

Lake Mead

National Recreation Area
National Park Service
U.S. Department of the Interior



Cottonwood Cove and Temple Bar Arsenic Treatment Facilities Environmental Assessment



TABLE OF CONTENTS

PURPOSE OF AND NEED FOR ACTION	1
Introduction.....	1
Purpose and Need	1
Background.....	1
Project Area Location	2
Related Laws, Legislation, and Other Planning and Management Documents.....	5
Servicewide and Park Specific Legislation and Planning Documents	5
Issues and Impact Topics	6
Issues and Impact Topics Identified for Further Analysis	6
Impact Topics Considered but Dismissed from Further Consideration.....	6
DESCRIPTION OF ALTERNATIVES	8
Introduction.....	8
Alternative A- No Action.....	8
Alternative B- Construct Arsenic Water Treatment Facilities.....	8
Alternatives Considered but Dismissed from Further Evaluation	11
Mitigation and Monitoring.....	11
Coordination, Consultation, and Permitting	12
Environmentally Preferred Alternative.....	13
Comparison of Impacts	14
AFFECTED ENVIRONMENT	15
Introduction.....	15
Geology and Soils	15
Vegetation	15
Wildlife	18
Special Status Species.....	18
Visual Resources.....	18
Park Operations.....	18
Safety and Visitor Use and Experience	19
ENVIRONMENTAL CONSEQUENCES	20
Introduction.....	20
Methodology.....	20
Impairment Analysis.....	21
Unacceptable Impacts	21
Cumulative Impacts	22
Geology and Soils	23
Laws, Regulations, and Policies	23
Criteria and Thresholds for Impact Analysis	23
Vegetation.....	25
Laws, Regulations, and Policies	25
Criteria and Thresholds for Impact Analysis	25
Wildlife	26
Laws, Regulations, and Policies	26
Criteria and Thresholds for Impact Analysis	27
Special Status Species.....	28

Laws, Regulations, and Policies	28
Criteria and Thresholds for Impact Analysis	29
Visual Resources.....	30
Laws, Regulations, and Policies	30
Criteria and Thresholds for Impact Analysis	31
Park Operations.....	32
Criteria and Thresholds for Impact Analysis	32
Safety and Visitor Use and Experience	34
Laws, Regulations, and Policies	34
Criteria and Thresholds for Impact Analysis	34
PUBLIC AND AGENCY INVOLVEMENT	36
LIST OF PREPARERS.....	38
REFERENCES	39
Federal Regulation, Order, Law.....	39
State Codes and Statutes	40
General.....	40

LIST OF FIGURES

Figure 1. Regional Map	3
Figure 2. Area Map.....	4
Figure 3. Arsenic WTF External Plans.....	9
Figure 4. Arsenic WTF Internal Schematics.....	10
Figure 5. Temple Bar Developed Area	16
Figure 6. Cottonwood Cove Developed Area.....	17

LIST OF TABLES

Table 1. Comparison of Long Term Impacts.....	14
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APPENDICES

Appendix A. Scoping Press Release.....	41
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PURPOSE OF AND NEED FOR ACTION

Introduction

The National Park Service (NPS) is considering the construction of two new water treatment facilities (WTFs) at the Cottonwood Cove and Temple Bar developed areas within the Lake Mead National Recreation Area (NRA). Lake Mead NRA is situated in southeastern Nevada and northwestern Arizona and encompasses land around Lakes Mead and Mohave (Figure 1). The NPS has prepared this environmental assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, regulations of the Council of Environmental Quality's Regulations for Implementing the National Environmental Policy Act (1993), and NPS Director's Order 12: Conservation Planning, Environmental Impact and Decision Making (2000).

The EA evaluates the no action alternative and one action alternative. The alternatives analyzed are: Alternative A: No Action and Alternative B: Construct Arsenic Water Treatment Facilities. Also included is a discussion of alternatives that have been ruled out and justifications for their elimination. The EA analyzes impacts of the alternatives on the human and natural environment. It outlines project alternatives, describes existing conditions in the project area, and analyzes the effects of each project alternative on the environment.

Purpose and Need

The purpose of this project is to reduce arsenic levels in the drinking water at Cottonwood Cove and Temple Bar within Lake Mead NRA. In 2001, the Environmental Protection Agency reduced the acceptable Maximum Contaminant Level (MCL) of arsenic in drinking water to 10 parts per billion. The new regulation took effect January 23, 2006, leaving these developed areas out of compliance for safe drinking water standards.

Each of these developed areas contains campgrounds, restaurants, park employee and concessioner housing, and trailer villages. In addition to year round residents, these areas receive high levels of recreational visitation, primarily in summer months. Arsenic is a tasteless and odorless element which has been linked to a variety of health problems, including several types of cancer (EPA 2009). It is important that Lake Mead NRA become compliant with current arsenic level standards to reduce potential impacts to human health.

Background

An arsenic standard in drinking water of 50 ppb was set by EPA in 1975, based on a Public Health Service standard originally established in 1942. A March 1999 report by

the National Academy of Sciences concluded that this standard did not achieve EPA's goal of protecting public health and should be lowered as soon as possible.

Arsenic is an odorless, tasteless, semi-metallic element that occurs naturally in the earth's crust. Arsenic can also enter the environment as a byproduct of mining operations, lumber production, and the use of fertilizers. Groundwater contamination at Lake Mead NRA is due to naturally occurring arsenic deposits.

Non-cancer effects can include thickening and discoloration of the skin, stomach pain, nausea, vomiting, diarrhea, numbness in hands and feet, partial paralysis, and blindness. Arsenic has been linked to cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate.

