive working relationships with neighboring public land managers, including Ice Age Fossils State Park and Desert National Wildlife Refuge, for resource stewardship, interpretation, and visitor recreation in support of the purpose of the park.</li> <li>• Reaching diverse audiences that represent the communities surrounding the park and around the nation are critical to maintaining quality visitor experiences. Park managers remain open to building new and mutually beneficial relationships with interested parties and organizations to advance educational, recreational, collaborative, and research opportunities.</li> </ul>

## Desired Conditions by Management Area

Table 2 contains a detailed description of each zone and its associated desired conditions zone.

**TABLE 2. MANAGEMENT ZONE DESIRED CONDITIONS**

Theme	Resource Protection and Research Zone	Visitor Experience Zone	Orientation and Development Zone
<b>Zone Description</b>	<ul style="list-style-type: none"> <li>The Research and Resource Protection Zone has unmodified features and a natural-appearing environment. Critical resource protection and strategic research opportunities are the guiding concepts for managing this zone and takes precedent over visitor use and development.</li> <li>This zone protects areas with highly sensitive fundamental paleontological, geological, cultural, and natural resources. These resources are the most highly managed within the park boundary to ensure their protection and study. Resource management seeks to retain the inherent and natural value of soundscapes, views, and plant communities and all other resources and features. This zone has the highest potential for rich scientific field research and inventory and monitoring programs compared to other zones.</li> <li>Visitor use in this zone is supplementary to resource protection and research and is prioritized in other zones. Any trails and limited modifications that occur in this zone maintain a natural appearance to the greatest extent practicable, while avoiding sensitive natural and cultural features. Although there may be limited self-guided experiences in this zone, most visitor interaction with sensitive resources is managed in this area with guided</li> </ul>	<ul style="list-style-type: none"> <li>The Visitor Experience Zone has key features and resources, a mostly natural-appearing environment, and some development that supports the visitor experience. The balance between visitor use and resource protection is the guiding concept for overall management in this zone, which may result in varied visitor opportunities and some development.</li> <li>Resources in this zone are highly protected and managed but are more accessible for visitors to connect with compared to the Resource Protection and Research Zone. Although resources are more easily accessible in this setting, resource protection takes precedent over visitor use and is prioritized and/or mitigated when creating new visitor opportunities.</li> <li>Visitors are able to experience visual and physical connectivity to fundamental resources. This safely connects visitors with resources from the past and present, while still providing a wide range of visitor experiences. Although some outdoor skills and familiarity may be required in some areas, accessible opportunities for visitors of all abilities are provided as both guided and unguided experience. There are low-to-moderate levels of day use that may range from a few hours to all day, and visitors expect to encounter each other on a regular</li> </ul>	<ul style="list-style-type: none"> <li>The Orientation and Development Zone has contemporary structures and amenities, some natural features, a modified landscape, and the presence of both visitors and staff. The harmonious conceptual and physical interface between the undeveloped setting of the park and proximate urban environment is the guiding feature and concept for the management of this zone. The Orientation and Development Zone supports visitor use and park operations, serving as primary locations for recreation, visitor interpretation, research, park administration, and maintenance functions.</li> <li>Resources are managed in a way that balance resource protection with all other Tribal, visitor, and staff functions. Although resources in this zone may be disturbed, their protection is considered a high priority in relation to all other activities. Resources found in a more natural setting may be less common compared to other zones but are showcased in a protected and developed environment.</li> <li>Visitor use levels are likely to be highest in this zone, and visitor use focuses on orientation and education. Although opportunities for visitor experiences in a natural setting may be limited, this zone provides a wealth of trip planning and scientific information about the park and its</li> </ul>

Theme	Resource Protection and Research Zone	Visitor Experience Zone	Orientation and Development Zone
	<p>interpretive experiences that focus on the conservation and the scientific process which provide experiences for varied skill levels. Navigation may be challenging due to limited signage and rugged terrain. Overall, visitor use is low compared to the two other zones. This zone may accommodate commercial use that is compliant with park values, management priorities, resource protection, and visitor safety.</p> <ul style="list-style-type: none"> <li>This zone is the least developed in the park and contains limited visitor amenities. Any development that occurs in this zone is related to visitor safety and scientific research and is temporary, when possible. The zone retains a relatively undeveloped character that prioritizes the natural environment and its resources.</li> </ul>	<p>basis in this zone. Finally, this zone may have opportunities for commercial use authorizations that are compatible with resource protection.</p> <ul style="list-style-type: none"> <li>Development in this zone is most typically implemented to support the visitor experience and protect park resources, where necessary. Although development is limited to mostly simple and unobtrusive directional signs and visitor amenities that interface well with the undeveloped nature of this setting, there may be instances of human-made structures in some areas that create the least impact on resources as possible. There are low-to-moderate levels of day use, and the potential for commercial use authorizations is accommodated.</li> </ul>	<p>resources. This area may have some trails, including accessible trails, but experiences are more likely to prioritize self-guided wayfinding and exhibits that focus on learning about fundamental resources and history. Visitors should expect to frequently encounter other visitors here, and visitors do not need a high degree of outdoor skills in this area. Some commercial use may be present in this area, as authorized by park management, that includes orientation areas, equipment storage, and other visitor experiences.</p> <ul style="list-style-type: none"> <li>Facilities and amenities are managed to provide safe, secure, and appropriate functions required for park management and visitor experiences. This area is the most developed of the three zones, but this development is completed so that it does not significantly impact fundamental resources or mitigate these impacts. Only necessary facilities, structures, and amenities are established to support park operations and visitor experiences and the park's overall mission, goals, and enabling legislation.</li> </ul>
<b>Paleontological Resources</b>	<ul style="list-style-type: none"> <li>Pleistocene fossils are the main focal points in this zone and are prioritized for research, protection, and excavation, when possible.</li> <li>All paleontological resources are documented, monitored, and protected by park resource staff to the greatest extent possible. Some of the most sensitive paleontological resources in the park are in this zone and may be more highly managed.</li> </ul>	<ul style="list-style-type: none"> <li>Fossil sites are monitored regularly by resource staff, according to the park's paleontological monitoring schedule.</li> <li>Fossil photographs and replicas may be shown to visitors as a substitute for visiting sensitive paleontological sites.</li> <li>Sensitive resources exist in this area to be learned about and appreciated but are protected from potential damage.</li> </ul>	<ul style="list-style-type: none"> <li>Guided interpretive experiences may be limited in this zone but serve as the main repository for fossils collected in the park and provide additional learning opportunities for paleontologists to study Pleistocene fossils.</li> <li>Paleontological resources are not likely to be found in their natural state and are moved for their protection and study.</li> </ul>



Theme	Resource Protection and Research Zone	Visitor Experience Zone	Orientation and Development Zone
	<ul style="list-style-type: none"> <li>Paleontological resources in this living research area are managed so that they are left undisturbed when not formally excavated. Data generated from this area are vetted, reviewed, and shared with the paleontological community to promote research and an understanding of the fossils in the park.</li> </ul>	<ul style="list-style-type: none"> <li>Leave-No-Trace and resource protection language is used in signage and park messaging that emphasizes and clearly communicates the importance and sensitive nature of the paleontological resources.</li> </ul>	
<b>Cultural Resources</b>	<ul style="list-style-type: none"> <li>The Tule Springs Archeological Site is maintained and preserved, to the extent possible given the effects of erosion, for its historic and scientifically significant value. Archeological and paleontological techniques that were innovative during the excavation of this site are showcased and interpreted. Researchers benefit from reinvestigating these sites and the body of knowledge that originated at this site.</li> <li>All cultural resources are documented, monitored, and protected by park resource staff to the greatest extent possible. Some of the most sensitive cultural resources in the park are in this zone and may be more highly managed.</li> <li>Visitors may have opportunities to engage with cultural resources in this zone; however, this would nearly always involve staff-guided interpretation.</li> <li>Specific sites and areas deemed culturally and spiritually significant by partner Tribes are protected. These significant sites are preserved to maintain the spiritual and cultural connection and may be closed off to the general public.</li> </ul>	<ul style="list-style-type: none"> <li>Cultural resources are documented, monitored, and protected by park resource staff to the greatest extent possible, and their protection is prioritized.</li> <li>Opportunities for the guided interpretation of cultural resources' significance and history do not compromise the integrity and protection of these resources. These experiences include accurate information that is collaboratively produced under the guidance of Indigenous peoples associated with park lands.</li> <li>Interpretive signs in this zone share and emphasize the culture and history of those who have lived on this land for time immemorial. These interpretive materials are created in conjunction with those who have been identified as having ancestral relationships with the Tule Springs area to communicate honest and culturally significant messages.</li> <li>Specific sites and areas deemed culturally and spiritually significant by partner Tribes are protected. These significant sites are preserved to maintain the spiritual and cultural connection and may be closed off to the general public.</li> </ul>	<ul style="list-style-type: none"> <li>Cultural resources in this zone may be housed in a secure facility that supports their research, understanding, Tribal engagement, and interpretation.</li> <li>Engagement with cultural resources is encouraged, though it is primarily done so through exhibits and waysides at locations deemed safe for self-guided experiences based on resource conditions and sensitivity. Visitors may have opportunities for staff-guided experiences at additional sites.</li> <li>Cultural resources are not likely to be found in the natural environment and are moved for their protection.</li> </ul>

Theme	Resource Protection and Research Zone	Visitor Experience Zone	Orientation and Development Zone
<b>Natural Resources</b>	<ul style="list-style-type: none"> <li>• Sensitive habitat and natural resources in this zone are protected to the highest degree in the park to prioritize natural resource management and conservation, which may include seasonal and permanent closures.</li> <li>• Wildlife and the associated environment are protected in a manner that preserves the connected nature of an ecosystem's past, present, and future. Wildlife protection is prioritized over visitor use and research.</li> <li>• Past and present geologic and hydrologic features and processes are protected so that they may continue to add to the unique features of the landscape. These natural systems and processes also provide opportunities for scientific learning and an improved understanding of the environment.</li> <li>• Research is conducted so that natural resources are minimally impacted, and researchers gain a better understanding of local wildlife through field work.</li> </ul>	<ul style="list-style-type: none"> <li>• Wildlife and natural resource protection is prioritized and balanced with visitor use and study.</li> <li>• Natural resources can be found in their natural state and are both managed and interpreted to promote their protection, interpretation, and stewardship.</li> <li>• Where possible and needed, natural resources receive supplementary management to mitigate the increasing intensity of processes like erosion and runoff.</li> </ul>	<ul style="list-style-type: none"> <li>• Wildlife, sensitive vegetation, and other natural resources are less likely to be spotted in this zone.</li> <li>• Resources in this zone are considered valuable assets to the landscape and are integrated or mitigated in the area's design.</li> <li>• Natural resources are considered in the mitigation of processes, like erosion and runoff, especially as these processes become more intense as the effects of climate change become more apparent.</li> </ul>
<b>Visitor Use and Experience</b>	<ul style="list-style-type: none"> <li>• Visitors have the opportunity to learn about and appreciate the sensitive nature of fossils and other resources in the park. Visitors also gain an understanding of the importance of a highly managed visitor experience in this zone.</li> <li>• Visitors experience this zone and engage with resources by foot and necessary adaptive equipment when not on designated roads.</li> <li>• Although visitors have opportunities to experience park resources, present and historic uses of the land, and other</li> </ul>	<ul style="list-style-type: none"> <li>• Visitors likely have the opportunity to experience a formal, guided interpretive experience in this zone where they can learn about fossils, human history, wildlife, vegetation, and other important features of the landscape.</li> <li>• Visitors have some opportunities for self-guided experiences to explore and learn about resources in the park. Trails and other amenities that disturb the environment at little as possible may aid in visitor learning.</li> <li>• Visitors can expect to frequently encounter other visitor groups and are relatively close</li> </ul>	<ul style="list-style-type: none"> <li>• This zone remains highly accessible to visitors of all abilities and is well marked so visitors can orient themselves to the special resources and experiences in the park and plan their visit.</li> <li>• Visitors can expect to find amenities in this zone, which may include water, restrooms, and other conveniences.</li> <li>• This zone contains the most concentrated amounts of visitor use. Visitors are adjacent to the urban interface and other modern conveniences. Visitors can expect to frequently encounter other visitors and staff</li> </ul>

Theme	Resource Protection and Research Zone	Visitor Experience Zone	Orientation and Development Zone
	<p>important information at various sites through self-guided and collaborative experiences, fossil sites are only accessible through guided experiences. These experiences create a sense of connection and care for the fossils and artifacts and other resources in the park.</p> <ul style="list-style-type: none"> <li>This zone has limited opportunities for immersive self-guided interpretive experiences where visitors are able to understand, in clear and straightforward language, the landscape and resources around them.</li> <li>Visitor experiences are more dispersed in a near more natural setting compared to other zones. Visitors may encounter few-to-no other visitors compared to other zones. Navigating this zone may require a high degree of self-reliance, as visitors may be far from the urban interface, developed areas, and emergency services.</li> <li>Visitors may have opportunities to view wildlife from a distance that is safe and protects both the wildlife and the visitors.</li> </ul>	<p>to the urban interface. Although a high level of outdoor skill level is likely not be required in this zone, visitors need to be comfortable with some level of self-reliance for short periods of time.</p> <ul style="list-style-type: none"> <li>Guided hikes may be offered to highlight excavation quarries, geologic features, or other areas of interest and connect visitors to scientific exploration beyond fossils.</li> <li>Transportation and visitor use on roads and trails are considered based on changing resource conditions and proximity that allow visitors and staff to travel throughout this zone safely and efficiently. This may result in temporary changes, reroutes, or closures that prioritize resource safety.</li> </ul>	<p>in this area. Few-to-no outdoor skills are necessary to have a meaningful visitor experience this area.</p> <ul style="list-style-type: none"> <li>This zone is the optimal area to educate visitors on fundamental values and resources, wildlife, wayfinding, and other park safety and orientation information. Visitors are educated through interpretative materials, species guides, written planning information, staff supervision, and other means.</li> <li>Visitors have opportunities to learn about and admire current Pleistocene knowledge, mainly through self-guided experiences, such as the fossil repository and museum exhibits.</li> <li>Self-guided experiences, such as interpretive exhibits, are the most accessible and readily available way for visitors to learn about and connect with all resources in the park.</li> </ul>
<b>Degree and Character of Development</b>	<ul style="list-style-type: none"> <li>Relative to all other zones, the Resource Protection and Research Zone is the least-developed zone and retain nearly all of its natural features and processes. Mitigation measures and development does not impact natural, paleontological, and archeological resources, to the greatest extent possible.</li> <li>Administrative roads maintained throughout this zone support park operations and emergency access.</li> </ul>	<ul style="list-style-type: none"> <li>Messaging regarding Leave No Trace principles and potential visitor impacts on resources is clear and in multiple languages to inspire a sense of respect and responsibility in visitors.</li> <li>Mitigations at historic paleontological sites, such as historic excavation sites, match the character of the landscape and are developed in a way that reflects the look and feel of the surrounding environment, preventing visual obtrusions and supporting resource preservation.</li> </ul>	<ul style="list-style-type: none"> <li>The Visitor Contact Zone is the most developed area in the park. This space is set aside for park staff to carry out scientific study, complete administrative duties, and act as a maintenance hub.</li> <li>Development supports Tribal engagement, allowing space for meetings, consultations, and collections access for groups who have ancestral ties to the lands within the park's boundary.</li> <li>Consistent with the enabling legislation, potential facilities and amenities would</li> </ul>

Theme	Resource Protection and Research Zone	Visitor Experience Zone	Orientation and Development Zone
	<ul style="list-style-type: none"> <li>Currently, existing roads/pathways may be modified or restored to be used as pedestrian-only trails.</li> <li>Trailheads have minimal signs but provide sufficient information for visitor orientation and safety. Trails are marked with natural-appearing elements and vary in length and difficulty. These rugged, yet varied, trails have adventurous and relaxing opportunities so that visitors can find their right sized adventure while remaining mostly self-reliant.</li> <li>Efforts to remediate damage to natural or cultural resources due to human or environmental forces match the character of the landscape. Resources are left in situ to the extent possible, and if they are removed from the park for educational or preservation purposes, priority given to maximizing interpretation of them and allowing for researcher access.</li> <li>There are few or no facilities and amenities constructed in this zone. Resource sensitivity guides the development of trails, and amenities are prioritized in areas that do not involve ground disturbance.</li> </ul>	<ul style="list-style-type: none"> <li>Amenities follow best practices for environmental sustainability and are adapted to current and potential future hazards. Sustainable, climate-adapted facilities also provide interpretive opportunities.</li> <li>Potential facilities and amenities can include the following: trails and trailhead parking, waysides, bathrooms, drinking water, benches, and multiuse recreation-based amenities and shade structures and be location dependent.</li> <li>Infrastructure, facilities, and wayfinding in this zone welcome visitors to the national monument and provide information that prepares them for their trip, whether it be limited to a more frontcountry or backcountry experience.</li> </ul>	<p>prioritize the on-site exhibition and curation of the resources to the extent practicable.</p> <ul style="list-style-type: none"> <li>Night-sky friendly lighting is used in this zone to minimize disturbances to nocturnal wildlife.</li> </ul>

## **Strategies to Achieve Desired Conditions**

This section identifies management strategies and actions that would be used to achieve and maintain the desired conditions and resolve issues and leverage opportunities.

Actions directed by the general management plan or in specific implementation plans would be accomplished over the years following the plan, as funding and staffing allows, and would be updated as needed. Park managers would continue to look for creative and diverse funding opportunities.

## **Parkwide Management Actions**

### **Science, Monitoring, and Research**

- Support research to increase the understanding of the park's natural resources and processes, including studies on dynamic processes, such as erosional processes, which can lead to loss of nonrenewable fossil resources and contextual information.
- Support opportunities for internally and externally conducted natural resource inventory, surveys, and monitoring that may include activities such as desert tortoise monitoring, special status species monitoring, common raven nest monitoring, and LeConte's thrasher surveys.
- Support inventory and monitoring programs for paleontological, archeological, and other priority resources.
- Develop policies and protocols to expand permissible and safe permitted research of all park resources; utilize the NPS Research Permit and Reporting System to facilitate and monitor research access within the park boundary.
- Stay current in paleontological research through the use of emerging technologies and best practices.
- Collaborate with partners to maintain relevant and practical management strategies to respond to climate change.

### **Facilities**

- Develop a comprehensive sign plan and wayfinding plan to provide consistent wayfinding throughout the park. Plan implementation may include, but is not limited to, the availability of maps, road-based signs, NPS boundary markers, and signs to indicate the type and intensity of trail use (pedestrian, bicycle, equestrian).
- Develop parkwide planning for trail use and potential trail development in the appropriate management zones, including the following:
  - Inventory and assess existing roads and trails in the park.
  - Prioritize the use of existing roads for future circulation and transportation.

- Identify and designate types of use on trails, including accessible, pedestrian, equestrian, and bicycle use.
  - Identify necessary actions to maintain visitor and staff safety on trail systems during extreme heat and precipitation events.
- Determine and prioritize optimal locations for visitor amenities.
- Identify the most suitable sites for development and methods to minimize ground disturbance for fossil resources protection.
- Conduct a feasibility study to determine potential facilities and visitor amenities that would prioritize the on-site exhibition and curation of resources.
- Determine the locations for and the extent of concessions.

### **Operations**

- Collect visitor use counts and statistics.
- Collaborate with local agencies for law enforcement support in the park.
- Evaluate staff organization and assess for efficiencies in shared services.
- Develop standard operating procedures for the disposal of dumped trash and toxic materials from within park boundaries, including mitigation of contaminated soils as needed.
- Develop standard operating procedures or conduct hazards analysis planning to inform appropriate management and response to storm/disaster events.
- Assess visitor use types, as needed, and identify where use types support desired conditions to support a variety of visitor experiences in the park.
- Where possible, integrate accessibility principles and universal design in future planning processes and management decisions.
- Mitigate and plan for current and potential environmental hazards regarding visitor flow and facility design.

### **Outreach and Partnerships**

- Conduct partner evaluations for Desert National Wildlife Refuge and Ice Age Fossils State Park to streamline activities and programs and develop joint work plans in the future.
- Increase collaboration between law enforcement and researchers to maintain awareness of resource protection issues.
- Create and maintain out-of-state and international contacts to promote tourism and research opportunities.



- Develop and maintain communication strategies with nearby homeowner associations (e.g., attend board meetings, events).
- Further reinforce the “National Park Service/Monument Tule Springs” identity to distinguish the park from other organizations and places named Tule Springs.
- Leverage existing partnerships to assist with waste collection and other small-scale maintenance.

### **Interpretation and Education**

- Develop educational programming to benefit from professional scientific research and protect resources.
- Integrate Indigenous knowledge into interpretive materials and programs, as appropriate.
- Develop internal and public-facing communications to increase the exposure of the park’s research potential to a global scientific audience.
- Develop a comprehensive visitor communication strategy that includes clear signage, virtual media, and other internet-based technologies and platforms.
- Communicate visitor safety information both physically throughout the park and virtually online to enhance visitor preparedness and safety.
- Provide information on pet safety concerning resource protection, environmental hazards, leash rules, and visitor conflicts.
- Educate visitors on multiuse trail etiquette.
- Create volunteer opportunities that serve as stewardship and education opportunities.
- Share partner opportunities from nearby sites that have similar interpretive themes.
- Provide guidance and safe opportunities for photography and wildlife viewing.
- Develop a communication guide for staff, visitors, and researchers for protecting the desert tortoise.
- Where and when appropriate, incorporate Native language place, plant, and animal names in interpretative materials.
- Assemble a selection of photographs and replicas that may serve as a substitute for visiting cultural sites for visitors.
- Interact with visitors through ranger-led activities, roving rangers, and other interpretive experiences.
- Develop an interpretive plan that reaches and engages visitors before entering the park.

- Highlight science communication in park programming.
- Provide information on traffic, vehicle circulation, safety for visitors.
- Develop a long-range interpretive plan for consistent delivery of accurate and relevant information to visitors.
- Develop programming and messaging about “urban conservation strategies.”
- Create communication, messaging, and materials that distinguishes Tule Springs Fossil Beds National Monument from other sites and organizations with similar names.
- Create maps that clearly illustrate endorsed entrances to the park.
- Develop communications materials for visitor staging areas (e.g., highway directional signs, street signs, bus depots).
- Provide interpretive opportunities for sites with easy access, such as badlands and other significant sites in the park.

#### **Natural and Cultural Resources**

- Develop and implement a vegetation management strategy.
- Use and explore innovative and emerging technology to maximize resource protection.
- Develop a curriculum, objectives, and support for law-enforcement-provided education.
- Develop educational materials to address keeping wildlife wild, such as recommendations for safe distances for viewing wildlife, and picnic area, food handling, and waste disposal etiquette.
- Use wildlife-proof/safe collection containers to reduce wildlife habituation and raven use.
- Collaborate with Tribal partners to delineate and protect resources and places of spiritual and cultural significance.
- Develop a parkwide integrated pest management plan (prevention and management of nonnative and invasive plant and animal species).
- Develop a parkwide integrated vegetation plan and/or restoration plan to promote native plant communities and habitats (applicable to rehabilitation of areas with past disturbances, rights-of-way management, areas where potential ground disturbance is planned, among others).

- Develop a strategy to provide proxies for sensitive resources to reduce disturbance to those resources (e.g., paleontological resources, birds).
- Prioritize sites for protection and emphasize an NPS staff presence and patrol at these sites, or build fencing, if appropriate.
- Monitor boundary fence conditions, identify where breaches are most common, and develop a response-and-repair strategy.
- Where appropriate, implement and communicate seasonal and/or long-term closures for visitor use in areas with sensitive or threatened resources.
- Inventory and monitor archeological and paleontological sites after extreme weather events.
- Use, test, and improve new and emerging archeological and paleontological best practices.