EPA has set the arsenic standard for drinking water at 10 parts per billion to protect consumers served by public water systems from the effects of long-term, chronic exposure to arsenic. Once fully implemented, the new standard will provide additional protection to an estimated 13 million Americans. The date of this EPA ruling was January 22, 2001. Water systems were given 5 years to achieve compliance, resulting in an effective date for this standard of January 23, 2006. Exemptions for an additional 3 years can be issued by individual states. Small water delivery systems (serving 3,300 people or less) can apply for up to three additional 2-year exemptions, for a total exemption duration of 9 years. These exemptions allow up to 14 years from the date of the ruling for small water delivery systems to achieve compliance.

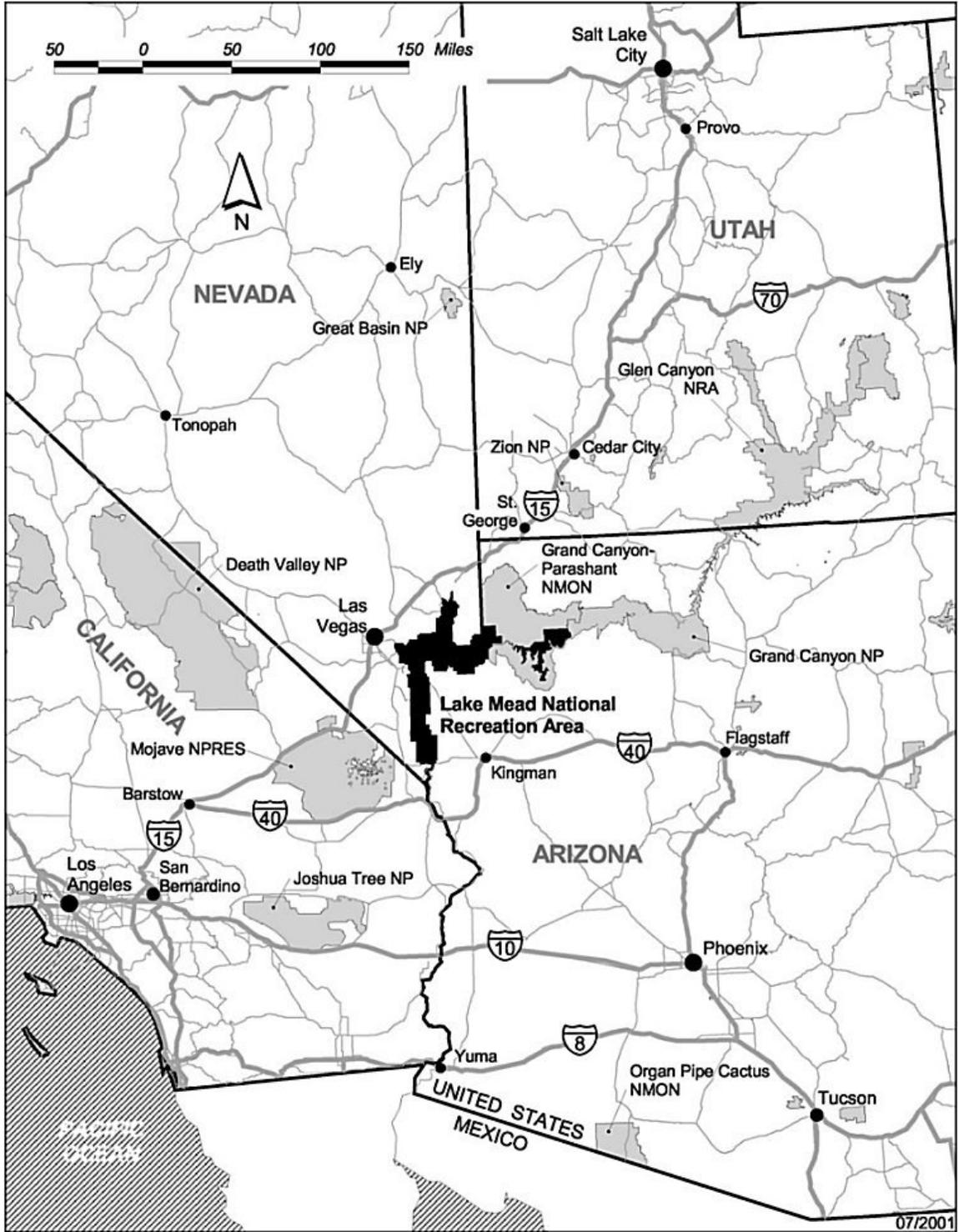
Current arsenic levels range from approximately 12-13 ppb and 14-18 ppb at Temple Bar and Cottonwood Cove, respectively. Each of these areas utilizes groundwater, which is naturally filtered by the earth during extraction. Due to this natural filtration, water treatment at each of these developed areas currently consists solely of chlorination for disinfection.

Most developed areas at Lake Mead NRA draw surface water from one of the lakes. While surface water requires more filtration and treatment than groundwater, arsenic is not present in appreciable quantities and is far below the 10 ppb EPA standard.

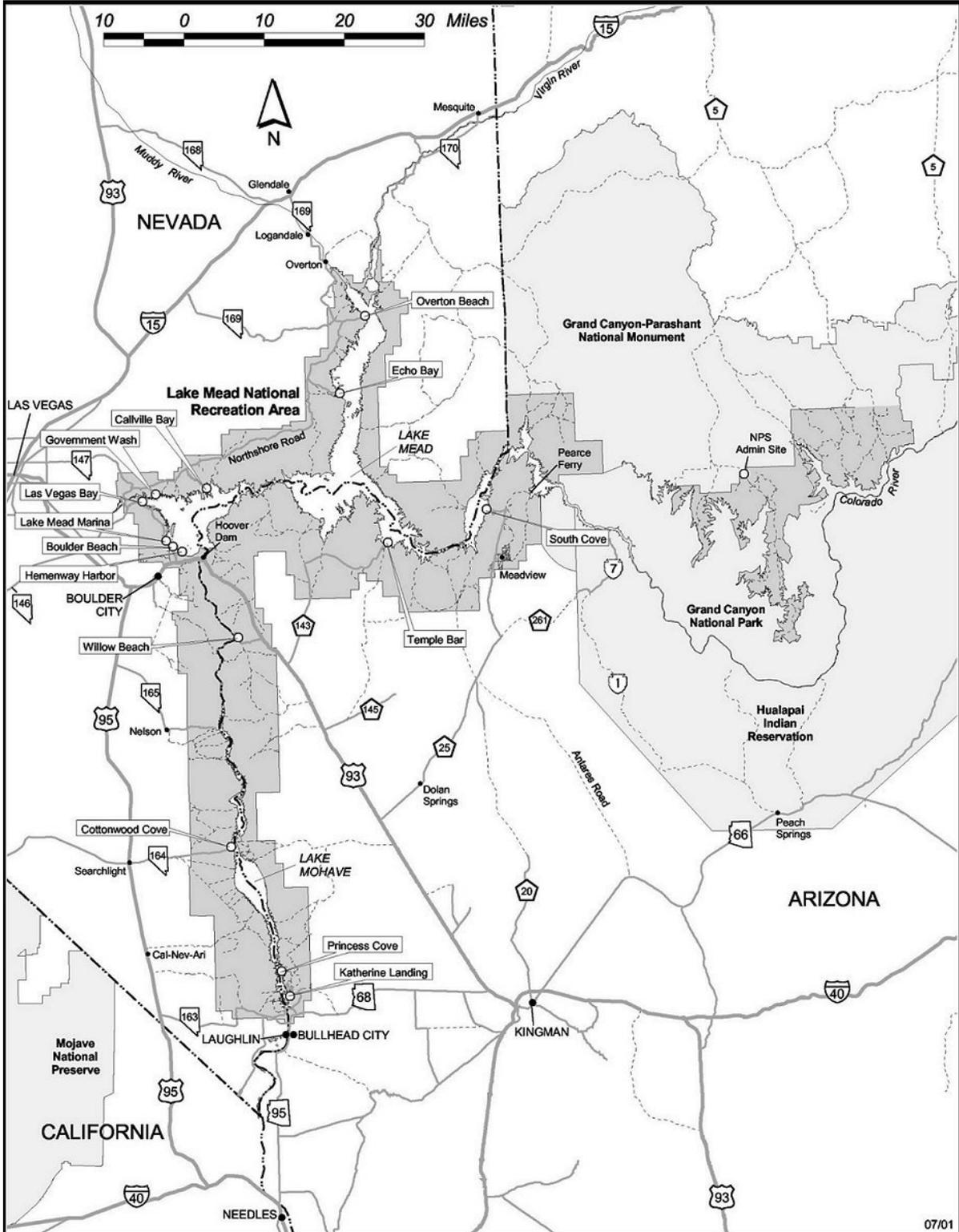
Project Area Location

Lake Mead NRA is located in southeastern Nevada and northwestern Arizona (Figure 1). The park is approximately 1.5 million acres in size and includes both Lake Mead, formed by Hoover Dam, and Lake Mohave, formed by Davis Dam. The scope of this project includes the developed areas of Cottonwood Cove on Lake Mohave in Nevada, and Temple Bar on Lake Mead in Arizona.

**Figure 1. Regional Map
Lake Mead National Recreation Area**



**Figure 2. Area Map
Lake Mead National Recreation Area**



Related Laws, Legislation, and Other Planning and Management Documents

Service-wide and Park Specific Legislation and Planning Documents

The NPS Organic Act of 1916 directs the NPS to manage units “to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner as will leave them unimpaired for the enjoyment of future generations.” Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.”. The Organic Act prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts. An action constitutes an impairment when its impacts “harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources and values.”

NPS Management Policies (2006) requires the analysis of potential effects of each alternative to determine if actions would impair park resources. To determine impairment, the NPS must evaluate “the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.” The NPS must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment to the affected resources and values.

NPS units vary based on their enabling legislation, natural and cultural resources, missions, and the recreational opportunities appropriate for each unit, or for areas within each unit. The enabling legislation for Lake Mead NRA (Public Law 88-639), established the recreation area “for the general purposes of public recreation, benefit, and use, and in a manner that will preserve, develop and enhance, so far as practicable, the recreation potential, and in a manner that will preserve the scenic, historic, scientific, and other important features of the area, consistent with applicable reservations and limitations relating to such area and with other authorized uses of the lands and properties within such area.” An action appropriate at Lake Mead NRA, as designated by the enabling legislation, may impair resources in another unit. This environmental assessment analyzes the context, duration, and intensity of impacts related to construction and maintenance of new arsenic treatment facilities, as well as the potential for resource impairment, as required by Director’s Order 12: Conservation Planning, Environmental Impact Analysis and Decision Making (2000).

Issues and Impact Topics

Issues are related to potential environmental effects of project alternatives and were identified by the project interdisciplinary team. Once issues were identified, they were used to help formulate the alternatives and mitigation measures. Impact topics based on substantive issues, environmental statutes, regulations, and executive orders were selected for detailed analysis. A summary of the impact topics and rationale for their inclusion or dismissal is given below.

Issues and Impact Topics Identified for Further Analysis

The following relevant impact topics are analyzed in the EA. Whether each issue is related to taking action or no action is specified.

Geology and Soils: The action alternative would result in both temporary and permanent localized impacts to geology and soils.

Vegetation: The action alternative would result in both temporary and permanent localized impacts to vegetation.

Wildlife: The action alternative would result in localized temporary and permanent impacts to wildlife and wildlife habitat.

Special Status Species: While WTF sites would be located near previously disturbed areas, the facility at Cottonwood Cove would be within potential habitat for the federally threatened desert tortoise (Mojave population). The facility at Temple Bar would be in potential habitat for desert tortoise protected by Arizona state law.