### **Aliante Loop and Durango Loop Trails**

The temporary 3.5-mile Aliante Loop trail and the two Durango Loop trails (2.25 miles) would be designated as official park trails as part of the park's intent to provide visitor use opportunities. Over time, pedestrian use stemming from adjacent housing developments created these trails through the monument and follow relatively flat terrain along their lengths. Park staff evaluated the trails to monitor their use in providing visitor access while protecting sensitive park resources. Within this evaluation, park staff assessed the trails for the potential for environmental impacts. Park staff determined that impacts on sensitive natural resources along the existing visitor-created trails were not a concern and that new trail development on previously undisturbed areas of the park would create more disturbance compared to using an existing visitor-created trail. Park staff determined that there were no extraordinary circumstances that would require a higher level of NEPA analysis. Establishing these trails as official, permanent park assets would not require additional ground disturbance or widening of the footprint. Advancing the trails to a permanent park asset would simply be a change to the trails' status and designation.

The trails feature the natural landforms of the park, including mountain vistas, desert washes, and desert plant communities and would accommodate both pedestrian and bicycle use.

### **Visitor Use Management Elements**

#### **Indicators and Thresholds**

This general management plan incorporates aspects of the Visitor Use Management Framework (IVUMC 2016) to develop long-term strategies for monitoring and managing visitor use in the park. Key aspects of visitor use management incorporated into the plan include the identification of desired conditions (see above) and indicators, thresholds, and objectives.

Indicators are specific resource or experiential attributes that can be measured to track changes in conditions so that progress toward achieving and maintaining desired conditions can be assessed. Thresholds are the minimum acceptable conditions associated with each indicator. An objective is a specific result that the National Park Service aims to achieve within a specified time frame, and it reflects conditions that are affected directly by NPS action. Although all indicators have an associated threshold, only some indicators have an identified objective. Objectives are markers to help ensure positive progress toward achieving and maintaining desired conditions, especially if conditions are not currently meeting desired conditions. Indicators, thresholds, and objectives provide park managers with monitoring tools to ensure that desired conditions for resources and visitor experiences are achieved and maintained over time.

The planning team identified three indicator topics and four indicators that would be the most important to monitor the effectiveness of the strategies and actions described in this chapter. The three indicator topics monitor visitor-created trails, site conditions at sensitive paleontological and cultural resource sites, and illegal dumping. The team also identified three other issues that require monitoring but do not have an associated indicator or objective. This other monitoring is related to visitor-created trails (that do not originate from designated trails), condition of sensitive habitat and the health of associated species, and domestic animal waste.

The planning team also identified management strategies associated with each indicator. Several of these management strategies are currently in use or are called for above in the alternatives but may be increased in response to changing conditions. The selected indicators, thresholds, and objectives are listed below. See appendix C for detailed descriptions of the indicators, thresholds, and objectives; rationales for selecting the indicator or objective; monitoring protocols; and potential management strategies.

**Indicator:** Number of informal visitor-created trails annually

**Threshold:** No more than three visitor-created trails leaving designated trails per mile annually

**Indicator:** Annual number of documented incidents of downgraded site conditions (poor, fair, good, excellent, destroyed, cannot be found) due to human-caused disturbances at sensitive paleontological resources sites, as recorded on the Tule Springs Fossil Beds National Monument Paleontological Condition Form

**Threshold:** No more than one documented incident of downgraded site condition to sensitive paleontological resources sites per year due to human-caused disturbances, as recorded on the Tule Springs Fossil Beds National Monument Paleontological Condition Form

**Indicator:** Annual number of documented incidents of downgraded site conditions (poor, fair, good, excellent, destroyed, cannot be found) due to human-caused disturbances at sensitive cultural sites, as recorded in the NPS Cultural Resources Inventory System

**Threshold:** No more than one documented incident of downgraded site condition to sensitive cultural resource sites per year due to human-caused disturbances, as recorded in the NPS Cultural Resources Inventory System

**Indicator:** Number of new illegal dumping sites within the park boundary annually

**Objective:** By 2030, the number of new illegal dumping sites within the park boundary will be reduced to zero from the current count of eight new illegal dumping sites per year.

## Visitor Capacity

This plan also incorporates relevant guidance to initially address visitor capacity. Visitor capacity is defined as the maximum amounts and types of visitor use that an area can accommodate while achieving and maintaining desired resource conditions and visitor experiences that are consistent with the purposes for which the area was established (IVUMC 2016).

Pursuant to Director's Order 2: *Park Planning*, standalone general management plans like this one do the following:

*... initially address the requirement to identify visitor capacity by assessing current levels of visitor use and baseline conditions for resources and visitor experiences. They typically include qualitative statements about the types and levels of visitor use that a park could accommodate, while achieving and maintaining desired resource conditions consistent with park purposes.*

This general management plan delineates and designates management areas, outlines the management vision, and identifies desired conditions for visitor use and experience in the park's management areas. This plan also identifies indicators and thresholds and high-level strategies and actions to achieve desired conditions. The plan provides guidance on the general intensities of use and activities in different zones throughout the park through the related description of desired conditions. Director's Order 2: *Park Planning* goes on to state the following:

*The identification of and implementation commitments for visitor capacity will be addressed as part of a park's planning portfolio. For parks that do not identify visitor capacity and implementation commitments in a stand-alone [general management plan] GMP, these requirements will be met through plans that have a significant focus on visitor use ...*

This standalone general management plan does not fully identify visitor capacity or related implementation commitments since more detailed planning and further visitor use-related data are needed to inform a meaningful analysis. As needed, subsequent plans (e.g., a long-range interpretive plan and site-specific planning, visitor use management plans, trail management plans, or similar) would be developed that include more detailed management strategies to support visitor use and experience and would identify and/or refine visitor capacity as additional information and management guidance becomes available.

The guidance in this plan, including desired conditions applied by zones and the indicators, thresholds, and objectives, would continue to inform future planning and guide the management of the types and levels of visitor use to sustain the quality of park resources and visitor experience consistent with the park’s purpose. See appendix C for further details on considerations for identifying future visitor capacities, areas periodized for identification, potential future actions, and data needs.

## Consideration of Boundary Adjustments

A statutory requirement for general management planning is to consider “potential modifications to the external boundaries of the park—if any—and the reasons for the proposed changes” (1978 National Parks and Recreation Act (16 U.S.C. 1a-7). Through the general management planning process, several sites were identified as potential amendments to the park’s boundary. Please note that major boundary adjustments must be authorized by Congress.

This boundary adjustment analysis examines the paleontological, cultural, historic, and natural significances of those properties to determine if they are appropriate additions to the boundary of Tule Springs Fossil Beds National Monument. The analysis also examines the potential for those properties to address management issues or resource protection needs.

The properties under consideration are evaluated according to criteria set forth in section 3.5 of *NPS Management Policies 2006*. For a property to be included in a boundary expansion, the property must meet at least one of the following three criteria:

1. Protect significant resources and values or enhance opportunities for public enjoyment related to park purposes.
2. Address operational and management issues, such as the need for access or the need for boundaries to correspond to logical boundary delineations (e.g., topographic features or roads).
3. Otherwise, protect park resources that are critical to fulfilling the park’s purposes.

In addition to meeting one of the three criteria above, potential additions must also meet both of the following criteria from section 3.5 of *NPS Management Policies 2006*:

1. The added lands will be feasible to administer, considering size, configuration, and ownership costs; the views and impacts on local communities and surrounding jurisdictions; and other factors such as the presence of structures, hazardous substances, or exotic species.
2. Other alternatives for management and resource protection are not adequate.

The general management planning process considered whether modifications to the park’s external boundaries were needed to help the park meet its purpose, maintain its significance, preserve its fundamental and other important resources, ensure high-quality visitor experiences, and/or address operational and management issues. A summary of the properties considered, and analysis of each site, is given in appendix D. For any property that



met the criteria for analysis, the planning team moved to the next column of criteria questions to determine whether a boundary adjustment was warranted.

## Boundary Modifications

National Park Service policies require park managers to evaluate the adequacy of boundaries for protecting resources and providing visitor opportunities in general management plans. Appendix D of this general management plan includes an analysis of boundary modification and land protection that reviews the criteria for boundary adjustments as applied to Tule Springs Fossil Beds National Monument. In accordance with this analysis, the preferred alternative proposes one parcel for inclusion within the boundary of the park, which meets the boundary adjustment criteria (see figure 3).

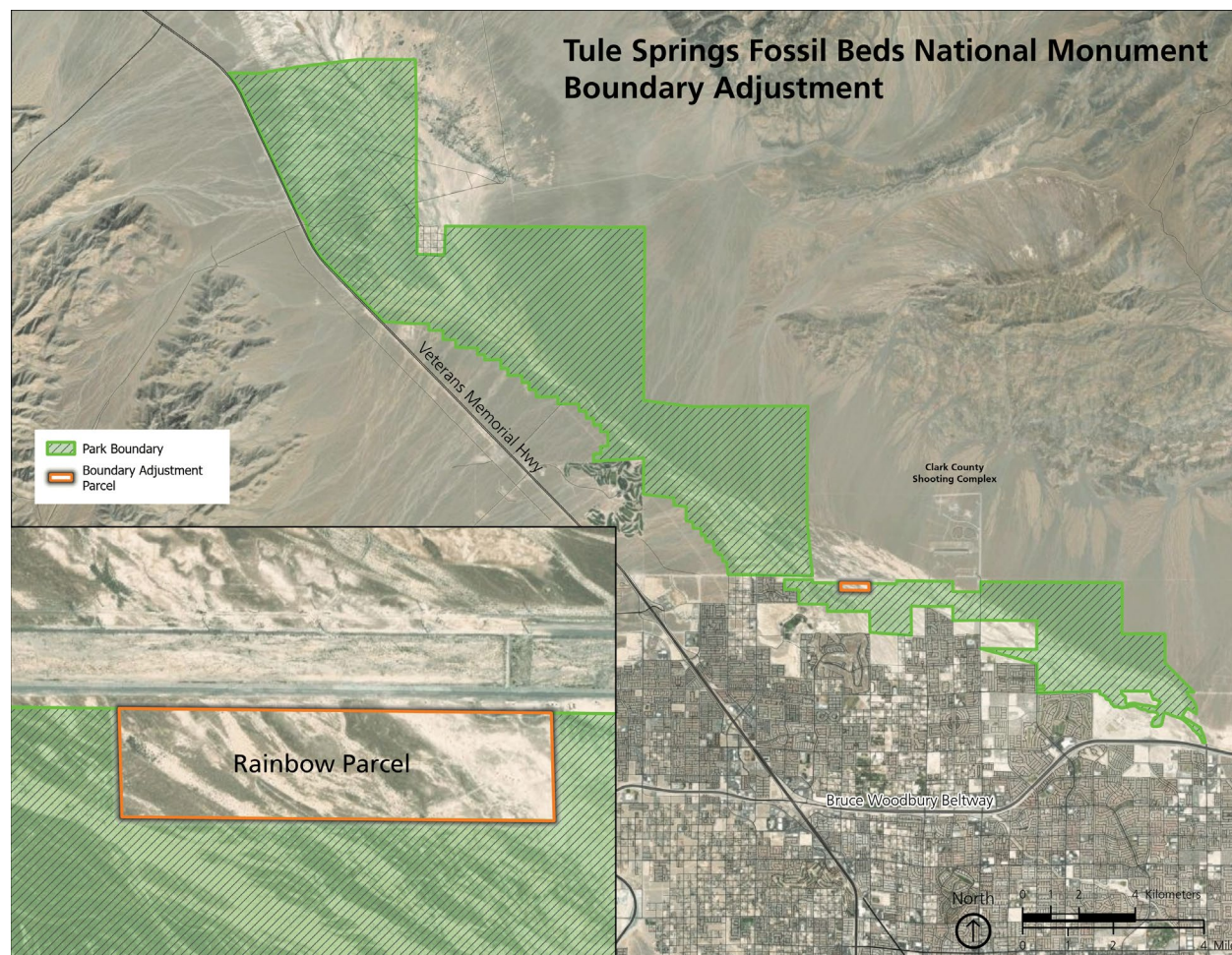


FIGURE 3. POTENTIAL BOUNDARY AMENDMENTS FOR TULE SPRINGS FOSSIL BEDS NATIONAL MONUMENT

Under the preferred alternative, park managers would pursue an amendment of the park boundary to include acquisition of the Rainbow parcel. This privately owned parcel is 44 acres and is located along the northern boundary of the south unit of the park and south of the Clark County Shooting Complex. The landowners have approached park managers about the potential for NPS acquisition. The site contains habitat for Las Vegas bearpoppy (*Arctomecon californica*), which is a Nevada state critically endangered species, and the Las

Vegas buckwheat (*Eriogonum corymbosum* var. *nilesii*), which is a rare species monitored by the Nevada Department of Conservation and Natural Resources, is a high-priority evaluation species under the Clark County Multiple Species Habitat Conservation Plan and is listed as a sensitive species under the Bureau of Land Management’s Sensitive Species List for Nevada (BLM 2023a; USFWS 2014). In addition, there are known paleontological and archeological sites in the vicinity of this property.

## **ALTERNATIVE B: NO ACTION**

The Council on Environmental Quality defines the “no action” alternative as the alternative that represents no change from current management. The no-action alternative is required by the National Environmental Policy Act and serves as a baseline for comparing the changes and impacts of other action alternatives to the effects of current management operations.

Under alternative B, the no-action alternative, there would be no management zones, as the park does not have existing management zones defined. No further direction would be available about desired natural and cultural resource conditions, appropriate types and intensities of visitor use and development, desired visitor experiences, and park partnerships. Other visitor use management tools, such as visitor capacity, indicators, and thresholds, would not be addressed.

If a general management plan were not approved and implemented, the National Park Service would manage the park based solely on the park’s enabling legislation, foundation document, NPS Organic Act, NPS regulations and policies, existing agreements with the park’s partners, and other plans that contribute to the park’s planning portfolio. Functionally, the park would continue to be managed as it is today, with no major change in management direction. Visitors would continue to experience the park’s programming, amenities, events, signage, recreational opportunities, and historic resources. Park managers would continue to preserve and maintain historic features as fundamental resources and values in accordance with applicable laws and policies, standards, and guidelines. Partnerships would remain important to the success and management of the park.

Under alternative B, no boundary adjustments would be considered. The National Park Service would continue to work with surrounding landowners and partners to identify opportunities for preserving resources that extend beyond the park boundary.

## **ALTERNATIVES CONSIDERED BUT DISMISSED**

The planning team initially developed two zoning schemes and presented them to the public in July 2022. One zoning scheme was largely focused on recreational opportunities and a limited area for administrative purposes. A second zoning scheme focused on resource protection and research and contained administrative areas that would be located in both the north and south units. After analyzing the two zoning schemes and reviewing public comments on the management zones that emphasized resource protection, the planning team combined the two zoning schemes to produce the zoning scheme presented in alternative A. Because the two zoning schemes were substantively similar, with only

differences in the application of the zones on the landscape, they were dismissed in favor of one combined zoning scheme for alternative A.



# Chapter Three: Affected Environment and Impact Analysis

---

# 3





This page intentionally blank.

## **CHAPTER 3: AFFECTED ENVIRONMENT AND IMPACT ANALYSIS**

### **INTRODUCTION**

The Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA) indicate that an environmental assessment should “briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact” (CEQ 2022). To support this analysis, the National Park Service reviewed resources (impact topics) that may be present in the planning area and identified those resources that may be impacted by the preferred alternative. Impact topics that were considered but dismissed from further analysis in this environmental assessment are described in appendix G, along with the reasons for dismissal.

This chapter also considers cumulative impacts, which result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively important, actions taking place over time. Cumulative impacts are addressed by impact topic and are considered for each alternative.

### **POTENTIALLY IMPACTED RESOURCES**

The following resources are present and could be impacted by the preferred alternative:

- federally listed species
- special status species and habitat
- paleontological resources
- geologic features (tufa)
- archeological resources
- cultural resources – Tule Springs Archeological Site
- visitor use and experience

The affected environment describes the current and trending conditions for natural and cultural resources and visitor experiences and includes human health and safety. These descriptions serve as baseline for understanding the resources that could be affected by implementing the preferred alternative.

#### **Federally Listed Species**

##### **Affected Environment**

Section 7 of the Endangered Species Act of 1973, as amended, directs all federal agencies to use their existing authorities to conserve federally listed threatened and endangered species



and to ensure that actions they fund, authorize, permit, or otherwise carry out will not jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of designated critical habitats.

The planning area was reviewed for potential/suitable habitat for federally listed (threatened or endangered) species on November 21, 2022, using the US Fish and Wildlife Service (USFWS) Information for planning and Consultation (IPaC) tool to obtain the list of species (USFWS IPaC Project Code 2023–0017643; USFWS 2023, 2022). The National Park Service initiated informal consultation on January 3, 2023, with the US Fish and Wildlife Service Southern Nevada Ecological Services Field Offices to inform them about the plan and the potential impact on federally listed species and their critical habitats and to confirm the list of species. The National Park Service will continue ongoing consultation with the US Fish and Wildlife Service to obtain concurrence on the National Park Service’s section 7 determination of “may affect, not likely to adversely affect” the species that was carried forward for analysis.

As indicated in table 3, there are five federally listed threatened or endangered, candidate/proposed species or subspecies with the potential to occur in or near the planning area. No critical habitat is identified for any of the presented species in or near the planning area.

Based on an assessment of known habitat types in the planning area and on previous NPS survey efforts, one federally listed species (the desert tortoise) is known to occur in the planning area and is evaluated in this environmental assessment.

Species with no potential or suitable habitat in the planning area and species whose distributional and/or elevation ranges are outside the planning area were excluded from further review. Table 3 includes the species that were excluded from further review in this environmental assessment and a summary of the rationale for excluding them.

**Table 3. Federally Listed Threatened, Endangered, or Candidate Resources Occurring or Potentially Occurring in Tule Springs Fossil Beds National Monument**

Common Name	Federal Status	Potential to Occur	Critical Habitat Identified?	Considered for Further Analysis?	Rational for Exclusion (Limiting Factors)	NPS Determination
<b>Insects</b>						
Monarch butterfly <i>Danaus plexippus</i>	Candidate	No	No	No	Consultation with the US Fish and Wildlife Service under section 7 of the Endangered Species Act is not required for candidate species.	N/A
<b>Fish</b>						
Pahrump poolfish	Endangered	No	No	No	The preferred habitat for the species does	N/A

Common Name	Federal Status	Potential to Occur	Critical Habitat Identified?	Considered for Further Analysis?	Rational for Exclusion (Limiting Factors)	NPS Determination
<i>Empetrichthys latos</i>					not occur in the planning area.	
<b>Reptiles</b>						
Desert tortoise <i>Gopherus agassizii</i>	Threatened	Yes	Yes; does not overlap the planning area	Yes	Carried forward for further analysis.	May affect, but is not likely to adversely affect
<b>Birds</b>						
Southwestern Willow Flycatcher <i>Empidonax traillii extimus</i>	Endangered	No	Yes; does not overlap the planning area	No	This species is unlikely to be in the planning area without its preferred habitat.	N/A
Yellow-billed cuckoo <i>Coccyzus americanus</i>	Threatened	No	Yes; does not overlap the planning area	No	This species is unlikely to be in the planning area without its preferred habitat.	N/A

### Desert Tortoise

The federally threatened desert tortoise (*Gopherus agassizii*) occurs in the Mohave Desert, west and north of the Colorado River (USFWS and NPS 2010) and is known to occur in Tule Springs Fossil Beds National Monument (Scott et al. 2017). The desert tortoise is a terrestrial species characterized by a domed shell and round, stumpy elephantine hind legs. Habitat for the tortoise is usually characterized by creosote bush (*Larrea tridentata*) vegetation, which is a common vegetative feature of the Mohave and Colorado Deserts, which may also include creosote bursage (*Ambrosia dumosa*) and shadscale (*Atriplex* spp.) scrub. Often, native desert grasses, especially galleta (*Hilaria* spp.) and Indian ricegrass (*Achnatherum hymenoides*), are associated with high tortoise densities.

This species occurs throughout the park's desert scrub habitats. Recent survey work conducted by the Bureau of Land Management and the National Park Service found that desert tortoises occur in natural areas of the park and can be found in disturbed areas of the front country (Pereira 2022). The US Fish and Wildlife Service identified biological and physical features that are essential to the desert tortoise's conservation, including sufficient space to support viable populations in each recovery unit and to provide for movement, dispersal, and gene flow; sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species; suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites; sufficient

vegetation for shelter from temperature extremes and predators; and habitat protected from disturbance and human-caused mortality.

The tortoise has encountered declines in abundance in many areas resulting from several factors, including widespread habitat loss, degradation, and fragmentation caused by road development, urbanization, and agricultural development (USFWS 2010b). Other factors include the presence of livestock grazing and the invasion of exotic grass annuals (which fuel local fires), energy and mineral development, and off-road vehicle use. Individual mortality can be attributed to vehicle use on roads, disease, vandalism (illegal shooting), and unauthorized collecting. An impact associated with increased human presence is predation from predators, such as ravens and coyotes, which are associated with human disturbance, as they may be significant predators on young (<7 years old). This impact has an aggregate effect on population abundance, particularly because desert tortoises mature slowly before they are able to reproduce. These factors vary regionally in their severity.

In a review of desert tortoise status, the US Fish and Wildlife Service (2010) found that habitat loss, degradation, and fragmentation continue to impact desert tortoises. These threats are combined with the indirect impacts associated with an expanding human presence through continued development and manipulation of desert environments. See the *Desert Tortoise (Mojave Population) Recovery Plan* (USFWS 1994) for a review of factors affecting Mohave and Colorado Desert populations.

### **Environmental Trends and Planned Actions**

Desert-inhabiting wildlife species already live close to the limits of their physiological tolerances. A shift in vegetation communities from climate change could alter the amount of suitable habitat in a specific area for the tortoise and influence their distribution. Desert reptiles, such as desert tortoises, can generally avoid high temperatures by shifting activity periods, seeking shelter below vegetation, and burrowing in crevices and burrows. However, modeling indicates that the increased duration and intensity of drought conditions may reduce suitable desert tortoise habitat by nearly 66% in the Mojave Desert (Barrows 2011). Warming temperatures could also produce a shift in the sex ratio of reptile eggs, resulting in a higher frequency of male hatchlings and thereby affecting reproductive success for the species (Barrows 2011).

In addition to changes from climate change and ongoing threats, past and ongoing actions continue to have effects on desert tortoise and their habitat. Past actions that have impacted desert tortoise and its habitat on park lands include the development of administrative facilities and corresponding infrastructure, including the development and use of unpaved roads and paving of parking lots; the installation of boundary fences and associated disturbance; the development and use of a rights-of-way (e.g., transmission lines, utility roads and corridors); storm water retention facilities; and unauthorized human use, including off-road vehicle use, shooting areas, and illegal dumping.

Past actions that have impacted desert tortoise and its habitat in areas surrounding the park include urban development and related infrastructure, as well as the development and use of administrative and recreational facilities and corresponding infrastructure on agency-managed lands.

Recent and ongoing actions that facilitate continued disturbance by people and will continue to affect desert tortoise include facility construction and maintenance projects, such as fence construction (post and cable) along the southern portion of park's south boundary and paralleling the US 95 Highway corridor along the north unit; the designation of 3.2 miles of trail (Aliante Loop and Durango Loop trails, which were previously visitor-created trails); and the ongoing administrative and visitor use of roads. Mitigation measures would be implemented to reduce impacts on individual desert tortoises, including having qualified and authorized biologists monitor all activities, training personnel on the occurrence and status of the desert tortoise, and revegetating areas disturbed by construction. Please refer to appendix E for a complete description of mitigation measures.

Reasonably foreseeable actions associated with future projects include disturbance associated with rights-of way, notably the Greenlink West Transmission Project that is currently under review by the Bureau of Land Management (BLM 2023b); the establishment of a new official park trail and related facilities (approximately 2,900 feet) extending from a 2,002-acre master-planned residential community into and along the eastern boundary in the park's south unit (the Eglinton Preserve Tufa Trail from the planned Villages of Tule Spring development); support for rehabilitation projects (CERCLA projects); illegal dumping remediation; the implementation of invasive weed and fire management actions; the restoration efforts along historic trails); and planned paleontological fossil excavations. These activities could impact desert tortoise, with the potential for injury or mortality from development and predators that are associated with disturbance and human activity. Such activities include increased vehicle and heavy equipment use in the area during the construction phases and regular intervals of maintenance after construction and increased levels of pedestrian use, as well as a change in patterns of pedestrian use. The changed composition of the landscape could provide nest and roost sites for ravens and other predators in the form of trees, poles, buildings, and other nonnatural features (USFWS 1994; Kristan and Boarman 2007; Steenhof et al. 1993).