Visual Resources: Visual impacts are addressed, although WTF sites would be located in previously disturbed areas and near existing water storage tanks and other park infrastructure.

Park Operations: The action alternative would have impacts on park operations at both Cottonwood Cove and Temple Bar.

Safety and Visitor Use and Experience: The action alternative would achieve enhanced water quality at both developed areas and would improve safety and visitor use and experience, while the No Action alternative would have adverse impacts on health, safety, and visitor use.

Impact Topics Considered but Dismissed from Further Consideration

The following topics are not further addressed in this document because there are no potential effects to these resources, which are not in the project area or would be imperceptibly impacted: designated wilderness; designated ecologically significant or critical areas; wild or scenic rivers; wetlands; floodplains; designated coastal zones;

Indian Trust Resources; prime and unique agricultural lands; or sites on the US Department of the Interior's National Registry of Natural Landmarks.

Project sites were surveyed to assess potential impacts to cultural resources. No cultural resources were identified at either location in project areas or zones of influence. Therefore, impacts to cultural resources are not further analyzed.

Arsenic treatment would result in changes to potable water only, and would have no impact on surface water resources. Arsenic treatment would be a final step in the treatment of groundwater before delivery to end users and would have no impact on the quantity or quality of water in the aquifers themselves. Therefore, water resources and sole or principal drinking water aquifers are not further analyzed.

Although construction of WTFs and associated site preparation would temporarily increase dust and noise in localized areas, these effects are temporary and would disappear upon completion of the project. Dust abatement measures would be developed to minimize impacts to air quality during construction activities. Operational noise associated with WTFs would not appreciably increase the ambient noise of developed areas. Therefore, impacts to air quality and soundscapes are not further analyzed.

In addition, there are no potential conflicts between the project and land use plans, policies, or controls (including state, local, or Native American) for the project area.

Regarding energy requirements and conservation potential, construction activities would require the increased use of energy for the construction itself and for transporting materials. However, overall, the energy from petroleum products required to implement the action alternative would be insubstantial when viewed in light of production costs and the effect of the national and worldwide petroleum reserves.

There are no potential effects to local or regional employment, occupation, income changes, or tax base as a result of this project. The project area of effect is not populated and, per Executive Order 12898 on Environmental Justice, there are no potential effects on minorities, Native Americans, women, or the civil liberties (associated with age, race, creed, color, national origin, or sex) of any American citizen. No disproportionate high or adverse effects to minority populations or low-income populations are expected to occur as a result of implementing any alternative.

DESCRIPTION OF ALTERNATIVES

Introduction

This section describes the alternatives considered, including the No Action Alternative. The alternatives described include mitigation measures and monitoring activities proposed to minimize or avoid environmental impacts. This section also includes a description of alternatives considered early in the process but later eliminated from further study; reasons for their dismissal are provided. The section concludes with a comparison of the alternatives considered.

Alternative A- No Action

Under this alternative, WTFs would not be constructed at Cottonwood Cove or Temple Bar. The potable water in these areas would continue to originate at wells, and would remain out of compliance with current EPA arsenic MCL regulations. Prolonged exposure to arsenic can lead to a wide range of health problems, including paralysis, loss of vision, and cancer.

Alternative B- Construct Arsenic Water Treatment Facilities (Management-Preferred Alternative)

Under Alternative B, new WTFs would be constructed at both the Cottonwood Cove and Temple Bar developed areas. The WTF at Temple Bar would be located immediately adjacent to existing water storage tanks. The WTF at Cottonwood Cove would be located approximately 500 feet from existing water storage tanks. The permanent facilities would be approximately 100 feet by 50 feet at each location. Each site would contain arsenic treatment equipment, laboratory space, restrooms, covered parking, and water discharge structures for the backwash of filter media (Figures 3 and 4). New or improved unpaved access roads would be required at each location, although these roads would stem from existing roads and would be relatively small in size. Underground water and power supplies would be constructed at each location, and would stem from existing utilities in the immediate area.

Each arsenic WTF would be equipped with photovoltaic cells on the roof to provide supplementary power. Buildings would be oriented to minimize the amount of energy required for cooling during the hot summers of the desert. Windows would be solar tinted to reduce heat from solar radiation, and skylights would be incorporated to reduce the energy costs of overhead lighting. WTFs would be located lower in elevation than associated water storage tanks so that gravity may be used to backwash filter media during the cleaning and replacement process, ensuring that only a single pump would be required at each location.

The buildings would be hidden from view both by existing structures and by strategic placement based on the elevational contours of the area to the greatest extent practicable. New structures would be colored to match their surroundings, and would utilize shielded

Figure 3. Arsenic WTF External Plans

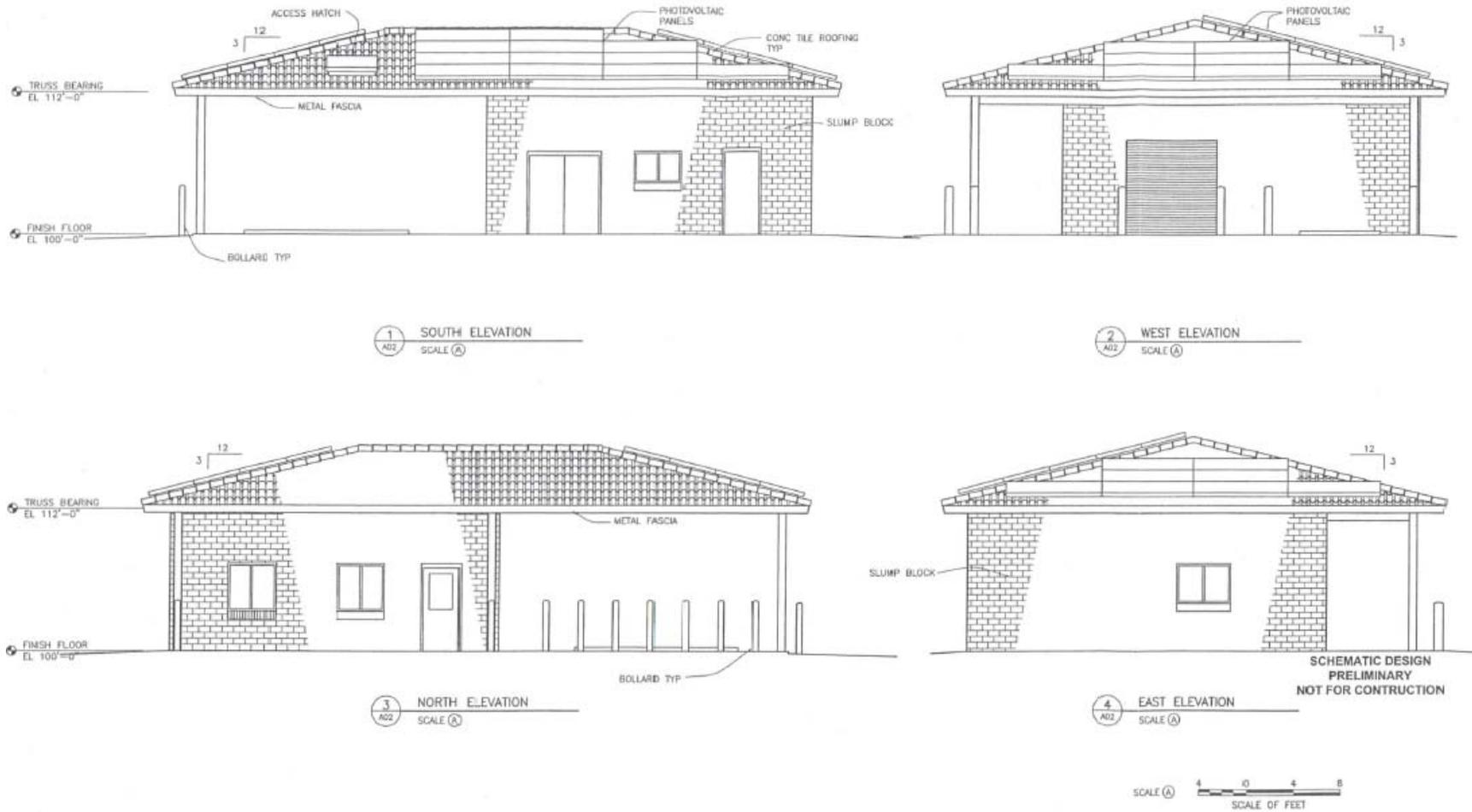
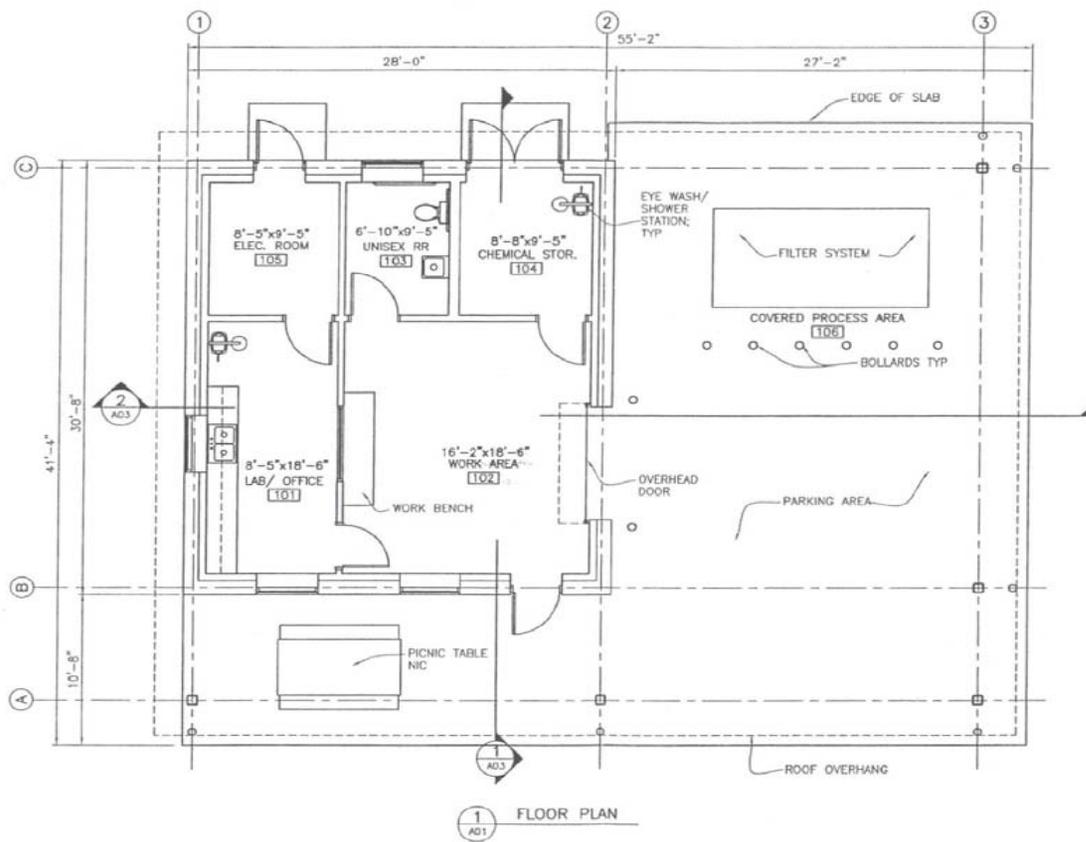


Figure 4. Arsenic WTF Internal Schematic



low intensity external security lighting. Each facility would be enclosed by chain-link fencing, and neutral inserts would be utilized to reduce impacts on visual resources. Reducing arsenic concentrations in potable water would have positive impacts on human health for users in each of these developed areas.