### **Impact Analysis**

Because this section includes a federally listed species, the following environmental consequences analysis will address NEPA standards ("impacts"), as well as Endangered Species Act (ESA) section 7 standards ("effects"). While the inclusion of this information is not required per NEPA regulations, providing it here indicates that this species was carefully evaluated within the context of this plan.

For the purposes of this section, the term "impacts" refers to both NEPA impacts and ESA effects. In this document, the anticipated ESA determination categories are based on the US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service guidance for implementing section 7 consultation under the Endangered Species Act (USFWS and NMFS 1998) and are as follows:

- **No effect.** The appropriate conclusion when the action bureau determines its preferred alternative would not affect a listed species or designated critical habitat.

- **May affect, not likely to adversely affect.** The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous favorable effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.
- **May affect, likely to adversely affect.** The appropriate finding in a biological assessment (or conclusion during consultation) if an adverse effect to listed species may occur as a direct or indirect result of the preferred alternative or its interrelated or interdependent actions and the effect is not discountable, insignificant, or beneficial (see the definition of “may affect, not likely to adversely affect”). If the overall effect of the preferred alternative is beneficial to the listed species but is also likely to cause some adverse effects, then the preferred alternative is likely to adversely affect the listed species. If incidental take is anticipated to occur as a result of the preferred alternative, a likely to adversely affect determination should be made.

#### *Alternative A: NPS Preferred Alternative*

Impacts on the desert tortoise would be the same or similar to what is described above in the “Environmental Trends and Planned Actions” section, which describes the current and expected future conditions of the park lands. A few additional actions are proposed for the management actions and strategies (management zones). The potential impacts from these actions are described below.

Under alternative A, planning projects under consideration could include developing standard operating procedures for illegal dumping remediation, creating a fencing response-and-repair strategy, assessing administrative and visitor facilities development and establishment, and developing landscape and vegetation restoration plans. The planning of these management actions and strategies would have to consider the potential impacts on desert tortoises and their habitat conditions and connectivity, even if the impacts in some situations are expected to be temporary.

For any of these activities, mitigation measures (appendix E) would be applied to reduce the effects on desert tortoises in the event that those activities are implemented. Given that the combined effect of these future management strategies and actions, if implemented, would be expected to improve the condition of park lands overall, there likely would be overall negligible effects on desert tortoises compared to their baseline condition and status.

Under alternative A, the management zoning that outlines visitor capacities for each zone is proposed in a manner that reflects current landscape condition and access by visitors and park staff. The proposed Orientation and Development Zone is closest to the urban-park interface. At present, wildlife, sensitive vegetation, and other natural resources are less likely to occur in this area, and when present, are protected (when possible) from human impacts. Specifically, for the potential construction of facilities, park management would have to

consider the impacts from the footprint size of a given facility and the expected area of influence outside the facility (i.e., access to and from the facility, pedestrian use, vehicle parking, refuse management, provision of comfort facilities, trails, sidewalks) regarding the impacts already occurring on desert tortoises at the urban interface. An additional consideration is the impact of developmental incursion towards undeveloped desert tortoise habitat. Recent research indicates that encounter rates for desert tortoises decrease significantly with an increase in development levels (Carter et al. 2020). The decrease in desert tortoise encounters reported was an average of a 4% decrease in encounter rates, with every 1% increase in development within 0.6 mile of an undeveloped area. Above a development value of 10% (10% of the area is developed within 0.6 mile of an undeveloped area), encounter rates dropped to essentially zero.

The remaining two proposed management zones (Resource Protection and Research Zone and Visitor Experience Zone) are focused on the protection and preservation of resources. Where visitor use would be anticipated to be higher, human impacts on desert tortoise would be mitigated using educational communications and materials, as well as supervision by park staff.

Under alternative A, the expected support for research and the monitoring of natural resources, including desert tortoises, would likely increase awareness of the importance of protecting the desert tortoise species and its habitat. Planned education and communication for staff, visitors, and researchers would also emphasize protecting the desert tortoise. This communication would include Leave No Trace ethics, pet safety and education, programming and messaging about conservation strategies along urban boundaries, and wayfinding and circulation to reduce impacts on the desert habitat. Alternative A also outlines the potential for using advanced technologies to accomplish paleontological research that would reduce the need for ground disturbance. These management actions and strategies, if implemented would be expected to have overall benefits to park land condition, including desert tortoise habitat.

Alternative A would change the status of the temporary trails (the Aliante and Durango Loop trails) to official park trails as part of the park's intent to accommodate visitor use. Because establishing these trails as official park assets would not require additional ground disturbance, the presence of and expected maintenance to the trail system would not be expected to change the current baseline condition of desert tortoise habitat.

A boundary adjustment and potential acquisition of the Rainbow parcel would not be expected to impact the desert tortoise since the parcel would likely remain in an undeveloped condition sited along an urban boundary. If acquired by the National Park Service, the Rainbow parcel would allow the protection of the habitat from further urban development and continue to provide habitat use by desert tortoises.

**Conclusion.** Implementing the management planning described for alternative A could result in loss or degradation of desert tortoise occurrence, habitat, and habitat use, though over the long term, it would be expected to provide improved habitat conditions for desert tortoise. When the incremental impacts of alternative A are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the



“Environmental Trends and Planned Actions” section, the overall cumulative impacts on desert tortoise would continue to be adverse. The incremental impacts of alternative A would endeavor to improve and also contribute to, but would not substantially change, the impacts that are already occurring.

#### *Alternative B: No Action*

Under the no-action alternative, conditions for the desert tortoise would continue to be the same as or similar to existing conditions with the same trends and impacts from past, present, and foreseeable planned actions. Therefore, the affected environment and impacts of no-action are the same and discussed only once here. For the desert tortoise, mitigation measures (appendix E) would be applied to any activities that have the potential to impact this species.

**Conclusion.** The lack of general management planning would not provide the strategic and deliberate planning that would outline the future management of the park, nor would the broad guidance for management decisions that affect park resources and visitor experiences be established. Continued management of the park without a general management plan would result in continued ongoing loss or degradation of desert tortoise occurrence, habitat, and habitat use. When the incremental impacts of the no-action alternative are combined with the impacts of the past, ongoing, and reasonably foreseeable future planned actions described in the “Environmental Trends and Planned Actions” section, the overall cumulative impacts on desert tortoise would continue to be adverse. The incremental impacts of the no-action alternative would contribute to, but would not substantially change, the impacts that are already occurring.

## **Special Status Species and Habitat**

### **Affected Environment**

#### *Las Vegas Bearpoppy*

The Las Vegas bearpoppy (*Arctomecon californica*) is listed as a critically endangered plant species in the state of Nevada (Nevada Division of Natural Heritage 2022). On July 22, 2020, the US Fish and Wildlife Service initiated status reviews of the bearpoppy to determine whether the petition for adding this species to the List of Federally Endangered and Threatened Plants is warranted (USFWS 2020). At the time the review was initiated, the US Fish and Wildlife Service determined that the petition for the Las Vegas bearpoppy presented substantial scientific or commercial information indicating that the petitioned action may be warranted. It should be noted that the Mojave poppy bee (*Perdita meconis*) is an extremely rare species of bee that has a close pollinator relationship with the Las Vegas bearpoppy, as well as a few other desert-restricted poppy species. This bee is native to the Mojave Desert, and its historic range includes areas of Arizona, Utah, and Nevada, including Clark County. At present, the bee appears to be restricted to Clark County, Nevada (NatureServe summary 2023). In a 90-day petition finding, the US Fish and Wildlife Service found that listing this species may be warranted and has initiated a status review (USFWS 2019). The bearpoppy is a short-lived perennial plant species that is endemic to the Mojave Desert in soils with a high gypsum content and associated with soil conditions that contain

cryptobiotic crusts (Thompson and Smith 1997).<sup>4</sup> The combination of gypsum soils and cryptobiotic crusts provides optimal conditions for bearpoppy presence and may inhibit the growth of other plant species, including invasive plant species, that otherwise establish in gypsum soils, though the mechanism for how this occurs is unclear (Moore et al. 2014; Thompson and Smith 1997; Harper and Pendleton 1993). Soils with cryptobiotic crust cover correlate with low levels of both ground disturbance and habitat deterioration. In the park, this plant is commonly found along washes and bajadas, growing in sporadic, clumpy occurrences where beneficial growing conditions prevail. The bearpoppy has the potential to occur in areas that are transected by the Aliante Loop trail.

In 1993, the Bureau of Land Management undertook a comprehensive survey over 39,500 acres of BLM-managed land and recorded 99 populations that ranged across that area (91 in Clark County, Nevada, and 8 in Mohave County, Arizona) (Stosich et al. 2022). Since those surveys, it is estimated that the range for this species has declined by nearly half to about 20,000–24,000 acres (The Nature Conservancy 2007). However, the occurrences of the bearpoppy over the range are highly variable due to timing and amount of precipitation and fragmentation of habitat due to development (e.g., road, trails, energy development) across those lands, which impacts gene flow and seed disposal in and between populations (Stosich et al. 2022; Mistretta et al. 1996).

### Environmental Trends and Planned Actions

Desert-inhabiting species already live close to the limits of their physiological tolerances. A shift in habitat suitability (precipitation, relative humidity, drought) from climate change could alter the availability of suitable habitat and environmental conditions for the bearpoppy over a given time period, as well as specific areas where plant species could establish. Additionally, changes to the environment in which bearpoppy grows could influence the frequency and timing of propagation (flowering, seed, seed dispersal), which in turn, can influence their distribution and population dynamics over the long term. Plant species that are endemic and are restricted to specific habitats are especially at risk, because while the climatic environment may shift, the soil and nutrient environment that the plant depends on will not (Loarie et al. 2008). Increased temperatures and atmospheric carbon dioxide, changes in precipitation, and disturbance due to extreme climate events can increase the survival, spread, growth, and establishment of pests and invasive species that may also compete for soil and moisture resources (NPS in prep).

In addition to changes from climate change and ongoing threats, past and ongoing actions continue to have effects on the bearpoppy and its habitat. Past actions that have impacted the bearpoppy and its habitat on park lands include the development of administrative facilities and corresponding infrastructure, including the development and use of unpaved roads, the paving of parking lots, the installation of boundary fences and associated disturbance; the

---

4. Cryptobiotic crusts are a layer of living organisms resulting from a close association between soils and communities of lichens, mosses, photosynthetic bacteria, blue-green algae, and microfungi and often are unnoticed (hidden, or “crypto-”) due to their tendency to blend in with bare soil color (Belnap 2001; Rosentreter and Belnap 2003). Cryptobiotic crusts are known to have very prominent ecological roles in trapping sediments, stabilizing soils, and resisting erosion, as well as regulating nitrogen fixation (soil fertility) and water retention (Bowker et al. 2018; Belnap 2001).

development and use of rights-of-way (e.g., transmission lines, utility roads and corridors); the establishment of storm water retention facilities; and unauthorized human use including off-road vehicle use, shooting areas, and illegal dumping.

Past actions that have impacted the bearpoppy and its habitat in areas surrounding the park include urban development and related infrastructure, as well as the development and use of administrative and recreational facilities and their corresponding infrastructure on agency-managed lands.

Recent and ongoing actions that facilitate continued disturbance by people and will continue to affect the bearpoppy and their habitat include facility construction and maintenance projects such as fence construction (post and cable) along the southern portion of park's south boundary, and paralleling the US 95 Highway corridor along the north unit; the designation of 3.2 miles of trail (Aliante Loop and Durango Loop trails, which were previously visitor-created trails); and ongoing administrative and visitor use of roads. The ongoing administrative and visitor use of roads contributes to continued disturbance, as well as facilitates introduction of nonnative plant species that could impact bearpoppy where it occurs. Though invasive species may not be a widespread threat to bearpoppy occurrence and its habitat, they may establish in areas where the soils are disturbed and then compete with bearpoppy establishment, including the creation and use of visitor-created trails (Stosich et al. 2022). Mitigation measures would be implemented to reduce impacts on the bearpoppy and their habitat. Please refer to appendix E for a complete description of mitigation measures.

Reasonably foreseeable actions associated with future projects include disturbance associated with rights-of way, notably the Greenlink West Transmission Project that is currently under review by the Bureau of Land Management (BLM 2023b); the establishment of a new official park trail and related facilities (approximately 2900 feet) extending from a 2,002-acre master-planned residential community into and along the eastern boundary in the park's south unit (the Eglington Preserve Tufa Trail from the planned Villages of Tule Spring development); support for rehabilitation projects (CERCLA projects); illegal dumping remediation; the implementation of invasive weed and fire management actions; restoration efforts along historic trails; and planned paleontological fossil excavations. These activities could impact the bearpoppy and their habitat due to reconfiguration and disruption of ecological process that affect habitat suitability from development pressures that are associated with disturbance and human activity. Such activities and disturbances include soil disturbance from increased vehicle and heavy equipment use during the construction phases and regular intervals of maintenance after construction, as well as increased levels of pedestrian use, and a change in patterns of pedestrian use. The changed composition of the landscape could alter pedestrian use patterns that contribute to higher levels of ground disturbance and erosion, less coverage of cryptobiotic soils, direct mortality of larger patches of bearpoppy should disturbances be concentrated in areas, and altered patterns of precipitation run off due to establishment of hardened surfaces along the urban interface.

## Impact Analysis

### *Alternative A: NPS Preferred Alternative*

Impacts on the bearpoppy would be the same or similar to what is described above in the “Environmental Trends and Planned Actions” section, which describes the current and expected future conditions of the park lands. A few additional actions are proposed for the management actions and strategies (management zones). The potential impacts from these actions are described below.

Under alternative A, potential future projects could include providing administrative camping, developing standard operating procedures for illegal dumping remediation, creating a fencing response-and-repair strategy, assessing developing areas for facilities administrative and visitor facilities, and developing landscape and vegetation restoration plans. The planning of these management actions and strategies would consider the potential impacts on Las Vegas bearpoppy habitat. However, mitigation measures (appendix E) would be applied to the planning processes for those activities to reduce the effects on the bearpoppy in the event those activities are implemented. Given that the combined effect of these future management strategies and actions, if implemented, would be expected to improve the condition of park lands overall, there likely would be overall negligible effects on the bearpoppy compared to their baseline condition and status.

Under alternative A, the management zoning that outlines visitor capacities for each zone are proposed in a manner that reflects current landscape condition and access by visitors and park staff. The proposed Orientation and Development Zone is closest to the urban-park interface. At present, wildlife, sensitive vegetation, and other natural resources are less likely to occur in this area, and when present, are protected (when possible) from human impacts. Specifically for the potential construction of facilities, park management would have to consider the impacts from the footprint size of a given facility and the expected area of influence outside the facility (i.e., access to and from the facility, pedestrian use, vehicle parking, refuse management, vegetation management, provision of comfort facilities, trails, sidewalks) regarding the impacts already occurring to bearpoppy occurrences at the urban interface.

The remaining two proposed management zones (Resource Protection and Research Zone and Visitor Experience Zone) are focused on the protection and preservation of resources. Where visitor use would be anticipated to be higher, human impacts on the bearpoppy would be mitigated using educational communications and materials.

Under alternative A, the expected support for research and the monitoring of natural resources, including the bearpoppy, would likely increase awareness of the importance of the bearpoppy and its habitat. Planned education and communication for staff, visitors, and researchers would also emphasize protecting the bearpoppy. This communication would include Leave No Trace ethics, programming and messaging about conservation strategies along urban boundaries, and wayfinding and circulation to reduce impacts on the bearpoppy habitat. Alternative A also outlines the potential for using advanced technologies to accomplish paleontological research that would reduce the need for ground disturbance and

the presence of people. These management actions and strategies, if implemented, would be expected to have overall benefits to park land condition, including the bearpoppy habitat.

Alternative A would change the status of the temporary trails (the Aliante and Durango Loop trails) to official park trails as part of the park's intent to accommodate visitor use. Because establishing these trails as official park assets would not require additional ground disturbance, the presence of and expected maintenance to the trail system would not be expected to change from the current baseline condition of the bearpoppy habitat.

A boundary adjustment and potential acquisition of the Rainbow parcel would not be expected to impact bearpoppy habitat since the parcel would likely remain in an undeveloped condition sited along an urban boundary. If acquired by the National Park Service, the Rainbow parcel would allow the protection of the habitat from further urban development and continue to provide potential habitat for bearpoppy.

**Conclusion.** Implementing the management planning described for alternative A could result in the loss or degradation of individual bearpoppy occurrences and/or its habitat, though over the long term, it would be expected to provide improved habitat conditions for the bearpoppy. When the incremental impacts of alternative A are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the "Environmental Trends and Planned Actions" section, the overall cumulative impacts on the bearpoppy would continue to be adverse. The incremental impacts of alternative A would endeavor to improve and also contribute to, but would not substantially change, the impacts that are already occurring.

#### *Alternative B: No Action*

Under the no-action alternative, conditions for the Las Vegas bearpoppy would continue to be the same as or similar to existing conditions with the same trends and impacts from past, present, and foreseeable planned actions. For the bearpoppy, mitigation measures (appendix E) would be applied to any activities that have the potential to adversely impact this species.

**Conclusion.** The lack of general management planning would not provide the strategic and deliberate planning that would outline the future management of the park, nor would the broad guidance for management decisions that affect park resources and visitor experiences be established. Implementing the management planning described for the no-action alternative could result in loss or degradation of bearpoppy occurrences, habitat, and habitat use, though over the long term, it would be expected to provide improved habitat for the bearpoppy. When the incremental impacts of the no-action alternative are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the "Environmental Trends and Planned Actions" section, the overall cumulative impacts on the bearpoppy would continue to be adverse. The incremental impacts of the no-action alternative would contribute to, but would not substantially change, the impacts that are already occurring.

## **Paleontological Resources**

### **Affected Environment**

Tule Springs Fossil Beds National Monument was established to “... conserve, protect, interpret, and enhance ... the unique and nationally important paleontological [and] scientific ... resources” found here. The park lands preserve nearly 23,000 acres of the fossil-rich Las Vegas Formation. Paleontologists have been interested in vertebrate fossils from the Las Vegas Valley since 1903, when US Geological Survey workers reported teeth and bones in the sediments exposed in the wash between Corn Creek Springs and Tule Springs (USGS 2018). Though the rock record of Tule Springs dates to over 570,000 years ago, fossils are found in sediments that are 100,000–12,500 years old, and several plant and animals are represented in the fossil and ancient pollen records of Tule Springs.

Paleontological resources are further protected by the Paleontological Resources Preservation Act of 2009 (PRPA 2009) to manage and protect paleontological resources on federal land. This law provides specific mandates for administering paleontological resource research and collecting permits and the curation of fossil specimens in museum collections. The law also includes provisions for both criminal and civil penalties associated with paleontological resource crimes on federal lands.

### **Environmental Trends and Planned Actions**

Desert environments, soils, and geologic formations are subject to variable weather conditions that are exacerbated by climate change. Changing precipitation and humidity conditions can result in local flooding and/or intensify drought conditions, depending on the pattern of change. Extreme precipitation events and the risk of flooding are expected to regionally intensify with a changing climate (Dethier et al. 2020; NPS in prep). Floods threaten geologic resources through a variety of mechanisms, including inundation, enhanced erosional forces, road washouts, and structural collapse from the force of floodwaters. Extreme precipitation events could increase the risks from flash floods and from geologic hazards. Slope failures caused by intense rainstorms will be a concern. While the dynamic nature of the wash has been ongoing for thousands of years, the increased rate of erosion and the exposure of previously buried paleontological resources is of concern. Once exposed, the resources degrade at a faster rate in the desert environment, complicate the provenience for paleontological finds, and are subject to looting.

In addition to changes from climate change and ongoing threats, past and ongoing actions have had effects on paleontological resources. During the 1960s, extensive scientific investigations occurred on now-park lands, which included soil disturbing activities using traditional fossil surface-soil disturbing excavation techniques and massive earth moving activities (USGS 2018). In these instances, several trenches were carved into the sediments using heavy motorized equipment to expose vertical walls in the sediment layers, with some measuring as deep as 43 feet. This method exposed the sediments for study in detail. During later research in the early 2000s, museum staff from the San Bernadino County Museum (California) further conducted comprehensive and systematic paleontological excavations of the area (USGS 2018; Springer et al. 2017). Current excavations for fossils are rare. At present, park staff carry out a paleontological site monitoring program on previously



documented fossil sites for changes in fossil condition, erosion, and human-caused disturbances.

In addition to changes from climate change and ongoing threats, past and ongoing actions continue to have effects on the paleontological resources. Past actions that have impacted the paleontological resources on park lands include development of administrative facilities and corresponding infrastructure, including development and use of unpaved roads and the paving of parking lots; the installation of boundary fences and associated disturbance; the development and use of rights-of-way (e.g., transmission lines, utility roads and corridors); the establishment of storm water retention facilities; and unauthorized human use, including off-road vehicle use, shooting areas, and illegal dumping.

Past actions that have impacted the paleontological resources in areas surrounding the park include urban development and related infrastructure, as well as the development and use of administrative and recreational facilities and their corresponding infrastructure on agency-managed lands.

Recent and ongoing actions that facilitate continued disturbance by people and will continue to affect the paleontological resources include facility construction and maintenance projects such as fence construction (post and cable) along the southern portion of park's south boundary, and paralleling the US 95 Highway corridor along the north unit; the designation of 3.2 miles of trail (Aliante Loop and Durango Loop trails, which were previously visitor-created trails); and ongoing administrative and visitor use of roads. The ongoing administrative and visitor use of roads contributes to continued disturbance where roads and paleontological resources occur together. Though this type of use is less likely to be a widespread threat to paleontological resources, the roads provide conduits for pedestrian use to establish and the subsequent creation of visitor use trails to access sensitive resources. Mitigation measures would be implemented to reduce impacts on paleontological resources. Please refer to appendix E for a complete description of mitigation measures.

Reasonably foreseeable actions associated with future projects include disturbance associated with rights-of way, notably the Greenlink West Transmission Project that is currently under review by the Bureau of Land Management (BLM 2023b); the establishment of a new official park trail and related facilities (approximately 2,900 feet) extending from a 2,002-acre master-planned residential community into and along the eastern boundary in the park's south unit (the Eglington Preserve Tufa Trail from the planned Villages of Tule Spring development); support for rehabilitation projects (CERCLA projects); illegal dumping remediation; the implementation of invasive weed and fire management actions; the restoration efforts along historic trails; and planned paleontological fossil excavations. These activities could impact the paleontological resources due to reconfiguration and disruption of soils and geology from development pressures that are associated with disturbance and human activity. Such activities and disturbances include soil disturbance from increased vehicle and heavy equipment use during the construction phases and regular intervals of maintenance after construction, as well as increased levels of pedestrian use, and a change in patterns of pedestrian use. The changed composition of the landscape could alter pedestrian use patterns that contribute to higher levels of ground disturbance and erosion, and altered

patterns of precipitation run off due to establishment of hardened surfaces along the urban interface.

## **Impact Analysis**

### *Alternative A: NPS Preferred Alternative*

Impacts on paleontological resources would be the same or similar to what is described above in the “Environmental Trends and Planned Actions” section, which describes the current and expected future conditions of the park lands. Some additional actions are proposed for the management actions and strategies (management zones). The potential impacts from these actions are described below.

Under alternative A, planning projects could include providing administrative camping, developing standard operating procedures for illegal dumping remediation, creating a fencing response-and-repair strategy, assessing developing areas for facilities administrative and visitor facilities, and developing landscape and vegetation restoration plans. The planning of these management actions and strategies would consider the potential impacts on known paleontological resources. Site surveys would be conducted ahead of any ground disturbing activities to minimize and avoid impacts on paleontological resources to the extent possible. In addition, mitigation measures (appendix E) would be applied to the planning processes for those activities to reduce the effects on paleontological resources in the event those activities are implemented.