Alternatives Considered but Dismissed from Further Evaluation

An alternative considered but dismissed was switching from the use of groundwater to the use of surface (lake) water at both Temple Bar and Cottonwood Cove. While surface water does not contain appreciable arsenic levels, it contains a wide array of biotic and abiotic substances that must be treated or removed, creating additional waste that must be disposed of. Extracting surface water requires either a floating barge containing a pump and associated piping, or a pipeline that runs from the treatment facility into the lake. Lake Mead experiences constantly changing water levels, making these extraction methods both costly and time consuming. Invasive quagga mussels are present in both Lakes Mead and Mohave. These mussels grow readily on submerged objects, and are capable of clogging intake pipes. The maintenance involved in keeping pumps and pipes quagga mussel free can be very time consuming, labor intensive, and costly.

Treating groundwater for arsenic is a much more efficient and less complex method of attaining healthy drinking water than building and maintaining the necessary infrastructure to collect and treat surface water.

Mitigation and Monitoring

Mitigation measures are specific actions designed to reduce, minimize, or eliminate impacts of alternatives and to protect Lake Mead NRA resources and visitors. Monitoring activities are actions to be implemented during or following project implementation to assess levels of impact. The following measures would be implemented under the Action Alternative and are assumed in the analysis of effects.

- To reduce impacts on vegetation and soils, topsoil would be collected and stockpiled under the supervision of resource management staff. Upon completion of the project, topsoil would be placed in disturbed areas to enhance the recovery of native vegetation and reduce erosion.
- To prevent the introduction and spread of non-native plant species, construction equipment would be pressure-washed prior to entering the park to ensure it is free of foreign soils and plant material. If equipment leaves the park, it would be re-washed prior to returning to the project site.
- All areas to be disturbed would have boundaries flagged before beginning the activity, and all disturbance would be confined to the flagged areas. All project personnel would be instructed that their activities must be confined to locations within flagged areas. Disturbance beyond the actual zone would be prohibited.

- Vegetation salvage would occur within project boundaries as deemed appropriate by NPS resource managers. Salvaged plants would be stored at the park's native plant nursery and used to revegetate the project site.
- During construction of the WTFs, a park biologist would be on site to ensure no wildlife (including the protected desert tortoise) wanders into the project area. If wildlife is present, construction would be postponed until all animals have vacated the area.
- All trash would be disposed of in appropriate containers and removed from the project site daily to avoid attracting ravens, which may feed on juvenile desert tortoises and other wildlife.
- All open trenches or holes would be covered at night to prevent desert tortoises and other wildlife from becoming trapped. During the day, all open trenches would be checked in the morning, afternoon, and evening. Trenches would be checked immediately prior to backfilling.
- Before construction begins, a qualified NPS biologist would provide on-site training to workers which would include information on desert tortoise biology, legal protection of the species, and all required mitigation and reporting requirements.
- Project areas would be surveyed for burrowing owls prior to construction. Any identified burrows would be avoided or collapsed while unoccupied.
- To reduce visual impacts, new facilities would be concealed by existing structures and elevational contours of the area, and any external lighting would be downshielded. The chain-link fencing surrounding new facilities would include neutral inserts to reduce visual impacts. Topsoil replacement and revegetation would further reduce visual impacts.
- New facilities would be constructed using permanent pre-colored, non-reflective building materials that match surrounding hues to reduce impacts on visual resources.
- Dust abatement measures would be developed to minimize impacts to air quality during construction activities.

Coordination, Consultation, and Permitting

The following consultation and coordination has occurred as part of this environmental assessment:

Because WTF locations occur in potential habitat for the desert tortoise, a federally listed threatened species in Nevada, informal consultation with the U.S. Fish and Wildlife Service was initiated under Section 7 of the Endangered Species Act on March 18, 2009. All conservation measures identified during the consultation process have been included in this EA. NPS received concurrence from U.S. Fish and Wildlife that the project is *not likely to adversely affect* the desert tortoise on April 13, 2009. This concurrence memo concludes Section 7 consultation.

Environmentally Preferred Alternative

The environmentally preferred alternative is the alternative that will promote NEPA, as expressed in Section 101 of NEPA. This alternative will satisfy the following requirements:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable or unintended consequences;
4. Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and,
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative B is the environmentally preferable alternative because overall it would best meet the requirements in Section 101 of NEPA. Alternative B is consistent with criteria two, three, five, and six. Alternative B would improve water quality and ensure that public health is not jeopardized. Alternative B prevents undesirable consequences by limiting risks to health and safety. This alternative helps achieve a balance between the natural environment and human use, and enhances the quality of renewable resources for human consumption. By utilizing existing structures, natural topography, and earthen tones to disguise new facilities, and limiting new disturbance, alternative B has beneficial impacts on human health and safety without degradation, jeopardizing park resources, or having other unintended consequences. The preferred alternative would meet the goals of the project and would achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities. With the implementation of mitigation measures, impacts to the natural environment would be minor under this alternative. Beneficial impacts to the human environment in terms of health and safety would be moderate.

Unlike Alternative B, the No Action alternative does not fully meet the goals of the project or NEPA criteria two, three, five, or six, because benefits to human health and safety would not be fully realized. The continued consumption of water with levels of arsenic higher than those recognized as safe by the EPA could result in serious health

effects. This alternative would not enhance the quality of renewable resources or achieve a balance between population and resource use that would permit high standards of living or a wide sharing of life's amenities.

Comparison of Impacts

Table 1 summarizes the potential long-term impacts of the proposed alternative. Short-term impacts are not included in this table, but are analyzed in the Environmental Consequences section. Impact intensity, context, and duration are also defined in the Environmental Consequences section.

Table 1: Comparison of Long Term Impacts

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED)
GEOLOGY AND SOILS	No impacts	Moderate adverse impacts
VEGETATION	No impacts	Minor adverse impacts
WILDLIFE	No impacts	Minor adverse impacts
SPECIAL STATUS SPECIES	No impacts	Not likely to adversely affect
VISUAL RESOURCES	No impacts	Minor adverse impacts
PARK OPERATIONS	No impacts	Minor adverse impacts
SAFETY AND VISITOR USE AND EXPERIENCE	Moderate adverse impacts	Moderate beneficial effects

AFFECTED ENVIRONMENT

Introduction

This section provides a description of the existing environment in the project area and the resources that may be affected by the proposals and alternatives under consideration. Complete and detailed descriptions of the environment and existing use at Lake Mead NRA are found in the Lake Mead NRA Lake Management Plan and Final Environmental Impact Statement (2002), Lake Mead NRA Resource Management Plan (NPS 2000) and the Lake Mead NRA General Management Plan (NPS 1986).

Location and General Description of Lake Mead NRA and the Project Area

Project locations are outlined in red on the following maps. At the Temple Bar site, the treatment facility and associated water discharge location will be located immediately adjacent to one another. At the Cottonwood Cove site, facilities will be located further apart to minimize impacts to undisturbed areas.

Geology and Soils

The Cottonwood Cove area consists mainly of upland soils interspersed with large washes, typical of many areas in the park. Rain events constantly change and reshape the washes, while turning upland soils into hard, compacted desert pavement.

The Temple Bar developed area consists of both upland soils, dominated by desert pavement, and washes. Gypsum soils are present in surrounding areas, which are important habitat for sensitive plant species. Across the lake from Temple Bar is a large rock formation known as “The Temple”, an important scenic resource as well as an area of historical significance.

Within both developed areas, soils have been permanently altered by the construction of roads, parking areas, launch ramps, and buildings. Geology and soils on the peripheries of the developed areas more closely resemble those of adjacent natural areas.

Vegetation

Desert creosote-bursage shrub communities and desert wash communities surround these developed areas. Native soils and plant species remain on the peripheries of the developed areas, although human use and disturbance has often altered the soil and allowed for invasion by less desirable weedy plant species.

Figure 5. Temple Bar
Lake Mead National Recreation Area

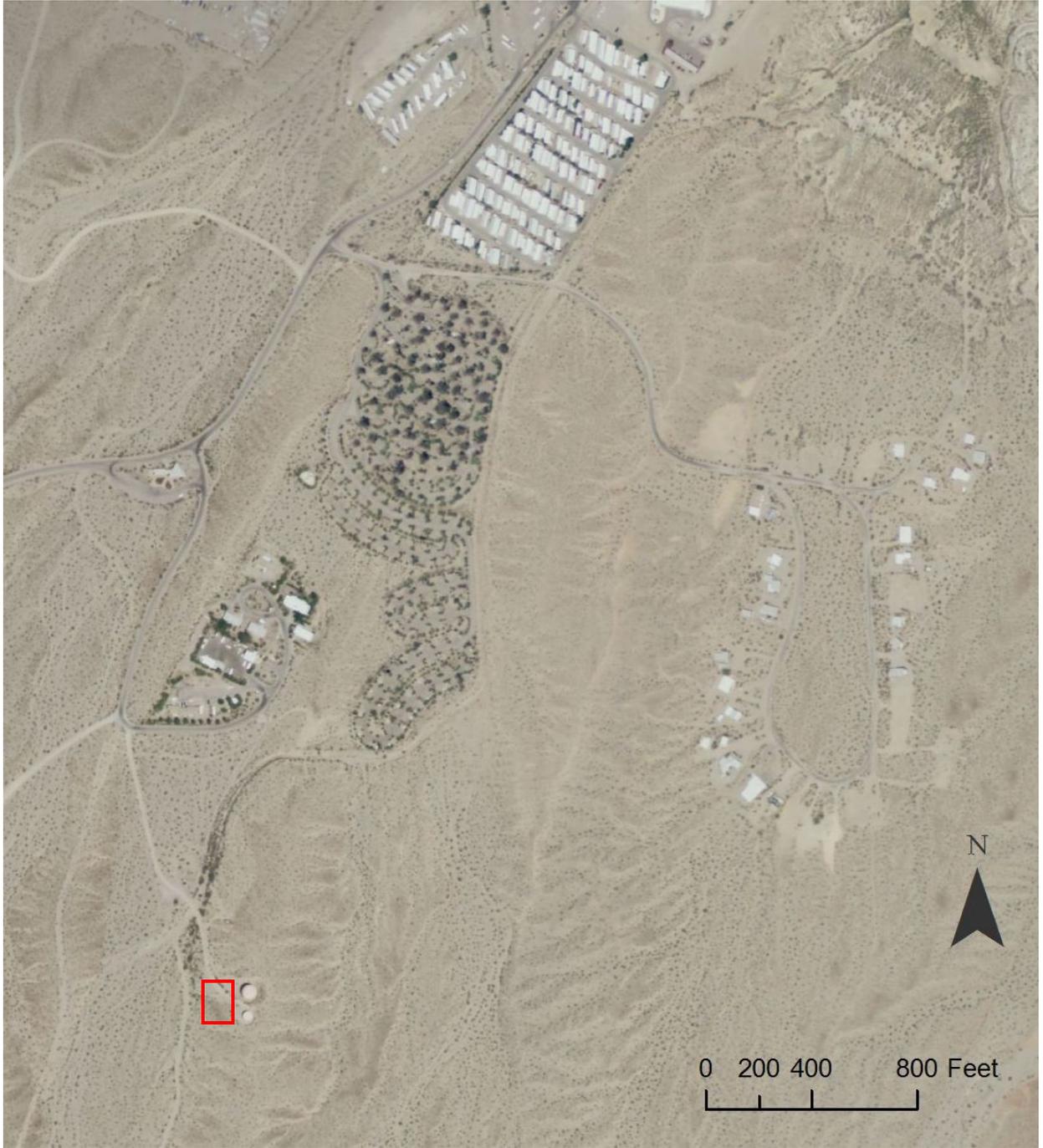


Figure 6. Cottonwood Cove
Lake Mead National Recreation Area



Unique and sensitive vegetative resources occur at both Temple Bar and Cottonwood Cove. There are areas dominated by gypsum soils near Temple Bar which contain bear poppy (*Arctomecon californica*), a protected species in the state of Arizona. In addition, a dense forest of teddy bear cholla (*Opuntia bigelovii*) occurs north of the Cottonwood Cove access road which provides stunning views to visitors on the drive to the developed area.