Under alternative A, for each management zone, park staff would establish visitor capacities based on the current landscape condition, park staff access, desired conditions, and other guidance from the Interagency Visitor Use Management Council. The proposed Orientation and Development Zone is closest to the urban-park interface. At present, wildlife, sensitive vegetation, and other sensitive natural resources are less likely to occur in this area, and when present, are protected (when possible) from human impacts through monitoring and educational signs. The potential development of facilities would not be anticipated to impact paleontological resources, as the potential for paleontological resources to be found in this zone is anticipated to be low.

The remaining two proposed management zones (Resource Protection and Research Zone and Visitor Experience Zone) focus on protecting and preserving paleontological resources. In areas where visitor use could be higher, human impacts on paleontological resources would be mitigated using educational communications and materials about appropriate behavior when encountering paleontological resources to discourage vandalism and theft.

Under alternative A, the expected support for research and the monitoring of natural resources, including paleontological resources, would likely increase awareness of the importance of protecting these resources and their contribution to the knowledge of the paleontological environment. Planned education and communication for staff, visitors, and researchers would also emphasize protecting paleontological resources. This communication would include Leave No Trace ethics, programming and messaging about conservation strategies along urban boundaries, and wayfinding and circulation to reduce impacts on paleontological resources would be among the communication topics addressed.

Alternative A also outlines the potential for using advanced technologies to accomplish paleontological] research that would reduce the need for ground disturbance. These management actions and strategies would be expected to have overall benefits to the areas where paleontological resources are a site-defining component of the landscape.

Alternative A would change the status of the temporary Aliante and Durango Loop trails to official park trails as part of the park's intent to accommodate visitor use. Establishing these as official park trails would not require additional ground disturbance or actions and the presence of and expected maintenance to the trail system would not be expected to change the current baseline condition, no impacts on paleontological resources are anticipated.

A boundary adjustment and potential acquisition of the Rainbow parcel would not be expected to impact paleontological resources since the parcel would likely remain as an area in an undeveloped condition sited along an urban boundary. If acquired by the National Park Service, the Rainbow parcel would allow the protection of the habitat from further urban development and subsequent loss of paleontological resources.

**Conclusion.** Implementing the management planning described for alternative A could result in a permanent loss or degradation of paleontological resources where they exist. When the incremental impacts of alternative A are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the "Environmental Trends and Planned Actions" section, the overall cumulative impacts on paleontological resources would continue to be adverse. The incremental impacts of alternative A would contribute to, but would not substantially change, the impacts that are already occurring.

#### *Alternative B: No Action*

Under the no-action alternative, conditions for paleontological resources would continue to be the same as or similar to existing conditions with the same trends and impacts from past, present, and foreseeable planned actions. Therefore, the affected environment and impacts of no-action are the same and discussed only once here. For paleontological resources, mitigation measures (appendix E) would be applied to any activities that have the potential to adversely impact this resource.

**Conclusion.** The lack of general management planning would not provide the strategic and deliberate planning that would outline the future management of the park, nor would the broad guidance for management decisions that affect park resources and visitor experiences be established. Implementing the management planning described for the no-action alternative could result in permanent loss or degradation of paleontological resources. When the incremental impacts of the no-action alternative are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the "Environmental Trends and Planned Actions" section, the overall cumulative impacts on paleontological resources would continue to be adverse. The incremental impacts of the no-action alternative would contribute to, but would not substantially change, the impacts that are already occurring.

## **Geologic Features (Tufa)**

### **Affected Environment**

Tule Springs Fossil Beds National Monument preserves nearly 23,000 acres of the fossil-rich Las Vegas Formation (USGS 2018; Springer et al. 2015). Tufa is an important geologic feature in the park and is characterized by silty, light-colored sediments that formed from calcium carbonate precipitates originating from cool, spring-fed waters and at present form a meandering surface feature throughout the park. Tufa formations represent a vast spring ecosystem that existed throughout the Las Vegas Valley for millennia, and are evidence of how desert wetland environments responded to past episodes of abrupt climate change (Springer et al. 2015). This network of spring-fed streams meandered across the Tule Springs area. The stream channels became frozen in time in the form of tufa. Specific spring environments, such as marshes and wet meadows, spring pools and ponds, and spring-fed streams, can be recognized through careful examination of the deposits and the variety of tufa extent at the park formed in the presence of algae and water-loving plants, coating leaves, twigs, branches, and logs. At first, tufa is soft and spongy, and when the springs dry up, it hardens into the rocky form that is seen today throughout the park. Tule Springs is home to the only braided fluvial tufa system in North America, preserving a network of stream channels marking where streams appeared on the landscape thousands of years ago.

### **Environmental Trends and Planned Actions**

Desert environments, soils, and geologic formations are subject to variable weather conditions that are exacerbated by climate change. Changing precipitation and humidity conditions can result in local flooding and/or intensify drought conditions, depending on the pattern of change. Extreme precipitation events and the risk of flooding are expected to regionally intensify with a changing climate (Dethier et al. 2020; NPS in prep). Floods threaten geologic resources through a variety of mechanisms, including inundation, enhanced erosional forces, road washouts, and structural collapse from force of floodwaters. Extreme precipitation events could increase the risks from flash floods and from geologic hazards. Slope failures caused by intense rainstorms will be a concern. While the dynamic nature of the wash has been ongoing for thousands of years, the increased rate of erosion and where tufa formations are located is of concern.

In addition to changes from climate change and ongoing threats, past and ongoing actions continue to have effects on the tufa formations. Past actions that have impacted the tufa formations on park lands include the development of administrative facilities and corresponding infrastructure, including the development and use of unpaved roads; the paving of parking lots; the installation of boundary fences and associated disturbance; the development and use of rights-of-way (e.g., transmission lines, utility roads and corridors); the establishment of storm water retention facilities; and unauthorized human use including off-road vehicle use, shooting areas, and illegal dumping.

Past actions that have impacted tufa formations in areas surrounding the park include urban development and related infrastructure, as well as the development and use of administrative and recreational facilities and their corresponding infrastructure on agency-managed lands.

Recent and ongoing actions that facilitate continued disturbance by people and will continue to affect tufa formations include facility construction and maintenance projects such as fence construction (post and cable) along the southern portion of park's south boundary, and paralleling the US 95 Highway corridor along the north unit; the designation of 3.2 miles of trail (Aliante Loop and Durango Loop trails, which were previously visitor-created trails); and ongoing administrative and visitor use of roads. The ongoing administrative and visitor use of roads contributes to continued disturbance to tufa formations where roads and tufa formations occur together. Though this type of use is less likely to be a widespread threat to tufa formations, the roads provide conduits for pedestrian use to establish and the subsequent creation of visitor use trails to impact sensitive park resources. Mitigation measures would be implemented to reduce impacts on tufa formations, as park staff view them as an important and irreplaceable type of paleontological resources. Please refer to appendix E for a complete description of mitigation measures.

Reasonably foreseeable actions associated with future projects include disturbance associated with rights-of way, notably the Greenlink West Transmission Project that is currently under review by the Bureau of Land Management (BLM 2023b); the establishment of new official park trail and related facilities (approximately 2,900 feet) extending from a 2,002-acre master-planned residential community into and along the eastern boundary in the park's south unit (the Eglington Preserve Tufa Trail from the planned Villages of Tule Spring development); support for rehabilitation projects (CERCLA projects); illegal dumping remediation; the implementation of invasive weed and fire management actions; the restoration efforts along historic trails; and planned paleontological fossil excavations. These activities could impact tufa formations due to reconfiguration and disruption of soils and geology from development pressures that are associated with disturbance and human activity. Such activities and disturbances include soil disturbance from increased vehicle and heavy equipment use during the construction phases and regular intervals of maintenance after construction, as well as increased levels of pedestrian use, and a change in patterns of pedestrian use. The changed composition of the landscape could alter pedestrian use patterns that contribute to higher levels of ground disturbance and erosion, and altered patterns of precipitation run off due to establishment of hardened surfaces along the urban interface.

## **Impact Analysis**

### *Alternative A: NPS Preferred Alternative*

Impacts on tufa formations would be the same or similar to what is described above in the "Environmental Trends and Planned Actions" section, which describes the current and expected future conditions of the park lands. A few additional actions are proposed for the management actions and strategies (management zones). The potential impacts from these actions are described below.

Under alternative A, planning projects could include providing administrative camping, developing standard operating procedures for illegal dumping remediation, creating a fencing response-and-repair strategy, assessing developing areas for facilities administrative and visitor facilities, and developing landscape and vegetation restoration plans. The

planning of these management actions and strategies would consider the potential impacts on the tufa geological resource. Site surveys would be conducted ahead of any ground disturbing activities to minimize and avoid impacts on tufa geological resources to the extent possible in areas where ground disturbing activities are implemented.

Under alternative A, management zoning that outlines visitor capacities for each zone are proposed in a manner that reflects current landscape conditions and access by visitors and park staff. The proposed Orientation and Development Zone is closest to the urban-park interface. At present, wildlife, sensitive vegetation, and other natural resources are less likely to occur in this area, and when present, are protected (when possible) from human impacts through monitoring and educational messaging. Specifically for the potential construction of facilities in this zone, the potential for tufa formations in this area is anticipated to be low.

The remaining two proposed management zones (Resource Protection and Research Zone and Visitor Experience Zone) focus on protecting and preserving resources. In areas where visitor use is anticipated to be higher, human impacts on tufa would be mitigated using educational communications and materials to inform visitors of the resource and its protection.

Under alternative A, the expected support for research and the monitoring of natural resources, including tufa formations, would likely increase awareness of the importance of tufa formations and its contribution to the knowledge of the paleontological environment. Planned education and communication for staff, visitors, and researchers would also emphasize protecting tufa formations. This communication would include Leave No Trace ethics, programming and messaging about conservation strategies along urban boundaries, and wayfinding and circulation to reduce impacts on tufa formations. Alternative A also outlines the potential for using advanced technologies to accomplish paleontological research that would reduce the need for ground disturbance. These management actions and strategies would be expected to have overall benefits to park land condition, including the areas where tufa is a site-defining component of the landscape.

Alternative A would change the status of the temporary Aliante and Durango Loop trails to official park trails as part of the park's intent to accommodate visitor use. Since the establishment of these trails as official park assets would not require additional ground disturbance or actions, and the presence of and expected maintenance to the trail system would not be expected to change the current baseline condition, no impacts on tufa are anticipated.

The potential for tufa resources in the Rainbow parcel is anticipated to be low, and a boundary adjustment and potential acquisition of the Rainbow parcel would not be expected to impact this resource since the parcel would likely remain as an area in an undeveloped condition sited along an urban boundary.

**Conclusion.** Implementing the management planning described for alternative A could result in a permanent loss or degradation of tufa, where it exists. When the incremental impacts of alternative A are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the "Environmental Trends and Planned Actions" section, the overall cumulative impacts on tufa would continue to be adverse. The



incremental impacts of alternative A would contribute to, but would not substantially change, the impacts that are already occurring.

#### *Alternative B: No Action*

Under the no-action alternative, conditions for tufa formations would continue to be the same as or similar to existing conditions with the same trends and impacts from past, present, and foreseeable planned actions. Therefore, the affected environment and impacts of no-action are the same and discussed only once here.

**Conclusion.** The lack of general management planning would not provide the strategic and deliberate planning that would outline the future management of the park, nor would the broad guidance for management decisions that affect park resources and visitor experiences be established. Implementing the management planning described for the no-action alternative could result in permanent loss or degradation of tufa formations. When the incremental impacts of the no-action alternative are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the “Environmental Trends and Planned Actions” section, the overall cumulative impacts on tufa formations would continue to be adverse. The incremental impacts of the no-action alternative would contribute to, but would not substantially change, the impacts that are already occurring.

## **Archeological Resources**

### **Affected Environment**

As noted in the “Background and Overview” section, human use of the Las Vegas Valley stretches back more than 10,000 years (NPS 2019). The natural springs and resources they support were vital to the Southern Paiute, other Native American Tribes, and eventually, European Americans who traveled and resided in the area. The landscape is a spiritual place for connecting with the past. Many of these sites, and the landscapes upon which they reside, hold enduring cultural and spiritual significance to Native American Tribes.

Archeological resources found throughout the park are representative of the diverse cultural heritage of the region’s inhabitants and present a valuable record of human use and adaptation to changing environmental conditions the area. Extensive archeological studies have not been conducted in all portions of the park; however, several sites eligible for listing in the National Register of Historic Places have been documented. These include a prehistoric artifact scatter that contains paleontological resources, prehistoric stone alignments, and a prehistoric hearth feature (NPS 2010).

### **Environmental Trends and Planned Actions**

Little is currently known about the archeological resources in park lands. The extent of the resources has not been documented as of January 2024, and the park does not have an archeological monitoring plan in place. The lack of information makes it difficult to proactively manage the archeological resources and makes uncontrolled visitor use an ongoing threat. Managing visitor issues and establishing new expectations for public use of areas with significant archeological resources have been identified as critical resource

protection needs. Other threats include weathering, erosion, and encroachment of vegetation.

Increased temperatures from climate change could also pose challenges for archeological resources. Rapid deterioration of exposed artifacts and sites, as well as the microcracking of significant sites from thermal stress, are all identified impacts on archeological resources from increased global temperatures (Rockman et al. 2016).

## **Impact Analysis**

### *Alternative A: NPS Preferred Alternative*

Under alternative A, multiple management actions would be implemented to achieve desired conditions for resource conditions, visitor experiences and opportunities in the established management zones. Park staff would work to document, monitor, and protect the cultural resources, including archeological resources, to the greatest extent possible across the three zones.

In the Resource Protection and Research Zone, archeological research by both park staff and nonpark researchers would be permitted. The Resource and Research Protection Zone facilitates visitor connections to the resources through staff-guided interpretive experience. Through collaborative experiences and shared understanding, data on archeological resources would be made more easily accessible, and the resources themselves would be given additional layers of protection, as described below.

In the Resource Protection and Research Zone, additional management strategies would be considered for archeological resources. This zone would allow the park's resource staff to use, test, and improve new and emerging archeological best practices. In this zone, management actions would be taken to minimize erosion and theft at archeological sites. Specific sites and areas deemed culturally and spiritually significant by the park's Tribal partners would be protected. These significant sites would be preserved to maintain the spiritual and cultural connections, with the option to close these sites to the general public.

Should potential facilities for scientific and education be developed in the Orientation and Development Zone, park staff would seek to house cultural resources, including archeological resources, in a secure facility. Additional actions are not part of this alternative, but they may occur during the lifespan of this general management plan. Archeological surveys would be conducted ahead of site selection for a facility to avoid and/or minimize impacts on archeological resources, and other mitigation measures (appendix E) would be applied to any activities that have the potential to adversely impact this resource. Such a facility would serve multiple functions, providing a place where staff and nonpark researchers could conduct research on sensitive resources, and staff could provide interpretive services on archeological resources and would have a long-term beneficial impact on their protection. The information on archeological resources delivered in interpretive and educational programming would be informed through the development of a long-range interpretive plan.

**Conclusion.** Implementing the management actions described in alternative A would result in increased protection for the park's archeological resources. When the impacts of

alternative A are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the “Environmental Trends and Planned Actions” section, the overall cumulative impacts on archeological resources would be beneficial. The impacts of the actions described in alternative A would result in improved conditions from impacts that are already occurring.

#### *Alternative B: No Action*

Under the no-action alternative, conditions for archeological resources would continue to be the same as or similar to existing conditions with the same trends and impacts from past, present, and foreseeable planned actions. Therefore, the affected environment and impacts of no action are the same and discussed only once here.

**Conclusion.** The lack of general management planning would not provide the strategic and deliberate planning that would outline the future management of the park, nor would the broad guidance for management decisions that affect park resources and visitor experiences be established. Implementing the management planning described for the no-action alternative could result in the degradation of archeological resources’ condition. When the impacts of the no-action alternative are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the “Environmental Trends and Planned Actions” section, the overall cumulative impacts on archeological resources would be adverse.

### **Cultural Resources – The Tule Springs Archeological Site (Location of the 1962–1963 Tule Springs Expedition)**

#### **Affected Environment**

Tule Springs Fossil Beds National Monument includes a portion of the “Big Dig” where, in the early 1960s, pioneering scientific work contributing to the collective understanding of the paleontological and archeological history of North America occurred. Starting in 1962 with a focus on identifying direct evidence for human and Pleistocene megafauna interaction, investigators used heavy equipment to move massive amounts of deposits to reveal and describe the stratigraphic history of the Las Vegas Formation. Investigators coupled these techniques with traditional archeological and paleontological excavation methods using the then-new technique of radiocarbon dating to delineate and date the various stratigraphic units. Upon completion of their work in 1963, the effort resulted in the largest interdisciplinary scientific expedition ever conducted to that date. Today the location of the Tule Springs Expedition or the “Big Dig” is listed in the National Register of Historic Places as the Tule Springs Archeological Site. A portion of the site is found in the southern unit of Tule Springs Fossil Beds National Monument, while the remainder is located in the neighboring Ice Age Fossils State Park. Though no direct evidence for human and Pleistocene megafauna interaction was found during the original expedition, the site remains historically significant for the pioneering multidisciplinary nature of the work conducted there and for the potential it continues to hold for future discoveries contributing to the paleontological and past human use of the area.

## Environmental Trends and Planned Actions

Scientific research was identified in the park's 2019 foundation document as a fundamental resource and value. As with archeological resources, however, a lack of data and management direction for preservation threatens the fundamental paleontological resources at the Tule Springs Archeological Site. In attempting to preserve and protect the resources at the site, park staff must also contend with weathering and erosion impacts, the encroachment of vegetation (namely fossil disturbance through root growth and the disruption of fossil integrity), and uncontrolled visitor use. As much of the Tule Springs Archeological Site is included as part of Ice Age Fossils State Park, planned actions involving the pursuit of funding and the implementation of stabilization measures will be jointly pursued by the National Park Service and Nevada State Parks.

Climate change-related effects also threaten the Tule Springs Archeological Site and the paleontological resources within it. Increased temperatures cause accelerated decay of organic materials, threatening the continued existence of these resources. Radiocarbon dating, the scientific method made famous by the site, becomes less accurate as a result of carbon (a byproduct of fire) contamination (Rockman et al. 2016). Should the number of wildfires in and around the park increase, the threat of contamination at current expeditions at the Tule Springs Archeological Site also increases. This, in turn, could limit the accuracy and usefulness of research conducted in this location.

## Impact Analysis

### *Alternative A: NPS Preferred Alternative*

Under alternative A, the establishment of management zones would result in numerous management actions related to cultural resources of the Tule Springs Archeological Site. The fossil sites in the Resource Protection and Research Zone would be actively monitored by the park's resource staff according to a set paleontological monitoring schedule. Special attention would be paid to the Tule Springs Archeological Site, which would be maintained and preserved to the extent possible given the effects of climate change, for its historic and scientific values. Visitors would have opportunities to learn about the techniques used during the expedition and why they were innovative. Although there would be the potential for visitor-caused adverse impacts on the resources of the Tule Springs Archeological Site under this alternative, mitigation measures would be implemented to avoid and minimize these impacts. Please refer to appendix E for a complete description of mitigation measures.

Researchers would be able to use the existing work at the site for their own purposes. As with archeological resources, new and emerging best practices for paleontological resources would be used, tested, and improved in this zone. In the Orientation and Development Zone, visitors would be exposed to current Pleistocene knowledge, including records uncovered at the Tule Springs Archeological Site, mainly through self-guided experiences that could include museum exhibits and access to a fossil repository.

**Conclusion.** Implementing the management actions described in alternative A would result in improved conditions for the prehistoric and historic features at the Tule Springs Archeological Site. When the impacts of alternative A are combined with the impacts of past,

ongoing, and reasonably foreseeable future planned actions described in the “Environmental Trends and Planned Actions” section, the overall cumulative impacts on the Tule Springs Archeological Site would be beneficial. The impacts of the actions described in alternative A would result in improved conditions from impacts that are already occurring.

#### *Alternative B: No Action*

Under the no-action alternative, conditions for the cultural resources associated with the Tule Springs Archeological Site would continue to be the same as or similar to existing conditions with the same trends and impacts from past, present, and foreseeable planned actions. Therefore, the affected environment and impacts of no action are the same and discussed only once here.

**Conclusion.** The lack of general management planning would not provide the strategic and deliberate planning that would outline the future management of the park, nor would the broad guidance for management decisions that affect park resources and visitor experiences be established. Implementing the management planning described for the no-action alternative could result in the degradation of prehistoric and historic resources’ condition. When the impacts of the no-action alternative are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the “Environmental Trends and Planned Actions” section, the overall cumulative impacts on the Tule Springs Archeological Site would be adverse.

## **Visitor Use and Experience**

### **Affected Environment**

The entirety of Tule Springs National Monument is currently open to visitors and mixed-use recreation. While the park contains a multitude of paleontological, natural, and cultural resources, there is limited infrastructure on-site and sparse information available for visitors to plan their trip or to guide their experience and interpretation of park resources. The park has no established visitor centers, shade structures, water refill stations, or comfort stations on-site; however, the park does offer three off-site exhibits that highlight the history and science behind the national monument. These exhibits are displayed at different sites, and their current locations are noted on the park’s website.

The park is made up of two distinct areas labeled the south unit and north unit. Despite the lack of infrastructure, the park is a key open space to the surrounding communities in the Las Vegas area. With two temporary trails and a multitude of informal, visitor-created trails, the more frequently visited south unit of the park is more easily accessible for neighboring communities and provides important open space adjacent to a densely populated urban area. Both the north and south units are primarily accessed by private vehicles, although there is no formal paved road network in the park, and most access points along the boundary fence lines are unpaved and with no amenities.

### **Environmental Trends and Planned Actions**

Since the site was previously managed by the Bureau of Land Management, some of the historic use of the area is now incompatible with NPS policy and can cause confusion among

visitors about which types of use are permissible and where visitors are allowed to go. Unauthorized uses in the park have caused resource disturbances and can impact the safety and comfort of visitors. Some of these uses include shooting areas; unauthorized dumping areas; and trespass by motorcycle, all-terrain vehicles, and four-wheel drive vehicles. Recent and ongoing actions that have affected or may affect the visitor experience include facility construction and maintenance projects, such as fence construction (post and cable; 21,000 feet) along the southern portion of park's south boundary, and the use and formation of visitor-created trails throughout the park. These actions have created a fenced boundary with limited access points, resulting in reduced unauthorized activities, which benefits the visitor experience but also constrains access for those users who need to travel further to the identified access points. Additionally, park staff have made a limited number of improvements to the visitor experience since the land was transferred to the National Park Service. Some of these improvements have been single or small-scale efforts (e.g., establishing temporary trails, creating traveling exhibits, partnership programs). Although these actions have enhanced visitor opportunities, they have been done so with little management direction and would benefit from additional guidance.

Reasonably foreseeable actions, such as disturbances associated with rights-of way support for rehabilitation projects (Superfund activities, illegal dumping remediation, implementation of invasive weed and fire management actions, restoration efforts along historic trails), the establishment of the Eglington Preserve Tufa Trail along the eastern boundary in the park's south unit, and future planned paleontological fossil excavations, could adversely impact the visitor experience from the noise and presence of work crews while the disturbance is ongoing; however, many of these projects would benefit the visitor experience over the long term by improving conditions in the park and deepening the understanding of its resources. Infrastructure installed in the rights-of-way could result in long-term impacts on the visitor experience because of impacts on the views; however, there are already numerous utility lines intersecting the park, which sits in the urban interface.

Broad factors not specific to the park may increase or decrease future visitation, including population changes, economic trends, travel costs, leisure time availability, future disposable income, climate change impacts, and changes in recreation preferences. Planning for future visitor use includes climate change considerations. As described above, park staff have examined plausible future climate conditions, including more than one climate scenario to help staff address uncertainty in how climate change might play out. These scenarios predict an increase in average temperature and weather- and climate-related extremes (e.g., extreme heat, extreme precipitation events, extreme droughts) that can negatively impact visitors due to safety concerns, environmental disasters, and resource availability. Potential impacts on visitor experience and safety include heat-related illness, flash flooding, water availability, and other factors beyond the control of land managers. Additionally, climate change will likely impact the time of year that visitors come to the park. For example, many parks are already seeing expansion of the shoulder seasons, with higher visitation occurring both earlier and later in the year compared to historical trends. Extreme temperatures and summer monsoons could make visiting the park during the warmest months less desirable and instead concentrate visitation in the shoulder seasons and winter. This change has the

potential to impact the visitor experience, especially if crowding occurs, and would shift staff resources to focus on visitation during cooler months (NPS in prep).

## **Impact Analysis**

### *Alternative A: NPS Preferred Alternative*

Actions from this alternative that would most directly impact visitor use and experience include establishing management zones, desired conditions, and indicators and thresholds, along with management strategies and actions to achieve desired conditions. These components, especially the management zones and desired conditions, would improve the visitor experience at the park by increasing visitor understanding and appreciation of the park's resources, improving wayfinding, and enhancing learning and recreational opportunities by allowing staff to make intentional and targeted decisions in each area of the park. Over time, park managers would use the desired conditions and management strategies outlined in the preferred alternative to strategically assess existing visitor opportunities and experiences and respond proactively to new opportunities and trends. If this alternative was implemented, these indicators would be an opportunity for park managers to quantify the desired conditions and monitor the quality of resources and the visitor experience, thus ensuring visitors have access to high-quality experiences. This would, in turn, enhance visitors' connection with and understanding of the significance and fundamental resources and values of the park.

Actions that are defined in alternative A, as with the indicators and thresholds, would allow staff to gain a better understanding of visitor use and its impacts on resources and other visitors. Park staff generally consider current visitation levels to be manageable and feel that there are opportunities to increase visitation. How visitation levels would fluctuate in the coming decades is yet to be determined. Although the park has limited visitor statistics, based on staff experience and public feedback received from visitors, the park is not currently experiencing overcrowding, and most visitors are able to find opportunities to have meaningful and enjoyable visitor experiences. However, if desired conditions were not being achieved, additional management actions—such as improving education and interpretation, addressing hazardous materials, and employing additional security measures to protect palaeontologic and historic resources in some locations—could be implemented to ensure continued quality visitor experiences at the park while protecting park resources. Continuing to gather visitor use data (e.g., visitor counts, trails counts, time, distribution) through indicators and thresholds and other related monitoring would provide more context on how and where visitors experience the park and would assist in future decision-making about how to improve the visitor experience. Gathering this data would likely have little-to-no impact on the visitor experience since most of this data can be collected remotely via technology and without disturbing visitors. Compounded with the proposed zoning scheme, park staff would gain a better understanding of baseline conditions and create more focused visitor experiences for each zone. Overall, impacts on visitor use and experience from implementing the preferred alternative would be small and largely beneficial.

As mentioned previously, alternative A would change the status of the Aliante Loop and Durango Loop trails from temporary trails to official park trails. Since visitors are already



using these trails and park staff conclude that an undetermined increase in the amount of use would still meet desired conditions, establishing these as official park trails would benefit visitor use. Furthermore, some visitors have reported confusion about what a temporary trail is, and establishment as official park trails would likely decrease this confusion.

The boundary adjustment associated with the Rainbow Parcel has the potential to benefit visitor use and experience. Adjusting the park boundary to include this parcel gives visitors a larger area for recreation. The potential for the presence of fossils in this parcel would allow park staff to further develop interpretive and educational materials for visitors. Since the parcel would remain undeveloped, the views are less likely to be obstructed by possible future construction and development beyond the park boundary.

Additional actions are not part of this alternative, but they may occur during the lifespan of this general management plan. Some of those actions relevant to visitor use and experience include constructing potential facilities for scientific and education, creating new trails, and developing new or expanded interpretive offerings. Although a scientific and education center may have adverse resource impacts, it would benefit the visitor experience by giving visitors an opportunity to orientate themselves to the park and landscape, connect more directly with the park's fundamental resources and values, and may provide temporary shelter from extreme weather events in an emergency. New trails and expanded interpretive offerings would also have an overall benefit for visitors because they would provide additional recreational and educational opportunities and more formal access to the park.

**Conclusion.** The impacts of reasonably foreseeable future actions, which are included in the "Environmental Trends and Planned Actions" section, would likely increase visitation and lead some visitors to spend longer periods at the park. Under the preferred alternative, there would be enhanced and expanded opportunities to recreate at the park and learn about and connect with park resources. The effects of the preferred alternative, when combined with the effects of past, present, and reasonably foreseeable future actions, would contribute beneficial impacts on the overall conditions in visitor use and experience.

Implementing the desired conditions, zoning scheme, and indicators and thresholds in alternative A would result in overall positive impacts for visitor use and the visitor experience in the park. When the impacts of alternative A are combined with the impacts of past, ongoing, and reasonably foreseeable future planned actions described in the "Environmental Trends and Planned Actions" section, the overall cumulative impacts on visitor use and experience would continue to improve. Although the impacts of the actions described in alternative A may limit the use and desired experience of some visitors, overall, these impacts would create a safer experience for visitors, a clearer management direction park for staff, and more protective environment for its resources.

#### *Alternative B: No Action*

Under the no-action alternative, conditions for visitor use and experience would continue to be the same as or similar to existing conditions with the same trends and impacts from past, present, and foreseeable planned actions. Therefore, the affected environment and impacts of no-action are the same and discussed only once here.

**Conclusion.** Overall, the lack of general management planning under the no-action alternative would adversely impact visitor use and experience. Current access and interpretive programming are not sufficiently supporting visitors' understanding of the park's purpose, significance and fundamental resources and values. Continued management under current management activities would not provide sufficient information and infrastructure to guide or improve visitor experiences and may hinder consensus decision-making among park staff to take coordinated action and achieve shared management goals. Over time, the incremental changes to improve the visitor experience may not be sufficient to keep pace with a potential increase in visitation, which would lead to a degradation of the visitor experience. When considering the past, ongoing, and reasonably foreseeable future planned actions described in the "Environmental Trends and Planned Actions" section, the cumulative impacts on the park, its resources, and visitor experience would continue to be adverse.



# Chapter Four: Consultation

---

# 4





This page intentionally blank.

## **CHAPTER 4: CONSULTATION**

### **CONSULTATION WITH NATIVE AMERICAN INDIAN TRIBES**

The process of consultation and coordination is an important component of this plan. Tule Springs Fossil Beds National Monument initiated Tribal consultation for the general management plan on May 19, 2022. The National Park Service sent letters to the following Native American Tribes affiliated with the Tule Springs Fossil Beds National Monument inviting consultation:

Big Pine Paiute Tribe of the Owens Valley

Bishop Paiute Tribe

Bridgeport Indian Colony

Burns Paiute Tribe

Chemehuevi Indian Tribe

Colorado River Indian Tribes

Confederated Tribes of the Warm Springs Reservation of Oregon

Fallon Paiute-Shoshone Tribe

Fort Independence Indian Community

Fort McDermitt Paiute and Shoshone Tribes

Fort Mojave Indian Tribe of Arizona, California, and Nevada

Havasupai Tribe

Hopi Tribe

Hualapai Indian Tribe

Kaibab Band of Paiute Indians

Las Vegas Paiute Tribe

Lone Pine Paiute-Shoshone Tribe

Lovelock Paiute Tribe

Moapa Band of Paiute Indians

Pahrump Band of Paiutes

Paiute Indian Tribe of Utah

San Juan Southern Paiute Tribe

Shoshone-Paiute Tribes of the Duck Valley Indian Reservation

Summit Lake Paiute Tribe

Utu Gwaitu Paiute Tribe

Walker River Paiute Tribe

Yerington Paiute Tribe

Tribal representatives attended several of the stakeholder meetings held in conjunction with the development of this plan. Park staff will continue to engage with affiliated Tribes and conduct formal consultation when undertaking management actions at the park.

### **CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT**

The planning area was reviewed for potential/suitable habitat for federally listed (threatened or endangered) species on November 21, 2022 (USFWS IPaC Project Code 2023-0017643). The National Park Service initiated informal consultation on January 3, 2023, with the USFWS Southern Nevada Ecological Services Field Offices to inform them about the plan and the potential impact on federally listed species and their critical habitats. A review of this list was completed on January 3, 2023, by USFWS staff, and accuracy of the list was verified on the same date. The list was updated on July 3, 2023. No change was made to the list at that time.

The National Park Service will continue ongoing consultation with the US Fish and Wildlife Service to obtain concurrence on the National Park Service's section 7 determination of "may affect but not likely to adversely affect" the desert tortoise.

### **CONSULTATION UNDER SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT**

Tule Springs Fossil Beds National Monument staff informed the Nevada State Historic Preservation Office about the planning effort and environmental assessment in a letter dated January 4, 2023. The letter stated that the National Park Service did not anticipate the general management planning effort to engage a section 106 review process under the National Historic Preservation Act and its regulations in 36 CFR 800 due to the plan not including proposed actions to historic properties or other cultural resources.

In an e-mailed reply dated June 6, 2023, the Nevada State Historic Preservation Office (Nevada SHPO) confirmed receipt of the NPS correspondence that described the general management planning effort. The Nevada SHPO expressed an interest in reviewing the general management plan draft document when it is available. The National Park Service will continue ongoing consultation with the Nevada SHPO throughout this planning effort.

### **CONSULTATION WITH THE ADVISORY COUNCIL**

As established in Tule Springs Fossil Beds National Monument's enabling legislation, a 10-member advisory council is in place to provide guidance for the management of the park. The

National Park Service consulted with the advisory council and shared progress on the development of the general management plan on four separate occasions.

The general management planning process was introduced to the advisory council in a March 2, 2022, meeting. National Park Service representatives attended the meeting to provide information on who was involved in the development of the general management plan and what milestones would be accomplished at different stages.

In a subsequent meeting on June 8, 2022, the National Park Service provided an update on the completion of the planning team's first workshop in April 2022. While acknowledging the educational information that had been shared during the workshop, the members of the advisory council used the June meeting to express their interest in being more active participants in future workshops.

A third meeting was held on November 16, 2022, wherein the National Park Service provided information on the general management plan's civic engagement period, as well as the outcomes of the planning team's second workshop in October 2022. An update on the project's schedule was also provided.

The fourth meeting between the National Park Service and the Tule Springs Fossil Beds National Monument Advisory Council took place on February 15, 2023. The National Park Service shared information on the outcomes of the planning team's third workshop in January 2023.

## **CIVIC ENGAGEMENT**

Civic engagement is an early and open process to determine the breadth of issues and alternatives to be addressed in a planning effort. Civic engagement began with a notice released on July 20, 2022, describing the proposed management zones and desired conditions and soliciting comments or concerns with the proposal to develop a general management plan. Park staff shared a virtual newsletter, and a press release was also sent to local news organizations.

During the 30-day public comment period, the National Park Service invited the public to participate in a public meeting and provide comments through the NPS Planning, Environment, and Public Comment (PEPC) website at <https://parkplanning.nps.gov/TUSKgmp> or by mailing comments to the park.

The park hosted an in-person public meeting at the Clark County Shooting Complex on August 4, 2022, to share details about the planning process, answer questions from the public, and receive public comments. Twenty-four people attended that session. A separate stakeholder meeting was held earlier in the day presenting similar information to the park's partners and stakeholders. Twelve people attended that session, which included individuals representing the Moapa Band of Paiute Indians, Protectors of Tule Springs, Nevada Division of State Parks, Parashant National Monument, Pacific Oak SOR Park Highlands TRS, LLC (f/k/a KBS SOR Park Highlands TRS, LLC), a representative from Council Woman Fiore's office (Ward 6), Desert National Wildlife Refuge Center (US Fish and Wildlife Service), and the City of North Las Vegas. A total of 11 correspondences were collected through the PEPC



website, by e-mail, and via direct communication with NPS staff. Although commenters had the opportunity to freely respond, park staff provided five questions to gather targeted feedback. Attendees from the public meetings and those who submitted correspondences commented on a wide range of topics, including the development of the monument and adjacent lands, concern about the protection of Eglington Preserve and other sensitive areas, the park's boundary fence (including the desire of more access points and concerns about the fence being cut by visitors to create unauthorized access points), illegal vehicle access, trail opportunities and connections to larger trail systems, and additional recreation opportunities.

A complete summary of the public comments is available at <https://parkplanning.nps.gov/TUSKgmp>.

# Appendixes A – H



This page intentionally blank.

## APPENDIX A: FOUNDATION ELEMENTS

The *Tule Springs Fossil Beds National Monument Foundation Document* provides the underlying basis for the general management plan and includes relatively stable components that will not change much over time. These components are the legislated purpose of the park unit, the significance the unit holds, the focus of the unit's interpretation (interpretive themes) and education program, and the unit's fundamental resources and values. In addition, the foundation document contains a special mandates and administrative commitments section, which includes the legal requirements that must be followed in managing the park unit. A foundation document can be used in all aspects of park management to ensure that the most important objectives are accomplished before turning to items that are also important but not directly critical to achieving the park purpose and maintaining its significance.

The park's foundation document overview is available at [https://www.nps.gov/tusk/learn/management/upload/TUSK\\_FD\\_508.pdf](https://www.nps.gov/tusk/learn/management/upload/TUSK_FD_508.pdf). The park fundamental resources and values, other importance resources and values, and special mandates and administrative commitments are provided below, as they contain information pertinent to the Tule Springs Fossil Beds National Monument General Management Plan.

### FUNDAMENTAL RESOURCES AND VALUES

Fundamental resources and values are those features, systems, processes, experiences, stories, scenes, sounds, smells, or other attributes determined to warrant primary consideration during planning and management processes because they are essential to achieving the purpose of the park and maintaining its significance. Fundamental resources and values are closely related to a park's legislative purpose and are more specific than significance statements. Fundamental resources and values help focus planning and management efforts on what is truly significant about the park. One of the most important responsibilities of NPS managers is to ensure the conservation and public enjoyment of those qualities that are essential (fundamental) to achieving the purpose of the park and maintaining its significance. If fundamental resources and values are allowed to deteriorate, the park purpose and/or significance could be jeopardized.

The following fundamental resources and values have been identified for Tule Springs Fossil Beds National Monument:

- **Pleistocene Fossils.** Tule Springs Fossil Beds National Monument contains a precisely dated sequence of sediments that entomb the Tule Springs local fauna, one of the most significant late Pleistocene vertebrate assemblages in the American Southwest. The Tule Springs local fauna is both prolific and diverse and includes a large mammal assemblage dominated by mammoth, camel, horse, and bison. North American lion, saber-toothed cat, dire wolf, and ground sloth are also prominent, as well as micromammals, birds, snakes, and amphibians. Invertebrates, plant macrofossils, and pollen are also present in the deposits. These fossils are found in extensive paleospring deposits that record significant hydrologic changes that



occurred in the Las Vegas Valley during the recent geologic past in response to rapid climate change events.

- **Scientific Research.** Scientific inquiry in Tule Springs Fossil Beds National Monument has been ongoing since the early 1900s. The 1933 discovery of Pleistocene fossils and human cultural artifacts in apparent association led to intense scrutiny of Tule Springs as to the possible coexistence of humans and Pleistocene megafauna. With the advent of the radiocarbon dating technique, this hypothesis could finally be tested. In 1962–1963, a multidisciplinary team of scientists gathered in what was known as the Tule Springs Expedition, or later as the “Big Dig.” Geologists dug extensive trenches through the difficult terrain to investigate and radiocarbon-date the fossil- and artifact bearing layers. Ultimately, the hypothesis of human-megafaunal interaction was not substantiated with this research, but the framework created for the Las Vegas Formation stood the test of time. More than 40 years later, scientists reinvestigated the deposits at Tule Springs. Their work expanded the framework and, with new dating techniques, extended the chronology as far back as at least 500,000 years, tying these deposits to climate fluctuations during the late Pleistocene. Future research in Tule Springs Fossil Beds National Monument has tremendous potential to investigate the megafauna, paleoclimate, and paleoenvironments of the Las Vegas Formation.
- **Museum Collections.** Tule Springs Fossil Beds National Monument’s museum collection comprises artifacts, archives, and natural history specimens. The collection is critical in understanding late Pleistocene flora and fauna of the Las Vegas Valley as well as local paleoecosystems, geologic context, climate change, and traditional land use. The collection provides education and outreach opportunities such as educational programs, research, and both virtual and on-site/off-site exhibition. The park plays a role in furthering knowledge of paleontology in the Great Basin through cooperation with institutions holding related collections and others vested in interdisciplinary studies.
- **Paleoecosystem.** The paleoecosystem of the late Pleistocene deposits in Tule Springs Fossil Beds National Monument represents a complex mosaic of desert wetland depositional environments. Reconstructing these spring paleoenvironments, combined with detailed stratigraphy and chronologic control, reveals a synchronous ecosystem response to northern hemispheric abrupt climate change. This result can be used to model and anticipate future climate and environmental changes in desert wetland ecosystems worldwide. Faunal responses to these climatic fluctuations are a topic for current and future research.
- **Geologic Processes and Features.** Past and current geologic processes and their resultant scenic features are important resources in Tule Springs Fossil Beds National Monument. Past spring discharge is directly related to faults and past ground water table levels. Fluvial (river) features including erosion and other processes are present in the fossil deposits. They are a predominant feature of the active watershed, the upper Las Vegas Wash. The stratigraphically complex Las Vegas Formation is exposed

along the upper Las Vegas Wash and, through erosion and deposition, forms a highly dissected undulating topography. Other geologic features in Tule Springs Fossil Beds National Monument include significant tufa deposits, alluvial fans, inverted topography, aeolian features (dunes), and faults. These processes continue to shape the current landscape and provide an important opportunity for visitors to experience geological processes.

- **Public Understanding and Education.** The rich paleontologic and geologic record of Tule Springs Fossil Beds National Monument and its proximity to a large metropolitan area with more than 2 million residents and more than 42–43 million visitors per year make it an ideal location to conduct resource education and build stewards. Linking past, present, and future, the park provides opportunities to understand how research can inform both scientists and the general public as they seek to learn how the world they see today came to be and to look to the future with greater wisdom.

## OTHER IMPORTANT RESOURCES AND VALUES

Tule Springs Fossil Beds National Monument contains other resources and values that are not fundamental to the purpose of the park and may be unrelated to its significance but are important to consider in planning processes. These are referred to as “other important resources and values” (OIRV). These resources and values have been selected because they are important in the operation and management of the park and warrant special consideration in park planning.

The following other important resources and values have been identified for Tule Springs Fossil Beds National Monument:

- **Partnerships.** Tule Springs Fossil Beds National Monument possesses unparalleled opportunities for collaboration and outreach. Because of its proximity to the Las Vegas urban core, the park and its partners can reach diverse audiences including those from adjacent communities and visitors from around the world. In addition, the park’s boundaries with multiple state, federal, Tribal, military, and city entities provide multiple opportunities for community and partner involvement, as well as important recreation and conservation linkages. Support from multiple levels of government, community leaders, nonprofits, and other entities was essential to the creation of Tule Springs Fossil Beds National Monument and is critical for its long-term sustainability. Collaboration with the local community is crucial for the protection of important resources.
- **Modern Ecosystems.** Tule Springs Fossil Beds National Monument is a living desert landscape of native wash habitats that are home to abundant plants and animals, including rare species such as the bearpoppy and desert tortoise. Its location provides vital contiguous habitat with surrounding protected lands, amplifying the individual benefit of each. The upper Las Vegas Wash runs directly through the core of the park and, as the only drainage system in the Las Vegas hydrologic basin, provides critical flood control for the valley during heavy rains.

- **Human History.** Human use of the Las Vegas Valley stretches back more than 10,000 years. The natural springs and resources they support were vital to the Southern Paiute, other Native American Tribes, and eventually European Americans who traveled and resided in the area. Archeological resources found throughout the park are representative of the diverse cultural heritage of the region's inhabitants and present a valuable record of human use and adaptation to changing environmental conditions throughout the area. Many of these sites, and the landscapes upon which they reside, hold enduring cultural and spiritual significance to Native American Tribes.

## SPECIAL MANDATES

Many management decisions for a park unit are directed or influenced by special mandates and administrative commitments with other federal agencies, state and local governments, utility companies, partnering organizations, and other entities. Special mandates are requirements specific to a park that must be fulfilled. Mandates can be expressed in enabling legislation, in separate legislation following the establishment of the park, or through a judicial process. They may expand on park purpose or introduce elements unrelated to the purpose of the park. Key provisions among the special mandates contained in the park's enabling legislation (Pub. L. 113-291, 128 Stat. 3861, Sec. 3092) are presented below:

- **Management Plan.** Within three years after funds are made available for this purpose, a management plan will be developed that provides for the long-term protection and management of the park. It will allow for continued scientific research, consider existing management plans, involve public and stakeholder engagement, and consider the potential to link to regional trail systems.
- **Interpretation, Education, and Research.** Interpretation, education, and scientific research will be provided on the paleontological resources of the park, with priority for on-site exhibition and curation where possible.
- **Renewable Energy Transmission Facilities.** Upon a complete application from a qualified electric utility, a 400-foot-wide right-of-way will be issued to a qualified electric utility for the construction and maintenance of high-voltage transmission facilities.
- **Water Conveyance Facilities.** Upon a complete application from a public water agency, a 100-foot-wide right-of-way will be issued to a public water agency for the construction, maintenance, repair, and replacement of a buried water conveyance pipeline and associated facilities in a specified corridor. Also, a 100-foot-wide right-of-way will be issued to a unit of local government or public water agency for the construction, operation, maintenance, repair, and replacement of a buried water conveyance pipeline.
- **Advisory Council.** An advisory council will be formed and will last at least six years to provide guidance for the management of the park. The council will have 10 members, appointed by the Secretary of Interior, with one nominated representative (either a



member or nominated by the members) from each of the following entities: Clark County Commission, Las Vegas City Council, North Las Vegas City Council, Las Vegas Paiute Tribe, southern Nevada conservation community, Nellis Air Force Base, State of Nevada, a county resident with a background that reflects the park's purposes, and two individuals from the same or adjacent counties with paleontology experience.

**This page intentionally blank.**

## **APPENDIX B: NATIONAL PARK SERVICE GENERAL MANAGEMENT PLANNING AND OTHER APPLICABLE LAWS AND POLICIES**

### **NATIONAL PARK SERVICE GENERAL MANAGEMENT PLANNING**

#### **General Management Planning**

The National Parks and Recreation Act of 1978 requires each unit of the national park system to have a general management plan (Pub. L. 95-625, Nov. 10, 1978, 92 Stat. 3467). Director's Order 2: *Park Planning* specifies that a general management plan refers to (1) a standalone general management plan or (2) the planning documents in a park's planning portfolio that collectively meet the statutory requirements for a general management plan. These statutory requirements, as described in the National Parks and Recreation Act, include the following:

- (1) measures for the preservation of the area's resources;
- (2) indications of types and general intensities of development (including visitor circulation and transportation patterns, systems, and modes) associated with public enjoyment and use of the area, including general locations, timing of implementation, and anticipated costs;
- (3) identification of and implementation commitments for visitor carrying capacities for all areas of the system unit; and
- (4) indications of potential boundary modifications to the external boundaries of the system unit, and the reasons for the modifications.

General management plans are intended to be long-term documents that establish and articulate a management philosophy and framework for decision-making and problem-solving in national park system units. The purpose of general management planning is to ensure that a national park system unit has a clearly defined direction for resource preservation and visitor use to best achieve the NPS mandate to preserve resources unimpaired for the enjoyment of future generations. In addition, general management planning makes the National Park Service more effective, collaborative, and accountable by:

- providing a balance between continuity and adaptability in decision-making by defining the desired conditions to be achieved and maintained in a park unit and providing a touchstone that allows NPS managers and staff to adapt their actions to changing situations, while staying focused on what is most important about the park unit.
- analyzing the park unit in relation to the surrounding ecosystem, cultural setting, and community, which helps NPS managers and staff understand how the park unit can interrelate with neighbors and others in ways that are ecologically, socially, and economically sustainable. Decisions made in such a larger context are more likely to be successful over time.

- affording everyone who has a stake in decisions affecting a park unit an opportunity to be involved in the planning process and to understand the decisions that are made. Involving all interested parties in general management plan development provides opportunities for NPS managers and staff to interact with the public to learn about their concerns, expectations, and values and to share information about the park unit's purpose and significance and the opportunities and constraints for management of park lands.

The ultimate outcome of general management planning for park units is an agreement among the National Park Service, its partners, and the public on why each area is managed as part of the national park system, what resource conditions and visitor experiences should exist, and how those conditions can best be achieved and maintained over time.

The Tule Springs Fossil Beds National Monument was established by Congress in 2014 to conserve, protect, interpret, and enhance the unique and nationally important paleontological, scientific, educational, and recreational resources and values that are inherent to the park (Pub. L. 113-291, 128 Stat. 3861, Sec. 3092). This document represents the first general management plan for the new park unit.

## **Other Laws and Policies Related to National Park Service Management**

This section discusses some of the most pertinent laws and policies related to the national park system, park management, and park planning. Importantly, the park must comply with these laws and policies regardless of this general management plan planning effort.

**Laws.** The NPS Organic Act (16 United States Code 1) provides the central management direction for all units of the national park system:

*[P]romote and regulate the use of the Federal areas known as national parks, monuments, and reservations . . . by such means and measure as to conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.*

The National Park System General Authorities Act of 1970 (amendment to the NPS Organic Act of 1916; Pub. L. 91-383 Stat. 825) affirms that while all national park system units remain “distinct in character,” they are “united through their interrelated purposes and resources into one National Park System as cumulative expressions of a single national heritage.” The act makes it clear that the NPS Organic Act and other protective mandates apply equally to all units of the system.

Further, the Redwood Act of 1978 (amendment to the National Park System General Authorities Act of 1970; Pub. L. 95-625) states that NPS management of park units “. . . shall not be exercised in derogation of the values and purposes for which the System units have been established, except as directly and specifically provided by Congress.”

Some laws and policies are applicable solely or primarily to units of the national park system, such as the National Parks Omnibus Management Act of 1998 (Pub. L. 111–11, H.R. 146), which includes the Paleontological Resources Preservation Act of 2009 (PRPA 2009).

**Policies.** The National Park Service has established policies for all units under its stewardship that are explained in a guidance manual titled *Management Policies 2006*. The alternatives considered in this document incorporate and comply with the provisions of these laws and policies. Policies that apply to the park include how fossil resources will be protected and managed for public benefit (Section 4.8.2.1 – Paleontological Resources and their Contexts); and policy on the prohibition of the sale of fossils, artifacts, and specimens originating from NPS managed lands (Section 10.2.4.6 – Artifacts and Specimens).

**Regulations.** Regulations are mechanisms for implementing laws and for enforcing established policies. The National Park Service published regulations in title 36 of the Code of Federal Regulations (CFR). These regulations are detailed statements of how policies will be applied to the public. Once published in this form, they apply to everyone, and their violation may invoke a fine and/or imprisonment. Examples of regulations that pertain to the park include those that apply to the preservation of natural (e.g., fossils), cultural, and archeological resources (36 CFR 2.1); and the requirement of a permit to take or collect research specimens (e.g., fossils, plants, wildlife; 36 CFR 2.5).

The National Park Service also published regulations to communicate to the public how the Service will administer various programs, such as concession activities, the National Register of Historic Places, and the Land and Water Conservation Fund.

### **Compliance with the National Environmental Policy Act**

This general management plan is subject to the requirements of the National Environmental Policy Act (NEPA), implementing regulations found in 40 CFR Parts 1500–1508, Director’s Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision-Making* (NPS 2011), and the NPS *NEPA Handbook* (NPS 2015).

The National Park Service must comply with laws and policies to protect environmental quality and resources, preserve cultural resources, and provide public services. Applicable laws and policies related to resource management include the National Historic Preservation Act of 1966, as amended; the Archaeological Resources Protection Act of 1979; the Native American Graves Protection and Repatriation Act of 1990; the Clean Water Act of 1972; the Endangered Species Act of 1973; and Executive Order 11990, “Protection of Wetlands,” among others. Laws and policies related to public services and access include the Americans with Disabilities Act of 1990, the Architectural Barriers Act Accessibility Act Standards, the Final Outdoor Developed Area Guidelines, and the Rehabilitation Act of 1973.

**This page intentionally blank.**

## APPENDIX C: INDICATORS, THRESHOLDS, OBJECTIVES, AND VISITOR CAPACITY

### INTRODUCTION

Monitoring is essential to ensure that desired conditions for resources and visitor experiences are tracked, achieved, and maintained over time. The monitoring strategy for this plan was developed based on the principles described in the Interagency Visitor Use Management Council's (IVUMC) *Visitor Use Management Framework and Monitoring Guidebook*. These documents and associated background material are available on the IVUMC website at <https://visitorusemanagement.nps.gov/>.

Monitoring described in this plan is accomplished through the establishment of “indicators,” “thresholds,” and “objectives,” as follows:

- **Indicators** are specific resource or experiential attributes that can be measured to track changes in conditions caused by visitor use so that progress toward achieving and maintaining desired conditions can be assessed.
- **Thresholds** are the minimum acceptable conditions associated with each indicator.
- An **objective** is a specific result that an agency aims to achieve within a specified time frame and is associated with an indicator; additionally, objectives are markers to help ensure positive progress toward achieving and maintaining desired conditions.

Together, indicators, thresholds, and objectives provide park managers with a monitoring strategy to ensure desired conditions for resources and visitor experiences are achieved and maintained over time.

Management strategies are identified to prevent thresholds from being exceeded and are adaptively implemented in response to monitoring data and changes in conditions. Changes to management strategies are considered if management strategies are not effective and there is evidence that conditions are trending away from desired conditions or are approaching thresholds.

The planning team considered many potential issues and related indicators that would identify impacts of concern. Ultimately, the three indicators described in this section were selected because of the importance and vulnerability of the resources and visitor experiences. In identifying meaningful indicators, the planning team also reviewed the experiences of other park units with similar issues. Indicators would be applied to the preferred alternative in the plan.

In addition to the management strategies outlined in chapter 2, the planning team identified management strategies specific to each indicator. Some of these strategies are currently in use and may benefit from increased efforts in response to changing conditions. Other strategies would be implemented if and when monitoring indicates that thresholds are being approached or exceeded. Different management strategies would be explored in the future if the identified management strategies did not work. Details of future management strategies



would be developed at the time they are needed to ensure that the most effective approach is implemented. The impacts of these future management strategies would be analyzed in future compliance as needed.

The iterative practice of monitoring, implementing management strategies, and then continuing to monitor the effectiveness of management strategies allows park managers to achieve and maintain desired conditions for resources and visitor experiences in a dynamic setting, while maximizing benefits for visitors.

The following are detailed descriptions of the indicators, thresholds, and objectives and their associated rationales and monitoring strategies and the management strategies and actions. Any compliance needs associated with implementing management strategies and actions as part of future planning have been identified, where necessary.

### **Indicator Topic: Visitor-Created Trails**

#### **Indicator**

Number of visitor-created trails annually

#### **Threshold**

No more than three visitor-created trails leaving designated trails per mile, annually

#### **Rationale**

This indicator is related to both resource impacts and visitor experiences. As visitors leave designated and existing trails, vegetation, soil, cultural sites, and wildlife habitat can become damaged or degraded. With repeated use, these detours become visible visitor-created trails, also known as social trails. Visitors may leave official trails to hike to a destination or trailhead faster, to recreate or explore destinations off trail, or to reach a destination that was posted on social media platforms. Some visitors are unaware of the negative effects of visitor-created trails due in part to limited outreach education and awareness.

Issues of concern related to this indicator include natural resource impacts, crowding, congestion, and visitor safety. The Aliante Loop and Durango Loop trails are currently classified as temporary trails and would become official park trails under alternative A, as detailed in chapter 2. Upon this new potential designation, this indicator's rationale would still apply. The Aliante Loop trail is located in sensitive plant habitat for the Las Vegas bearpoppy and Las Vegas buckwheat. Recreating off trail can cause erosion, soil compaction, and plant trampling that can negatively affect native plant growth and encourage the spread of invasive weeds. Park staff have observed several visitor-created trails stemming from the Aliante Loop and Durango Loop trails, primarily to form shortcuts. The lack of visitor amenities and on-site information could lead to visitors getting lost and pose safety concerns, as they explore areas of the park not frequently accessed by others. Knowing where visitor-created trails develop may give park staff insight on the locations of pinch points or where trail routes can be improved. This would not only provide insight on where visitors tend to travel when going off-trail but also produce valuable data about visitor use levels and types of use in the park. Collectively, this may give insight into the development of new trails,

especially given the limited historical visitor use data available. This indicator provides insight into the frequency and extent to which visitor-created trails are developed.

Given the open landscape and visitor use patterns at the park, staff have determined that three new visitor-created trails per mile annually stemming from designated trails would still allow the park to achieve desired conditions because this is a manageable number of visitor-created trails to address. The threshold is based on the need to minimize visitor-created trails to ensure that desired conditions for resources are achieved and maintained. The park currently has two temporary trails, the Aliante Loop and Durango Loop trails. Visitor-created trails originating from the two temporary trails are well documented, and park staff are able to accurately and reliably continue this monitoring.

Additionally, there is a large, partially mapped, network of informal trails and old roads that has developed over years of use, both before and after the park's establishment. Park staff are more equipped to monitor and take action on the two designated trails rather than the large informal network in the park because they are often in less-accessible areas. The informal trail network is expansive, and although park staff can still act upon the creation of additional visitor-created trails, this informal trail network cannot be monitored as accurately as the designated trails because it is not fully mapped. Park staff expect to have this informal network mapped by around spring 2026, depending on staff and volunteer capacity. Being aware of conditions in this area is still critical, and details about monitoring this information can be found below in "Other Related Monitoring." The thresholds for this indicator may need to be revisited as the park's planning portfolio continues to grow, especially if a trail management plan is developed.

### **Monitoring Strategy**

The number of visitor-created trails would be monitored annually by documenting and measuring the paths using GPS equipment and photographing and describing resource conditions (i.e., soil cover, desert pavement disturbances, plant cover) using repeat photography. To track the creation of new visitor-created trails, park staff would compare present visitor-created trails to previously documented visitor-created trails and record the number of new visitor-created trails. Park staff would collect data twice per year at two different locations each spanning 1 mile of trail length. The section of trail monitored may change based on visitor use patterns and park staff's expertise.

### **Management Strategies**

- Educate visitors on social trail impacts and the importance of staying on the trail.
- Provide signage encouraging visitors to stay on the trail that provide interpretation, education, and/or highlight restoration and sensitive resource areas.
- Improve trail identification and signage (e.g., scenic viewpoint or fundamental resource ahead).
- Eradicate excess trails through restorative actions.

- Create visual deterrents (rocks, logs) to discourage the use of visitor-created trails.
- Increase staff or volunteer presence along trails.

### **Adaptive Management Strategies**

1. Consider trail watch volunteers, including trail stewardship programs.
2. Develop a formal volunteer restoration program to restore areas impacted by visitor-created trails back to their quality.
3. Improve maintenance and trail markings and general trail conditions.
4. Enhance trail design, such as adding views, rails, borders, boardwalks, or pavement, to improve the delineation of designated trails as appropriate.
5. Conduct additional monitoring such as encounter rates, people per view, soil loss, or others.
6. Close and restore unacceptable trails using signage and by covering up or camouflaging any visible portions of informal trails.
7. Close specific designated trails/routes or areas.
8. Evaluate the need and opportunities for new trails to help disperse use and provide connections to appropriate locations.

### **Indicator Topic: Damage to Nonrenewable Resource Sites**

#### **Indicator**

Annual number of documented incidents of downgraded site conditions (poor, fair, good, excellent, destroyed, cannot be found) due to human-caused disturbances at sensitive paleontological resources sites, as recorded in the Tule Springs Fossil Beds National Monument Paleontological Condition Form

#### **Threshold**

No more than one documented incident of downgraded site condition to sensitive paleontological resources sites per year due to human-caused disturbances, as recorded in the Tule Springs Fossil Beds National Monument Paleontological Condition Form

#### **Indicator**

Annual number of documented incidents of downgraded site conditions (poor, fair, good, excellent, destroyed, cannot be found) due to human-caused disturbances at sensitive cultural sites, as recorded in the NPS Cultural Resources Inventory System

#### **Threshold**

No more than one documented incident of downgraded site condition to sensitive cultural resource sites per year due to human-caused disturbances, as recorded in the NPS Cultural Resources Inventory System

## **Rationale**

These indicators are related to paleontological and cultural resource condition and would help park staff determine the frequency at which sensitive resource sites are being disturbed. Paleontological and cultural resources are typically nonrenewable, and damage is typically irreversible. Both paleontological and cultural resources at the park face similar threats and are subject to nearly identical impacts. These resources are subject to both human-caused and naturally occurring phenomenon, but park staff are able to differentiate damage from these two sources because of the high speed and level degradation caused by human interaction. As a result, this rationale applies to both indicators, and they are similar in nature.

Degradation of these resources is assessed based on a number of factors detailed in the Tule Springs Fossil Beds National Monument Paleontological Condition Form (paleontological condition form) and the NPS Cultural Resources Inventory System by considering the overall condition of sites. Based on the NPS paleontological condition form and the NPS Cultural Resources Inventory System, these indicators would allow park managers to make decisions that mitigate and prevent resource damage caused by visitor use but also provide insight on resource damage caused by other disturbances, like weather-related events. Park staff would look to subject matter experts and resource management to provide insight on what types of structures and resources may be needed to protect these resources. It is critical to consider impacts beyond visitor use when protecting these resources because no matter the cause of damage to sensitive resource sites, they become more vulnerable to increased levels of visitor use. For example, there are numerous sensitive resource sites in the park, and some of these resources have existed in the landscape, undisturbed, for thousands of years. However, as visitation and the region's population increase, the sensitive resources and sites face increased risks. Both authorized use (e.g., hiking, equestrian) and unauthorized use (e.g., dirt biking, looting, target shooting), cause damage to the area and its resources. Understanding the overall condition of these sites would allow park managers to act more quickly and protect them from future use.

Access to and education on sensitive paleontological and cultural resources is a key experience at Tule Spring Fossil Beds National Monument. The large network of visitor-created trails sometimes leads visitors to sensitive paleontological and cultural resource sites. By knowing which sites are threatened, park managers are informed about where visitors may be heading and what resources they wish to connect with. This knowledge can then inform park staff on what resources should be prioritized for protection and interpretation, especially as some sites gain more popularity than others. Additionally, natural resources are also threatened because unauthorized access can also introduce invasive species, garbage, and pet waste to sensitive sites.

The thresholds for these indicators are low because they are based on the highly sensitive character of the affected resources, the amount of visitor use taking place, and the extent to which these impacts could be tolerated. In addition, these indicators would include a long-term monitoring strategy to document changes to archeological site condition due to visitor use. The thresholds are similar but use different systems to rate their site conditions because, although they face the same threats, different factors are considered in evaluating the

condition of the resources. The NPS Cultural Resources Inventory System is an accepted database and rating system in the national park system. There is no standardized method to evaluate paleontological resources in the National Park Service. Subject matter experts at the park developed a paleontological condition form to objectively assess the condition of paleontological resources.

### **Monitoring Protocol**

Park staff would select two sensitive resource sites per year to monitor, which would include both paleontological and cultural resource sites. Since sensitive cultural resources and sensitive paleontological resources face similar threats in this environment, they would be monitored in similar ways but with different rating systems to track changes in site conditions. These sites would be evaluated at least twice per year using the NPS Cultural Resources Inventory System (poor, fair, good, excellent, destroyed, cannot be found) for sensitive cultural resources and the Tule Springs Fossil Beds National Monument Paleontological Condition Form (numerical scores translated into the descriptive categories of poor, fair, good, excellent, destroyed, and cannot be found) for paleontological resources. The sites selected may change from year to year and would be selected based on visitation patterns and park staff's best judgment.

### **Management Strategies**

- Educate visitors about sensitive resources and staying on trails, and promote trail and resource stewardship.
- Integrate educational programs related to appropriate activities surrounding paleontological and cultural sites and why they should not damage the areas.
- Educate visitors through interpretive panels, interpretive programming, and visitor outreach on the sensitivity of archeological resources and the need to protect historic sites.
- Encourage visitors report and help monitor any harmful activities, theft, or damage to paleontological archeological sites.
- Leverage partnerships to help increase awareness and outreach about sensitive resource protection.
- Increase the law enforcement presence at impacted cultural/historic sites and continue enforcement of park regulations.
- Provide deterrents to inappropriate visitor use near cultural sites (e.g., logs, rocks).
- Implement temporary or seasonal closures on trails that access cultural resources or historic sites.
- Conduct paleontological and archeological surveys and/or condition assessments, and implement recommendations for monitoring and stabilizing sites.

- Establish regular communication mechanisms with local Tribes and Indigenous groups to understand traditional cultural resource locations and activities.
- Install additional removable physical barriers, such as posts and rope, to deter visitor use of or access to particularly sensitive or fragile resources.

### **Adaptive Management Strategies**

- Close and/or rehabilitate unacceptable trails/routes and areas to sensitive resource sites using signage and/or by disguising visual elements of visitor-created trails, such as the use of rocks, brushy vegetation, or by raking organic material into the pathway.
- Conduct additional monitoring of known sites performed by park staff and/or park-trained site stewards.
- Conduct visitor surveys that seek to understand desired visitor opportunities pertaining to historic properties and current visitor knowledge of appropriate activities and actions near such properties. Information would be used to target additional management strategies that would provide access to properties and effectively communicate restrictions where necessary.
- Conduct archeological site testing, and provide recommendations to inform management strategies.
- Create physical barriers to separate visitors from sensitive resources.
- Install exhibit design features that make exhibits more resilient to visitor impacts.
- Add identified archeological sites to the park Facilities Management Software System database to allow for facilities-based projects and additional staff support for the preservation and care of archeological features.
- Implement security measures, such as alarm systems and cameras, along trails at cultural/historic sites.
- Consider more closely managing the number of visitors at one time so that rangers, volunteers, and partner staff can better observe visitor activities and minimize the wear on historic resources that can occur during high-visitation levels.
- Explore removing or limiting self-guided tour options at sensitive resource sites so that rangers, volunteers, and partner staff can better observe visitor activities and deter improper behavior in real time.
- Permanently reroute trails away from cultural or historic sites.
- Increase enforcement for vandalism and looting.
- Remove sensitive artifacts from the field as a last-resort preservation/protection measure.

## **Indicator Topic: Illegal Dumping**

### **Indicator**

Number of new illegal dumping sites within the park boundary annually

### **Objective**

Park staff would work to prevent the creation of new illegal dumping sites (and the need for their cleanup) by 2030. Currently, park staff clean up approximately eight new illegal dumping sites per year.

### **Rationale**

This indicator monitors how many instances per year the park responds to illegal dumping sites and its impact on the visitor experience and resource conditions. For the purpose of this indicator, dumping sites are considered areas that have a collection of litter that encompasses 10 square feet or more or areas that the park perceives other discarded items have been intentionally abandoned. Illegal dumping can diminish the visitor experience by adding hazards to the landscape, disrupting the views, and interfering with connection to resources. Additionally, it poses a threat to all park resources because materials can contain hazardous materials that damage vegetation, potentially toxic to wildlife, and may damage sensitive paleontological resources.

This topic was identified as an indicator with an associated objective because the issue has been persistent for years and dates back to before the National Park Service began managing the land in 2014. The issue is likely related to the different types of use previously prevalent in the area (e.g., target shooting and driving off-road). Park staff aim to change the perception of the area from an overlook patch of land to a high-quality living laboratory for researchers and visitors to experience. Historically, the area around Mud Hills and mile marker 102/103 have experienced the most instances of illegal dumping. Although to a lesser extent, there are various instances of landscape dumping along Moccasin Road and construction debris near Eglington preserve. These dump sites vary in size and can contain items such as home appliances, trash, organic waste, and other hazardous materials. The full extent of illegal dumping is not accurately known, but staff agree that dumping more frequently occurs in the north unit. Park staff have already identified four CERLCA sites to be cleaned up. The timing of their cleanup would depend on available funding and resources. These hazardous sites are a priority concern, and park staff aims to ensure that new ones do not develop. Although instances of illegal dumping seem to be trending downward, park staff are concerned that without a concerted effort to stop this dumping, it may continue to get worse since there is planned housing developments adjacent to the park boundary in multiple locations.

Stopping large-scale illegal dumping in the park is critical to prevent future and potential damage and protect park staff, resources, wildlife, and visitors. Large piles and excessive amounts of trash in the views diminish the visitor experiences and distract from visitors connecting with park resources. Additionally, it can create physical barriers on rails and roads, preventing safe transportation in the park. These dumping sites can pose threats to wildlife since some are attracted to brightly colored pieces of trash that are harmful when



ingested. In addition, remnants of leftover food waste can lead to unattended safety consequences for both fed wildlife and visitor safety. Landscape debris may contain exotic seeds that bring in new invasive species to the ecosystem and affect biodiversity. Trash can strangle vegetation and thus alter the landscape and habitat for wildlife. Park staff have even reported finding abandoned African bee beehives, which put native wildlife at risk.

Implementing this threshold may also create additional benefits for the park and its overall management. By regularly monitoring illegal dumping, park staff can get a better sense of infrastructure needs in various areas of the park. Implementing this threshold is also an opportunity for the park to work more closely with partners, other government agencies, and landowners to develop better more effective means for individuals to dispose of trash. This indicator can lead the park to create new education programs. Finally, by cleaning up illegal dumping sites and improving the overall ecosystem, park managers show a commitment to creating a safe and welcoming environment where visitors can connect with resources.

The objective is set to bring illegal dumping to zero because the park is full of sensitive resources, and illegal waste poses a multitude of threats to the longevity of these resources and the ecosystem. By tracking where these illegal dump sites are, park staff could gain insight on where trespassers may be entering the park to dump illegally. Tracking also helps park staff direct visitors to other areas that can provide a more positive visitor experience.

### **Monitoring Protocol**

Park staff would continue to monitor illegal dumping sites throughout the park on a monthly basis. Within one year, park staff would patrol and monitor every area of the park at least once per year to document new instances of illegal dumping. Additionally, park staff would continue to address these sites through an annual clean-up effort that removes and properly disposes of the contents.

### **Management Strategies**

- Provide information along park boundary about how to properly dispose of waste.
- Educate visitors through interpretive panels, interpretive programming, and visitor outreach on the harms of illegal dumping.
- Educate visitors using active and passive techniques on-site and prior to the visit.
- Provide opportunities for volunteer clean-up days.
- Provide opportunities for volunteers to participate in a Leave No Trace trainer program, which focuses on communicating messaging.
- Consider implementing a parkwide litter campaign using multiplatform tools and resources. Include Leave No Trace messaging such as “pack it in, pack it out.”
- Increase law enforcement and staff patrols of sites that experience high levels of dumping.

- Increase enforcement around litter and illegal dumping and provide citations as necessary.
- Collaborate with partners to create messaging and active strategies to deter illegal dumping.

### **Adaptive Management Strategies**

- Remove trash through technical means, which would be conducted outside of peak visitation hours to reduce the impact on the visitor experience and circulation in the area.
- Construct additional fencing in areas that experience high levels of illegal dumping.

### **Other Related Monitoring**

#### **New Visitor-Created Trails Not Stemming from Designated Trails**

Although an existing park indicator tracks visitor-created trails stemming from designated trails, park staff should monitor the creation of visitor-created trails throughout the park. Because the area was previously under different management, visitor use patterns and allowable uses sometimes differed from current park management policies. These historical uses influenced the development of a large network of visitor-created trails. Although park management intends to limit new visitor-created trails in all areas of the park, this plan is unable to establish a meaningful threshold for the creation of new visitor-created trails not stemming from designated trails. One of the primary reasons is because the informal trail network is not inventoried. In addition, park staff are not able to determine which visitor-created trails are new and which existed before this planning effort. Since park staff are aware of some of the popular visitor-created trails, park staff may be able to identify new visitor-created trails in other areas of the park. Park staff would continue to monitor these trails as they develop, but there is no associated threshold, given the lack of data and resources. Park staff should continue to monitor any new visitor-created trails in other areas of the park because these trails can impact resources, create safety concerns for visitors, and degrade the visitor experience. If visitor-created trails continue to be an issue in many areas of the park, management can consider actions to help mitigate their impacts.

#### **Potential Monitoring and Management Strategies**

- Complete mapping effort related to informal trail network.
- Document new visitor-created trails.
- Communicate with visitors to understand why they choose to use particular visitor-created trails.
- Educate visitors on visitor-created trail impacts and the importance of staying on designated trails.

- Improve trail identification and signage (e.g., scenic viewpoint or fundamental resource ahead).
- Eradicate excess trails through restorative actions.
- Create visual deterrents (rocks, logs) to discourage the use of visitor-created trails.
- Increase the staff or volunteer presence along trails.
- Consider trail watch volunteers, including trail stewardship programs.
- Develop a formal volunteer program to restore areas impacted by visitor-created trails to their undeveloped quality.
- Conduct additional monitoring such as encounter rates, people per view, and soil loss.
- Close specific routes or areas.
- Evaluate the need and opportunities for new trails to help disperse use and provide connections to appropriate locations.

### **Sensitive Habitat and Associated Species**

A key issue identified through this planning process is the condition and health of sensitive habitat and associated species, which include the federally listed species, critical habitat, and special status species described earlier in this document, as well as the Las Vegas buckwheat, burrowing owl, LeConte's thrasher, and phainopepla. There are a variety of uses that affect the quality of these species' habitat, and primary concerns include off-road vehicle use (e.g., dirt bikes) (not permitted in the park) and, at times, equestrian use (permitted on designated trails only).

The full extent of off-road vehicle use in the park is unknown, but staff report that this type of use has decreased in recent years and mostly occurs in the south unit. Both staff and volunteers from the Protectors of Tule Springs report seeing off-road vehicle users, as well as evidence of tire tracks and fences that have been cut to facilitate off-road vehicle access. As discussed in the affected environment section (chapter 3), this type of use directly negatively impacts sensitive species and/or habitat, including direct mortality, or causes indirect disturbance that impacts overall species fitness, such as flushing wildlife from nesting or nursing areas or creating barriers to feeding areas or burrows.

Equestrian use can also impact habitat, primarily when equestrians leave designated trails to move through the landscape. Although this type of visitor use can potentially damage habitat and cause harm to wildlife, it can be difficult to confirm that damage is directly related to equestrian use.

As described in chapter 3, an impact associated with increased human presence is predation from predators that are associated with human disturbance, such as ravens and coyotes. Ravens are especially well correlated with human presence in undeveloped areas due to their inclination to investigate areas where humans are infrequently observed (Walker and Marzluff 2015). Ravens are known to prey on juvenile desert tortoises, which has an overall

cumulative impact on desert tortoise populations, as tortoises do not typically breed until they are at least seven years old. Also, desert tortoises have a higher level of influence over the ecosystem in that burrows they create will provide shelter for other species (e.g., burrowing owls, lizards). A reduction in the number of desert tortoises and associated burrows, therefore, has a negative impact overall for species that rely on burrows for survival.

Park managers plan to track the health of sensitive habitat and their associated species. Special attention would be given to the Las Vegas bearpoppy and desert tortoise, given federally protected status, as well as LeConte's thrasher, a species currently monitored by park staff. Given current conditions and resources, it can be difficult to directly tie habitat damage to visitor use at the park. Consequently, park managers would not rely on defined thresholds or a monitoring protocol but the professional judgment and knowledge of NPS staff to recognize trends and issues. If habitat condition and the health of species begins to trend in a negative direction, park managers could consider additional management strategies that more directly protect sensitive habitat.

### **Potential Monitoring and Management Strategies**

- Conduct frequent monitoring of sensitive habitat sites.
- Calculate species population estimates.
- Conduct habitat condition assessment.
- Record instances of unauthorized use near and around sensitive habitat.
- Use native seed collection for using genetically same plants in restoration activities.
- Implement invasive weed mitigation strategies.
- Manage access to sensitive resource sites temporarily or permanently.
- Identify and map sensitive species and their habitat within the park boundary.
- Develop collaborative partnerships with federal, state, and local agencies that manage lands adjacent to the park.
- Work directly with academic institutions with research capabilities in desert ecology or ecosystem management.
- Consider and prioritize management actions that are consistent with and promote the purpose of both the Endangered Species Act and Migratory Bird Treaty Act.

### **Domestic Animal Waste**

A key issue identified through this planning process is the amount and frequency of abandoned waste from domestic animals. This issue primarily concerns dog waste, but instances of horse waste (at the Durango Loop horse gate and Iron Mountain/Torrey Pines Trailhead and parking area) also cause resource damage. The full extent of unmaintained waste from domestic animals is unknown, but staff have noted that dog waste is most

common on the Aliante Loop and Durango Loop trails. The park provides dog waste bags, but they are often not used, or visitors intentionally or unintentionally leave bags of animal waste along the trail or tied to tree branches. The park also provides personalized dog waste bag holders to the public during outreach events to encourage Leave No Trace ethics. Some members of the public who live near the park let their dogs run loose at the trailheads. This behavior is detrimental to resources, as excessive amounts of waste from domestic animals increase the likelihood of invasive species. Dog waste impacts vegetation not only because it can spread disease, but its presence can also inhibit the recovery of vegetation by preventing new growth. Finally, dog waste also impacts the visitor experience because it creates visual distractions along trails, contributes off-putting smells, and can be a health hazard when staff and volunteers frequently handle abandoned waste. Due to the dry climate, the waste often lingers and does not decompose.

Park staff should track trends and amounts of waste as visitation changes in the coming years. Monitoring this and other data may provide insight into whether the park is achieving desired conditions. Overall, park managers would not rely on defined thresholds or a monitoring protocol but the professional judgment and knowledge of NPS staff to recognize trends and issues. If problems continue with domestic animal waste, park managers could consider additional management strategies, such as further investment in sign planning, education materials, and areas for domestic animals.

### **Potential Monitoring and Management Strategies**

- Educate visitors through the B.A.R.K. Ranger program.
- Expand volunteer opportunities in the B.A.R.K. Ranger program.
- Document visitor complaints related to domestic animal waste and their frequency.
- Record the weight or volume of domestic animal waste collected.
- Collect data related to soil health near common sites for domestic animal waste.
- Record the number of domestic animals spotted on trails.

## **VISITOR CAPACITY**

### **Overview**

This section provides additional guidance about identifying visitor capacities, prepared in accordance with the IVUMC Visitor Use Management Framework. More information about the framework is available at <https://visitorusemanagement.nps.gov/>.

Visitor capacity is defined 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.” By establishing visitor capacities for areas of a park unit and implementing them with appropriate management strategies, the National Park Service can help ensure that resources are protected and that visitors have the opportunity for a range of high-quality experiences.

The sliding scale of analysis is also a key part of the framework and guides the investment of time and resources related to identifying visitor capacity. The analysis includes four primary components: Issue Uncertainty, Impact Risk, Stakeholder Involvement, and Level of Controversy. Tule Springs Fossil Beds has a low degree of issue uncertainty; little impact risk due to the minor changes proposed under the management strategies; medium stakeholder involvement given the complex array of partnerships and need to develop new partnerships; and a low level of controversy. Therefore, the level of analysis is commensurate with the lower end of the sliding scale.

In addition to being an effective management tool, identifying visitor capacities is also directed by legal mandate. The following discussion on visitor capacities was developed between park staff and subject matter experts. These discussions used the requirements and recommendations listed in the NPS *Development Guide for General Management Planning* to guide these conversations.

Based on this guidance and given the additional data needed, along with the need for more detailed planning and decision-making, this plan does not identify visitor capacities but instead discusses guidance for establishing and prioritizing areas for identifying visitor capacity. The protection of park resources will be addressed through the identified management strategies described in chapter 2 and other guidance in this plan, including desired conditions applied by zones and the indicators, thresholds, and objectives, and will continue to inform and guide management on the types and levels of visitor use to sustain the quality of park resources and visitor experience consistent with the park's purpose.

### **Current Use Levels**

The full extent of visitor use at Tule Spring Fossil Beds National Monument is currently unknown. The area in and around the park boundary has a long history of use prior to the transfer of the land to the National Park Service in 2014. Some of the previous use was both authorized and unauthorized by previous managers, and some of that use is no longer compatible with NPS and park management policies. Although park staff note that use patterns have changed over time, much of this use continues.

The current amount and timing of the different types of use are not fully understood currently, since park staff have just recently begun collecting data on visitor use and needs to further refine their data collection methods. Park staff began collecting annual visitor counts in November 2021. Not enough data exist to see trends in visitation and identify information, such as the most popular time to visit the park, which areas are most popular, and more.

Collecting data has proven to be difficult for a variety of reasons. The park has multiple entry points, both formal and informal. More staffing is needed to fully address the data collection needs throughout the park. This plan will provide guidance for setting up visitor use monitoring and provide guidance for the long-term assessment of visitor use types and levels. Park staff will use the plan to help assess what types of use support desired conditions in each park area because some uses in particular areas would not allow the park to maintain desired conditions. The full extent of how many visitors and what types of uses will take place in each

area of the park will be determined in the future as park staff collect more data and the park's planning portfolio continues to grow.

### Guidance for Identifying Visitor Capacities

Given the current availability of visitor use data and guidance on identifying visitor capacity, this general management plan lays the groundwork for future planning efforts to identify capacity. This approach initiates important steps for future efforts to identify capacity and allows park managers to do so at another time when they can consider more data and conduct a more meaningful analysis.

Desired conditions are qualitative statements that provide a high-level description about what visitor experience should look like in these zones and can be used as the groundwork for identifying capacities in the future. The NPS *Development Guide for General Management Planning* states that these “qualitative statements lay the groundwork for identifying visitor capacities and decisions about the types and amounts of use an area can accommodate.” Additionally, the guidance states that “more detailed analysis and decision making is found in implementation plans as part of a park's planning portfolio,” which means that a more meaningful analysis and visitor capacity identification can be carried out in future planning efforts.

As park staff develop their planning portfolio, they should consider a number of topics and conditions when identifying capacities. Some of these key considerations include, but are not limited to, the following:

- **Needs of Tribes and Indigenous groups.** Park staff would like to consider and prioritize the needs of Tribes and Indigenous groups. This may alter access or the amounts of access to certain areas. This consideration will require close collaboration and communication with Tribes and Indigenous groups about sensitive resource sites.
- **Neighboring public and private lands.** This consideration may be a limiting attribute to managing to capacity in a given area. Some of these areas may have conditions that affect visitation within the park boundary or already have identified their own visitor capacities that may influence what the park is able to manage to. This type of analysis is also an opportunity for park managers and adjacent land managers to work towards common goals.
- **Development of surrounding lands.** Lands adjacent to and near the park are planned to be developed by non-NPS entities. Some areas are further along in development than others and can affect how park managers will manage to desired conditions and visitor capacity, so they will be key to understanding the forthcoming extent and ways in which these areas will change to make informed management decisions.
- **Safety and skill level.** Park managers will need to integrate concepts about necessary skill level into future visitor capacities. Some areas may contain varied levels of self-reliance and mixed-use types, and each type of use will need to consider each other to keep visitors safe.



- **Future park development.** Although no facilities are currently planned for development, future planning efforts may identify facilities and amenities. This development will be a key feature that influences visitor capacities for specific areas.
- **Indicators and thresholds.** Under alternative A, park managers would implement the above-mentioned indicators and thresholds. The data gathered from these indicators may provide useful information that informs the future visitor capacity analysis.

Additional planning will depend on a variety of factors, including planning priorities, funding, amount of data available, and changes in visitor use patterns. To aide future planning efforts, park staff identified areas of high priority where capacity should be addressed. These areas are not considered higher priority over each other but should be addressed when resources and data allow. The following areas are considered priorities because these are currently the most popular areas among visitors, according to staff experience.

- Current and future established trails
  - Aliante Loop trail
  - Durango Loop trail
  - Eglington Trail (currently informal visitor created)
- Mile marker 102–103
- Boundary area adjacent to Ice Age Fossils State Park and Tule Springs Fossil Beds National Monument
- Mud Hills/Alamo Road area
- Golden Triangle
- Corn Creek Road

Other areas park staff identified as priorities but that do not experience high levels of use include the following:

- Eglington Preserve
- All remaining trails
- Detention basin
- Road system

Finally, park staff also have data needs and strategies that will aid in identifying visitor capacities. The data and actions identified below are not necessarily management strategies but actions that may assist park staff in gathering meaningful and useful data. All actions may not be completed before visitor capacities are identified and park staff may use additional data and methods to aid in informing the future visitor capacity analysis.

#### **Actions**

- Set up trail and vehicle counters at key locations.
- Identify potential facilities, amenities, and other development.
- Monitor indicators and thresholds.

#### **Data needs**

- Erosion rates
- Visitor satisfaction surveys
- Preferred visitor areas
- Stakeholder interests and concerns

**This page intentionally blank.**

## **APPENDIX D: ANALYSIS OF BOUNDARY MODIFICATION**

NPS *Management Policies 2006* states that the National Park Service will conduct studies of potential boundary adjustments and may make boundary revisions that

- include significant resources or opportunities for public enjoyment related to the purposes of the park,
- address operational and management issues such as boundary identification by topographic or other natural features, or
- protect park resources critical to fulfilling park purposes.

National Park Service policies also instruct that any recommendation to expand park boundaries be preceded by determinations that the added lands will be feasible to administer considering size, configuration, ownership, cost, and other factors and that other alternatives for management and resource protection be considered and are not adequate.

The following is a review of the criteria for boundary adjustments, as applied to Tule Springs Fossil Beds National Monument. This analysis is included as supporting documentation for alternative A (preferred alternative), which proposes a boundary change to the park. The park proposes that the Rainbow parcel be acquired and added to the park boundary (see figure 3).

Legislation would be needed to authorize the secretary of the interior to acquire the Rainbow parcel. Acquisition by the National Park Service would be restricted to a willing seller only; that is, the owner would be willing to sell, and adequate funds would be available to support the purchase.

### **SIGNIFICANT RESOURCES OR OPPORTUNITIES FOR PUBLIC ENJOYMENT RELATED TO THE PURPOSES OF TULE SPRINGS FOSSIL BEDS NATIONAL MONUMENT**

The Rainbow parcel is a 44-acre parcel located along the northern boundary of the south unit of the park and south of the Clark County Shooting Complex. Little is known about the cultural and natural history of this site since the lands have been in private ownership. However, paleontological and archeological sites are known to be in the immediate vicinity of this property, and there is potential for these resources to be present in the site.

Acquisition would allow for the protection of the habitat. As a secondary benefit, there is also an opportunity to increase public enjoyment on this parcel. Acquisition could result in legal public access and trails on this property.

### **FEASIBILITY TO ADMINISTER THE LANDS ADDED THROUGH BOUNDARY ADJUSTMENT**

As a contiguous tract on the northern boundary of the south unit of the park, the Rainbow parcel represents a logical and important addition to Tule Springs Fossil Beds National Monument. The parcel would add limited acreage to the park, when compared to the total

acreage in the park, and its resources are similar to those within park boundaries. The park has the necessary personnel and expertise to manage the property, which is easily accessible. Acquiring the Rainbow parcel would facilitate the enforcement of appropriate activity in this park area by enabling for the application of consistent regulations. Acquisition costs would need to be available within the National Park Service. The current owner is interested in selling the property to the National Park Service. Future uses of the property are anticipated to be less compatible with park management should it remain in private ownership.

## **SUMMARY**

Given the above discussion, the Rainbow parcel meets the boundary adjustment criteria for acquisition and incorporation in Tule Springs Fossil Beds National Monument. The following summarizes the analysis:

1. The Rainbow parcel contains potentially important paleontological resources and is identified as a location that contains primary fossil-bearing geologic layers and has important geological context for the park. This parcel also protects a hydrological resource that is important for rare plants, including federally listed species, near this site. Acquiring this parcel and including it within the monument boundary would prevent possible future development, including residential or commercial, facilitate contiguous NPS management, protect valuable paleontological resources, and provide public access to and interpretation of the resources.
2. No operational and management issues related to access and boundary identification exist.
3. The resources in the Rainbow parcel align with the park's purpose.
4. As a contiguous tract on the northern boundary of the south unit of the park, the Rainbow parcel represents a logical and important addition to Tule Springs Fossil Beds National Monument.

This general management plan recommends that legislation authorize the secretary of the interior to acquire the Rainbow parcel, as described in chapter 2, "Consideration of Boundary Adjustments" section.

## **PARCELS DISMISSED FROM ANALYSIS**

In addition to the property analyzed above, the planning team considered the potential addition of other parcels immediately adjacent to the park but dismissed them from full analysis. Parcels adjacent to the park boundary to the west and north that contain known fossil sites, potentially fossiliferous deposits, and/or habitat for sensitive species known to occur in the park were considered; however, their existing management, the landowners ongoing partnership with the park, and intergovernmental agreements led the study team to conclude that there would be little benefit to including those parcels within park boundaries. Because the parcels were unlikely to meet any boundary adjustment criteria at this time, they were dismissed from full analysis.

Other small parcels currently managed by the Bureau of Land Management and immediately adjacent to the park were considered during initial boundary adjustment analysis. Upon further analysis, the National Park Service determined that although these parcels have the potential to contain fossil resources, there is not enough data to confirm their presence, and, therefore, the planning team could not affirm that the parcels met the boundary adjustment criteria at this time.

The National Park Service would continue to work with surrounding landowners to support the protection of fossiliferous deposits and other resources. If further information about resources located in adjacent parcels becomes available in the future, reanalysis could be warranted, and consideration of a potential boundary modification could occur over the life of this general management plan.

**This page intentionally blank.**



## APPENDIX E: MITIGATIONS AND BEST MANAGEMENT PRACTICES

### CULTURAL RESOURCES

The National Park Service (NPS) would apply best management practices according to NPS *Management Policies 2006*, specifically with reference to 5.3.1 Protection and Preservation of Cultural Resources; 5.3.1.6 Visitor Carrying Capacity, 5.3.4 Stewardship of Human Remains and Burials, 5.3.5.1 Archaeological Resources, and other sections that would apply.

Before any construction and related activities, the National Park Service would conduct cultural resource surveys to mitigate potential impacts on resources. These surveys include terrestrial archeological surveys of new areas such as trails, roads, and parking lots.

Ground-disturbing activities associated with construction, such as clearing, trenching, and grading, have the potential to damage or destroy archeological resources that may be present on or below the ground surface, particularly in areas that have not previously been developed. Archeological surveys would precede ground-disturbing activities, and national register-eligible or listed archeological resources would be avoided during construction activities. If significant archeological resources were discovered during construction, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented, and, if the resources could not be preserved *in situ*, an appropriate mitigation strategy would be developed in consultation with the State Historic Preservation Office and as necessary, Native American Tribes.

### NATURAL RESOURCES

The National Park Service would apply best management practices according to NPS *Management Policies 2006*, specifically with reference to 4.4.2 Management of Native Plants and Animals, 4.4.2.3 Management of Threatened or Endangered Species, 4.4.4 Management of Exotic Species, and other sections that would apply. For the purposes of the plan's scope, implementing the following mitigation measures or best management practices would help to avoid or minimize impacts on threatened, endangered, proposed, and candidate species.

Given the number of projects that NPS staff must manage and that require a level of analysis for impacts to federally listed species, dialogue between the National Park Service and the relevant US Fish and Wildlife Service field offices is ongoing. The legacy information available through this ongoing dialogue (e.g., biological opinions provided by the US Fish and Wildlife Service) has considerably aided in developing the conservation measures described in this document. The following actions are possible conservation measures NPS staff could take to minimize impacts on resources:

- Natural resources would be protected and preserved as much as possible from recreational pressure and opportunities for restoration of landscapes to support desert ecosystems and habitats.
- Natural resources would benefit from visitors' increased knowledge and stewardship.

- Facilities and infrastructure would be designed to support visitor access in a sustainable manner, which would include efforts to size them efficiently to address visitor needs, and at a level that is maintainable (e.g., restrooms), to support resource protection.

### **Special Status Species and Habitats in General**

Implementing the following conservation measures or best management practices would help avoid or minimize impacts on threatened, endangered, proposed, and candidate species. Conservation measures that specifically address the desert tortoise are drawn from biological opinions issued by the US Fish and Wildlife Service on July 3, 2017 (USFWS 2017a) and July 25, 2017 (USFWS 2017b). These biological opinions were issued in response to actions proposed for potential ground-disturbing activities, such as the establishment of interpretive trails and development on perpetual easements across park lands for City of North Las Vegas rights-of-way.

- Educate and inform staff about the potential for special status species in or near the project area. Work would cease if a special status species were discovered in the project area until NPS staff reevaluate the project. Protective measures, including the potential modification of the work or the work schedule, could be determined as necessary.
- Ensure that all mitigations/conservation measures determined through the Endangered Species Act, section 7 consultation with the US Fish and Wildlife Service, are followed.
- In circumstances when it is deemed necessary to conduct activities near sites known to support threatened or endangered species, such work would be performed in a manner that is specified by the park biologist to minimize impacts on the listed species (e.g., working quietly on-site or minimizing time in or near habitats while en route to work sites).
- Should it be necessary to perform herbicide applications, to the extent possible, conformity to best management practices for wildlife would be followed. This includes following safety data sheets and label instructions and avoiding sensitive times/areas for wildlife (e.g., aquatic plant and animal species, bird nesting and foraging, bloom periods for pollinators).
- Fencing, if needed (including temporary fencing for construction projects and permanent fencing), would comply with wildlife-friendly fencing standards. Consult with the park resource management staff for assistance with specifications and appropriate design.

### **Desert Tortoise**

- The US Fish and Wildlife Service provides the approval of authorized desert tortoise (*Gopherus agassizii*) biologists. Qualified and authorized biologists would be used to

monitor all activities. An individual would be designated as the field contact representative to oversee project compliance and coordination and terms and conditions of the 2005 biological opinion (USFWS 2005).

- Desert tortoise collisions should be reported to the corresponding US Fish and Wildlife Service immediately or within 24 hours. If the desert tortoise is injured, the National Park Service would collaborate with the US Fish and Wildlife Service for potential approved veterinary assistance.
- For the protection of the desert tortoise, an on-site environmental educational and awareness program for staff and workers would be implemented (worker awareness training program). Construction personnel would be informed of the occurrence and status of the desert tortoise and would be advised of the potential impacts on desert tortoises and potential penalties for taking a threatened species.
- During seasons when desert tortoises are most active and that coincide with construction activities, the contractor must have a USFWS-authorized biologist on-site to monitor for desert tortoises.
- During seasons when desert tortoises are less active and when a USFWS-authorized biologist is not on-site, park staff would consult with a designated authorized desert tortoise biologist.
- Areas in the park would be surveyed by a USFWS-authorized biologist for desert tortoises and their burrows and dens immediately prior (within 24 hours) to the onset of construction in any given area.
- If a desert tortoise is encountered at the work site, the contractor must cease work, and the desert tortoise would be allowed to move on its own to a safe distance away before resuming work, including moving vehicles.
- Construction sites would be surveyed for desert tortoise presence, including burrows, before use. For the protection of the desert tortoise, the clearing limits (construction limits) would be clearly marked or flagged before construction. All construction activities, including staging areas, would be located within previously disturbed areas and fenced if necessary.
- Though desert tortoises are not likely to be encountered in the immediate areas involved in the preferred alternatives, should desert tortoise burrows be encountered, they would be avoided. Use of a desert tortoise-proof fence, placed at a minimum of 20 feet from the burrow on sides bordered by construction, would be used to prevent crushing underground portions of the burrow. The fencing would remain in place until construction in the vicinity is completed. Placement, inspection, and removal of fencing would occur under the direction of a USFWS-authorized desert tortoise biologist.
- The contractor would protect against intrusion by the desert tortoise at sites with potential hazards (e.g., auger holes, steep-sided depressions). No holes with the

potential to trap or kill wildlife would remain. A USFWS-authorized desert tortoise biologist would ensure that any hole left behind during work would be covered, backfilled, or that a wildlife escape ramp exists.

- A litter control program would be implemented during construction to eliminate the accumulation of trash and to avoid attracting common ravens that may prey on juvenile desert tortoise. Trash would be removed to trash containers following the close of each workday and disposed of outside of park lands in a sanitary landfill at the end of each workweek.
- Areas disturbed by construction would be revegetated, and surface reclamation of the disturbed areas would be performed to advance recovery of the habitat.

## **Soils**

- Disturbance to soils would be contained to as small a footprint as possible while meeting project objectives.
- Topsoil would be stored for as short a period as possible before restoration.
- Any topsoil temporarily disturbed during construction would be aerated and replanted with native vegetation to reduce compaction and prevent erosion.
- Identify staging areas before project implementation that would minimize soil compaction, road access, and project site access.
- Use existing roads. Cross-country travel or initiation of new roads may require additional compliance to be completed before this activity would be authorized.
- Route alignments for any planned construction would avoid specific areas known to be occupied by sensitive species and known habitat features of sensitive species such as burrows or nests.
- Minimize upland soil compaction during construction activities by selecting the location and timing of the access to minimize compaction (i.e., avoid periods when soil is wet, especially gypsum, clay, and silt soils).
- Minimize soil and vegetation disturbance during construction activities; avoid total removal of vegetation to allow regrowth by only removing targeted species and leaving the native herbaceous layer as undisturbed as possible.
- Schedule construction activities to reduce the spread of nonnative plants by implementing the activities during the dormant season.

## **Vegetation**

- Disturbance to vegetation would be avoided as much as possible and contained to as small a footprint as possible while meeting project objectives.

- All equipment, tools, and vehicles would be cleaned before entering the park to minimize the transportation of exotic seeds to the site. All equipment entering the park would be inspected and may be required to be pressure washed to remove foreign soil, vegetation, and other materials that may contain nonnative seeds or vegetation.
- Revegetation and recontouring of disturbed areas would take place following construction and would be designed to minimize visual intrusions. Revegetation efforts would use native species to strive to reconstruct the natural spacing, abundance, and diversity of native plant species. All disturbed areas would be restored as closely as possible to preconstruction conditions shortly after construction activities are completed.
- Rare plant species located in the project area would be flagged and avoided.
- Succulents, including yuccas and cacti, that must be disturbed by construction activities would be salvaged and transplanted in an appropriate location.

### **Migratory and Nesting Birds**

To best meet its agency obligations to protect these species under these acts, the National Park Service would incorporate guidance from the US Fish and Wildlife Service's Nationwide Standard Conservation Measures to reduce impacts on birds and their habitats during project implementation (USFWS 2015), USFWS Director's Order 225: *Incidental Take of Migratory Birds* (2021), and additional NPS-developed measures (USFWS and NPS 2010a). These measures include, but are not limited to the following:

- An on-site environmental educational and awareness program for staff and workers would be implemented (worker awareness training program). In addition to the focus on special status species described previously in this section, workers would be educated on avoidance of nests, nesting activity, and nesting areas.
- Surveys shall be timed to maximize the potential to detect nesting birds and should be repeated within five days of the start of project-related activity.
- The project would be implemented over the shortest time frame feasible.
- To the extent feasible, if necessary, vegetation removal or tree felling would be conducted outside the nesting season (all birds and raptors: February 1 – August 1).
- If vegetation removal is to occur during this time, nesting surveys would be conducted before any activity occurring within 500 feet of suitable nesting habitat.
- A minimum 500-foot buffer would be implemented around any active special-status species nest.
- If an active bird nest of other bird species is found, an appropriate no-disturbance buffer would be determined by a USFWS-authorized biologist based on site-specific conditions, the species of nesting bird, nature of the project activity, noise level of the

project activity, visibility of the disturbance from the nest site, and other relevant circumstances.

- If establishing a buffer zone is not feasible, the US Fish and Wildlife Service would be contacted for guidance to minimize impacts on migratory birds associated with the proposed project.

## **Paleontological Resources**

Measures for adequate protection or the salvage of significant paleontological resources are applied to areas determined to contain rock units that have either a high or undetermined potential for containing significant fossils. The Paleontological Resource Preservation Act of 2009 establishes a uniform code for decision-making on all federal lands. Specific mitigation measures generally need not be developed for areas of low paleontological potential.

The National Park Service would make those conducting construction aware that if there is not an on-site monitor, it would be necessary to contact a qualified professional paleontologist if fossils are unearthed in the course of excavation. This contingency should be planned for in advance.

To save time and project delays, in the advance planning phases of a project, the developer should contact a qualified professional paleontologist and arrange for the salvage of any unanticipated fossils. The paleontologist would then salvage the fossils and assess the necessity for further mitigation measures, if applicable. Decisions regarding the intensity of the paleontological resource impact mitigation program would be made by the project paleontologist on the basis of the significance of the paleontological resources and their biostratigraphic, biochronologic, paleoecologic, taphonomic, and taxonomic attributes, not on the ability of a project proponent to fund the paleontological resource impact mitigation program.

In areas determined to have high or undetermined potential for significant paleontological resources, an adequate program for mitigating the impact of development must include the following (Society of Vertebrate Paleontology 2010):

- an intensive field survey and surface salvage prior to earth moving, if applicable;
- monitoring excavations in previously undisturbed rock units by a qualified paleontological resource;
- salvage of unearthed fossil remains and/or traces (e.g., tracks, trails, burrows);
- screen washing to recover small specimens, if applicable;
- preparation of salvaged fossils to a point of being ready for curation (i.e., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles, where appropriate);
- identification, cataloging, curation, and provision for repository storage of prepared fossil specimens; and

- a final report of the finds and their significance.

All phases of mitigation must be supervised by a qualified professional paleontologist who maintains the necessary paleontological collecting permits and repository agreements. All field teams would be supervised by a paleontologist qualified to deal with the significant resources that might be encountered.

The lead agency must assure compliance with the measures developed to mitigate the impacts of excavation. To assure compliance at the start of the project, a statement that confirms the site's paleontological potential, confirms the repository agreement with an established public institution, and describes the program for impact mitigation must be deposited with the lead agency and contractor(s) before any ground disturbance begins.

In many cases, it will be necessary to conduct a salvage program before grading to prevent damage to known paleontological resources and to avoid delays to construction schedules. The impact mitigation program must include the preparation, identification, cataloging, and curation of any salvaged specimens. All field notes, photographs, stratigraphic sections, and other data associated with the recovery of the specimens must be deposited with the institution receiving the specimens. Since it is not professionally acceptable to salvage specimens without the preparation and curation of specimens and associated data, costs for this phase of the program must be included in the project budget. The mitigation program must be reviewed and accepted by the lead agency. If a mitigation program is initiated early during the course of project planning, construction delays due to paleontological salvage activities can be minimized or even completely avoided.



**This page intentionally blank.**

## APPENDIX F: IMPACT TOPICS CONSIDERED BUT DISMISSED

### ENVIRONMENTAL JUSTICE

Presidential Executive Orders 12898, “General Actions to Address Environmental Justice in Minority Populations” and 14096, “Revitalizing Our Nation’s Commitment to Environmental Justice for All” require all federal agencies to identify and address the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. According to the US Environmental Protection Agency, environmental justice is the

*... fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies. (US EPA 1998)*

The National Park Service actively solicited public participation as part of the planning process and gave equal consideration to input from all members of the public regardless of age, race, income status, or other socioeconomic or demographic factors. When assessing impacts from the preferred alternative, the National Park Service determined that the preferred alternative would not result in any identified effects that would be specific to any minority or low-income community. Restrictions on travel or access to any area of the park that might result from the preferred alternative would be equally applied to all visitors, regardless of race or socioeconomic standing.

The preferred alternative would not result in the destruction or disruption of community cohesion and economic vitality, displacement of public and private facilities and services, increased traffic congestion, and/or the exclusion or separation of minority or low-income populations from the broader community. For these reasons, environmental justice was not carried forward for analysis.

### GREENHOUSE GAS EMISSIONS

The preferred alternative would not increase the carbon footprint or increase greenhouse gas emissions associated with the site because the preferred alternative does not include any construction or ground-disturbing activities. Some administrative activities associated with the operation of the park may emit a small amount of greenhouse gases; however, those are not expected to change under the general management plan. Additionally, park visitors driving to the site may contribute greenhouse gas emissions. The National Park Service does not expect visitation numbers to change, due to actions proposed in the general management plan. Additionally, climate change is considered in the affected environment trends and

analysis for each topic carried forward. Therefore, greenhouse gas emissions was not carried forward for analysis.

## **NIGHT SKY**

The preferred alternative does not contain any activities that include changes in lighting fixtures at the park and, therefore, would have no impacts on night sky conditions. For this reason, this issue was not carried forward for analysis.

## **SOCIOECONOMICS**

The preferred alternative would cause no measurable changes in parkwide annual visitation. Although actions described in this plan may alter where and how visitors access park resources, it would not significantly impact overall access to the park, given visitors would still have multiple opportunities and access points to experience the park and its resources. The park does not currently charge an entrance fee, and there is currently no proposal to do so. The preferred alternative would have no anticipated effect on regional income and jobs would not be lost or shifted. Similarly, the preferred alternative is not expected to result in growth-inducing impacts for the region or in nearby communities. The potential for future development in certain management zones could result in additional future temporary construction jobs affiliated with the development; however, given the magnitude of development in the greater Las Vegas area, these temporary jobs would not be expected to create measurable socioeconomic benefits to the local economy. Because the preferred alternative is unlikely to impact the socioeconomic environment, visitor populations, and the regional economy, this impact topic was not carried forward for analysis.

## **LAND USE**

National Park Service *Management Policies 2006* provides direction for the protection of lands and resources within park units, acquisition of nonfederal lands that are in park units, and cooperation with agencies, Tribes, and private property owners to provide appropriate protection measures. Land use refers to the general characteristics of how land is allocated among various administrative, preservation, recreational, and development needs. Beneficial effects from the potential boundary adjustment and from development of management zoning in the park would need to result. No alternatives would adversely impact neighboring landowners. The lands proposed for acquisition are currently undeveloped, so no significant changes in use will occur. The proposed acquisition of undeveloped land will not change the current use, and no amenities or infrastructure are proposed. The impacts on land use are anticipated to be negligible or less; therefore, land use was dismissed as an impact topic.

## APPENDIX G: REFERENCES

Barrows, C. W.

- 2011 “Sensitivity to climate change for two reptiles at the Mojave-Sonoran Desert interface.” *Journal of Arid Environments* 75:629–635.

Belnap, J.

- 2001 Biological Soil Crusts: Webs of Life in the Desert (Fact Sheet), DO – 10.3133/fs06501. United States Geologic Service Publications Warehouse. Accessed January 18, 2023, at <http://pubs.er.usgs.gov/publication/fs06501>.

Bowker, M. A., S. C. Reed, F. T. Maestre, and D. J. Eldridge

- 2018 “Biocrusts: the living skin of the earth.” *Plant Soil* 429:1–7.

Bureau of Land Management (BLM)

- 2023a Bureau of Land Management Nevada Special Status Species list. September 2023. 1340 Financial Boulevard, Reno, Nevada. Accessed January 10, 2024, at <https://www.blm.gov/policy/nv-im-2024-003>.

- 2023b Greenlink West Project. Draft Environmental Impact Statement/Resource Management Plan Amendments. DOI-BKLM-NV-0000-2022-0004-EIS. Prepared by the US Department of the Interior, Bureau of Land Management Nevada State Office, Reno, Nevada May 2023. Accessed October 2023 at <https://eplanning.blm.gov/eplanning-ui/project/2017391/570>.

Carl Levin and Howard P. “Buck” McKeon National Defense Authorization Act for Fiscal Year 2015, Pub. L. 113-291. US Government Publishing Office, December 19, 2014.

Carter, S. K., K. E. Nussear, T. C Esque, I. I. F. Leinwand, E. Masters, R. D. Inman, N. B. Carr, and L. J. Allison

- 2020 “Quantifying development to inform management of Mojave and Sonoran desert tortoise habitat in the American southwest.” *Endangered Species Research* 42:167–184.

Clean Water Act, 33 U.S.C. Sec. 1251 et seq. 1972.

Council on Environmental Quality (CEQ)

- 2022 National Environmental Policy Act Implementing Regulations Revisions. Final Rule. 40 CFR Parts 1500-1508. May 20, 2022. Accessed at <https://ceq.doe.gov/laws-regulations/regulations.html>.

Endangered Species Act of 1973, Pub. L. 93-205, enacted December 27, 2022.

Executive Order 11990, “Protection of Wetlands,” 42 FR 26961, 3 CFR, May 24, 1977.  
Washington, DC.

Gathering of Plants or Plant Parts by Federally Recognized Indian Tribes, 36 CFR Sec. 2.6.

Harper, K. T., and R. L. Pendleton

1993 “Cyanobacteria and cyanolichens: can they enhance availability of essential minerals for higher plants?” *Great Basin Naturalist* 53:59–72.

Interagency Visitor Use Management Council (IVUMC)

2016 Visitor Use Management Framework. A guide to providing sustainable outdoor recreation. Edition One. July 2016. Accessed at  
<https://visitorusemanagement.nps.gov/VUM/Framework>.

Kristan, W. B. III, and W. I. Boarman

2003 “Effects of Anthropogenic Developments on Common Raven Nesting in the West Mojave Desert.” *Ecological Applications* 17(6):1703–1713.

Loarie S. R., B. E. Carter, K. Hayhoe, S. McMahon, R. Moe, C. A. Knight, and D. D. Ackerly

2008 “Climate Change and the Future of California’s Endemic Flora.” *PLoS ONE* 3(6):1–24.

Moore, M. J., J. F. Mota, N. A. Douglas, H. Flores-Olvera, and H. Ochoterena

2014 “The ecology, assembly, and evolution of gypsophile floras.” In *Plant Ecology and Evolution in Harsh Environments*, edited by N. Rajakaruna, R. Boyd, and T. Harris, 97–128. Hauppauge, NY: Nova Science Publishers.

Mistretta, O., R. Pant, T. S. Ross, J. M. Porter, and J. D. Morefield

1996 “Current knowledge and conservation status of *Arctomecon californica* Torrey and Fremont (Papaveraceae), the California bearpoppy.” Status report prepared for the US Fish and Wildlife Service. Nevada Natural Heritage Program, Carson City, NV.

National Historic Preservation Act, Pub. L. No. 89-665, 16 U.S.C. 470a, 97–128470w-6 et. seq.

National Park Service (NPS)

2006 *Management Policies 2006*. Department of the Interior, National Park Service.

2010 “Upper Las Vegas Wash/Tule Springs Reconnaissance Report.” Prepared by the US Department of the Interior, National Park Service, Denver Service Center. June.

2011 Director’s Order 12: *Conservation Planning, Environmental Impact Analysis, and Decision Making*. Department of the Interior, National Park Service. Washington, DC.

- 2015 *NEPA Handbook*. Department of the Interior, National Park Service.
  - 2019 *Tule Springs Fossil Beds National Monument Foundation Document*. Department of the Interior, National Park Service.
  - 2023 Digital Asset Management System, National Register Digital Assets, “Tule Springs Archeological Site.” Accessed July 27, 2023, at <https://npgallery.nps.gov/AssetDetail/NRIS/79001461>.
  - in prep Future climate exposure for Tule Springs Fossil Beds National Monument – Draft. Natural Resource Report, Climate Change Response Program. National Park Service. Fort Collins, Colorado. National Park Service Organic Act. An Act to establish a National Park Service, and for other purposes. Pub. L. 64-235 (August 25, 1916).
- National Parks and Recreation Act of 1978. Pub. L. 95-625, Sec. 1, 92 Stat. 3467 (November 10, 1978).
- National Parks and Related Programs, 54 U.S.C. Subtitle I: National Park System Sec. 100502, General Management Plans (2014).
- Native American Graves Protection and Repatriation Act. Pub. L. No. 101-601 (1990).
- NatureServe
- 2023 NatureServe Network Biodiversity Location Data for the Mojave Poppy Bee (*Perdita meconis*). NatureServe, Arlington, VA. Accessed September 5, 2023, at <https://explorer.natureserve.org/>.
- Paleontological Resources Preservation Act (PRPA), Public Law 111-011, Title VI, Subtitle D, 16 U.S.C. 470aaa et seq.). Enacted March 30, 2009.
- Pereira, T. J.
- 2022 “Mojave Desert Tortoise Vulnerability Assessment of Tule Springs Fossil Beds National Monument, Final Report.” Report prepared for National Park Service, Tule Springs Fossil Beds National Monument: Boulder City, NV, under contract P21AC10407.
- Preservation of Natural, Cultural and Archeological Resources. 36 CFR 2.1. 48 FR 30282, June 30, 1983.
- Rockman, Marcy, Marissa Morgan, Sonya Ziaja, George Hambrecht, and Alison Meadow
- 2016 *Cultural Resources Climate Change Strategy*. Washington, DC: Cultural Resources, Partnerships, and Science and Climate Change Response Program, National Park Service.
- Scott, E., K. B. Springer, and J. C. Sagebiel
- 2017 “The Tule Springs local fauna: Rancholabrean vertebrates from the Las Vegas Formation, Nevada.” *Quaternary International* 443:105–121.

Society of Vertebrate Paleontology

- 2010 “Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources.” The Society of Vertebrate Paleontology Impact Mitigation Guidelines Revision Committee. The Society of Vertebrate Paleontology Headquarters, McLean, VA: 11.

Springer, Kathleen, Craig R. Manker, and Jeffrey S. Pigati

- 2015 “Dynamic response of desert wetlands to abrupt climate change.” Proceedings of the National Academy of Sciences of the United States of America, Vol. 112, No. 47. November 24, 2015.  
<https://www.pnas.org/doi/epdf/10.1073/pnas.1513352112>.

Springer, K. B., J. S. Pigati, and E. Scott

- 2017 “Vertebrate paleontology, stratigraphy, and paleohydrology of Tule Springs Fossil Beds National Monument, Nevada (USA).” A field guide prepared for Society of Vertebrate Paleontology. *Geology of the Intermountain West* 4:55–98.

Steenhof, K., M. N. Kochert, and J. A. Roppe

- 1993 “Nesting by raptors and common ravens on electrical transmission line towers.” *Journal of Wildlife Management* 57:271–281.

Stosich, A. L. A DeFalco, and S. J. Scole-Sciulla

- 2022 “A review of *Arctomecon californica* (Papaveraceae) with a focus on the species’ potential for propagation and reintroduction and conservation needs.” *Monographs of the Western North American Naturalist* 14:1-22.

The Nature Conservancy

- 2007 “A conservation management strategy for nine low elevation rare plants in Clark County, Nevada.” Nevada Field Office, Reno, NV.

Thompson, S. K. Sheldon, and S. D. Smith

- 1997 “Ecology of *Arctomecon californica* and *A. merriamii* (Papaveraceae) in the Mojave Desert.” *Madroño* 44(2):151–169.

US Census Bureau

- 2020 American Community Survey and Housing Estimates. Las Vegas-Henderson-Paradise, Nevada Metro Area. Accessed May 1, 2023, at  
<https://api.census.gov/data/2021/acs/acs1/profile>.

US Environmental Protection Agency (US EPA)

- 1998 “Final Guidance for Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analyses.” April 1998. Accessed at  
[https://www.epa.gov/sites/production/files/2015-02/documents/ej\\_guidance\\_nepa\\_epa0498.pdf](https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_epa0498.pdf).

US Fish and Wildlife Service (USFWS)

- 1994 “Desert Tortoise (Mojave Population) Recovery Plan.” Portland, OR.
- 2005 “Biological Opinion for the Amended Lake Mead National Recreation Area Lake Management Plan.” Southern Nevada Fish and Wildlife Office, Arizona Ecological Field Services Office.
- 2010a Memorandum of Understanding between the US Department of the Interior National Park Service and the US Fish and Wildlife Service: To Promote the Conservation of Migratory Birds. 33. Signed April 12, 2010.
- 2010b “Mojave population of the Desert Tortoise (*Gopherus agassizii*) 5-year review: summary and evaluation.” Sacramento, CA.
- 2014 “Species Report for *Eriogonum corymbosum* var. *nilesii* (Las Vegas buckwheat).” Nevada Fish and Wildlife Office, Las Vegas, NV.
- 2015 Nationwide Standard Conservation Measures. Guidance, Washington, DC.
- 2017a “Reinitiation of Lake Mead National Recreation Area Programmatic Biological Opinion (File no. 84320-2009-F-0145), Clark County, Nevada.” Issued July 3, 2017. Southern Nevada Fish and Wildlife Office, Las Vegas, NV.
- 2017b Request to Append a Land Exchange to the National Park Service’s Tule Springs Fossil Beds National Monument Programmatic Biological Opinion (File No. 84320-2009-F-0145.R001). Issued July 25, 2017. Southern Nevada Fish and Wildlife Office, Las Vegas, NV.
- 2019 Endangered and Threatened Wildlife and Plants; 90-day Findings for Three Species. 84 *Federal Register* 4692, 50 CFR 17.
- 2020 90-day findings for two species. Notice of petition findings and initiation of status reviews. *Federal Register* 85(41):44265–44267.
- 2021 Director's Order 225: *Incidental Take of Migratory Birds*.
- 2022 Official Species List of Threatened and Endangered Species – Tule Springs Fossil Beds National Monument – November 21, 2022. Southern Nevada Fish and Wildlife Office, Arizona Ecological Field Services Office.
- 2023 Official Species List of Threatened and Endangered Species – Tule Springs Fossil Beds National Monument – July 3, 2023. Southern Nevada Fish and Wildlife Office.

US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS)

- 1998 *Endangered Species Act Consult Handbook. Procedures for Conducting Section 7 Consultations and Conferences*. Final. March 1998.



US Fish and Wildlife Service (USFWS) and National Park Service (NPS)

- 2010 Memorandum of Understanding between the US Department of the Interior, National Park Service and the US Fish and Wildlife Service: To Promote the Conservation of Migratory Birds. 33. Signed April 12, 2010.

US Geological Survey (USGS)

- 2018 “The Geology and Paleontology of Tule Springs Fossil Beds National Monument, Nevada.” Fact Sheet 2018–3038. The US Geological Survey Geosciences and Environmental Change Center. December.

Walker, L. E., and J. M Marzluff

- 2015 “Recreation changes the use of a wild landscape by corvids.” *The Condor Ornithological Applications* 117:262–283.

## **APPENDIX H: PREPARERS**

### **TULE SPRINGS FOSSIL BEDS NATIONAL MONUMENT**

Jeff Axel, Acting Deputy Superintendent

Jonathon Burpee, Superintendent, Lewis and Clark National Historical Park

Derek Carter, Superintendent

Erin Eichenberg, Integrated Resources Program Manager

Justin Pattison, Acting Superintendent

Lauren Perry, Paleontologist

Ashley Pipkin, Acting Superintendent

John Mark Simmons, Wildlife Technician, The Great Basin Institute

### **PACIFIC WEST REGION**

Martha Crusius, Program Manager, Park Planning & Environmental Compliance

Marie Denn, Aquatic Ecologist

Sheri Forbes, Chief of Interpretation, Education, Volunteers, Youth, and Cooperating Associations

Kirstie Haertel, Park Program Manager

Jason Lyon, Cultural Anthropologist

Pam McLay, Chief Land Resources Division

Anna Tamura, Planning Portfolio Manager

Rachel Wolstenholme, Wildlife Biologist

### **WASHINGTON OFFICE**

Jordan Hoaglund, Division Manager, Park Planning and Special Studies

Vincent Santucci, Paleontology Program Manager

Don Wojcik, Program Analyst

### **DENVER SERVICE CENTER**

Laura Babcock, GIS Specialist

Julie Bell, Project Manager

Kerri Cahill, Branch Manager

Allen Cardenas, Project Specialist

Suzanne Digre, Editor

John Paul Jones, Visual Information Specialist

Alexa Miles, Project Manager

Westby Mize, Project Specialist

Amanda Owens, Project Specialist

Phyllis Pineda Bovin, Project Specialist

Rafael Wood, GIS Specialist

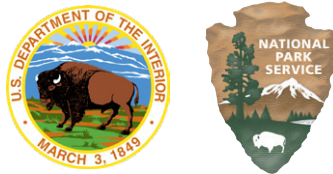
### **CLIMATE CHANGE RESPONSE PROGRAM**

Wylie Carr, Climate Change Ecologist

Joel Reynolds, Climate Science & Adaptation Coordinator

Amber Runyon, Climate Change Ecologist

Jeneva Wright, Archeologist



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

TUSK 236/192591  
February 2024





Tule Springs Fossil Beds National Monument | Nevada  
General Management Plan | February 2024