Wildlife

The desert, riparian, and aquatic ecosystems present at Lake Mead NRA provide habitat for a rich diversity of animal species. Developed areas, in which the habitat has been altered to suit human needs, typically only support a small subset of the park's wildlife. Opportunistic predators and scavengers are more abundant in these areas due to the greater abundance of food left by humans. The outer edges of the developed zones usually more closely resemble the desert habitat of the surrounding region, but because of disturbance it is less desirable for most desert-dwelling species. Common species to see in these locations include mammals such as coyotes, rabbits, and ground squirrels; birds such as Gambel's quail, mourning doves, and ravens; and reptiles including various snake and lizard species.

Special Status Species

The park is home to several federally or state protected species, as well as other plants and animals considered rare or sensitive. Some areas near Temple Bar contain suitable habitat for the bear poppy, a protected species in the state of Arizona, although they do not occur within the project areas. Among the animal species, most avoid developed areas, although the desert tortoise (*Gopherus agassizii*), a federally threatened species, is occasionally seen in or near these areas during its active season. Both project areas also provide potential habitat for the burrowing owl (*Athene cunicularia*), a species of management concern.

Visual Resources

The park's scenic vistas are an important visual resource, and striking backdrops for recreational activities include deep canyons, dry washes, sheer cliffs, distant mountain ranges, the lakes, colorful soils and rock formations, and mosaics of different vegetation.

Park Operations

Both the Cottonwood Cove and Temple Bar developed areas include park housing for rangers, utility operators, and maintenance employees. Park employees are responsible for the operation and maintenance of water and sewer systems, campground maintenance, and visitor safety. Utility operators currently maintain water delivery and treatment

systems at each developed area and oversee groundwater pumping, chlorination, water storage tanks, and evaporation ponds.

Safety and Visitor Use and Experience

Lake Mead and Lake Mohave offer a variety of recreational opportunities and are what attract most of the visitors to the park. Lake Mead NRA visitors include boaters, swimmers, fishermen, hikers, photographers, roadside sightseers, backpackers, and campers. Recreation visits in 2008 totaled just under 8 million and represent a substantial contribution to the area's economy. The majority of park visitation occurs during the summer months and involves water-based recreation. However, visitation is increasing in the spring and fall as visitors discover the backcountry regions of the recreation area through hiking and travel on the approved road system.

Temple Bar

Temple Bar is the eastern most developed area of the park and is situated on Lake Mead near the boundary with Grand Canyon National Park. Visitation to this area in 2008 was just over 70,000. In February 2007, half of the marina slips at Overton Beach were relocated to this area. An increase in visitation is expected as a response to the relocation and to the proposed development on adjacent lands. Some of the facilities and services currently offered include a ranger station, marina and boat rentals, general store, restaurant, motel, cabin rentals, NPS and concessioner housing, campground, trailer village, swim area, launch ramp, and picnic area.

Cottonwood Cove

Cottonwood Cove is located on Lake Mohave and attracts many visitors from California, Arizona, and Nevada. Visitation in 2008 was just over 231,000. Some of the facilities and services offered at Cottonwood Cove include a ranger station, marina with boat rentals, general store, restaurant, motel, NPS and concessioner housing, trailer village, campgrounds, swim beach, shoreline fishing, launch ramp, and picnic area.

ENVIRONMENTAL CONSEQUENCES

Introduction

This section presents the likely beneficial and adverse effects to the natural and human environment that would result from implementing the alternatives under consideration. This section describes short-term and long-term effects, direct and indirect effects, cumulative effects, and the potential for each alternative to result in unacceptable impacts or impairment of park resources. Interpretation of impacts in terms of their duration, intensity (or magnitude), and context (local, regional, or national effects) are provided where possible.

Methodology

In describing potential environmental impacts, it is assumed that the mitigation identified in the Mitigation and Monitoring section of this EA would be implemented under any of the applicable alternatives. Impact analyses and conclusions are based on NPS staff knowledge of resources and the project area, review of existing literature, and information provided by experts in the NPS or other agencies. Any impacts described in this section are based on preliminary design of the alternatives under consideration. Effects are quantified where possible; in the absence of quantitative data, best professional judgment prevailed.

Impacts are characterized as negligible, minor, moderate, or major, according to definitions provided for each impact topic below. In addition, the following terms may also be used in characterizing impact type:

- *Localized Impact*: The impact occurs in a specific site or area. When comparing changes to existing conditions, the impacts are detectable only in the localized area.
- *Direct Effect*: The effect is caused by the action and occurs at the same time and place.
- *Indirect Effect*: The effect is caused by the action and may occur later in time or be farther removed in distance, but is still reasonably foreseeable.
- *Short-Term Effect*: The effect occurs only during or immediately after implementation of the alternative.
- *Long-Term Effect*: The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more and could be beneficial or adverse.

In the absence of quantitative data concerning the full extent of actions under a proposed alternative, best professional judgment prevailed.

Impairment Analysis

In addition to determining the environmental consequences of the alternatives, NPS Management Policies (2006) requires the analysis of potential effects to determine if actions would impair park resources. Under the NPS Organic Act of 1916 and the NPS General Authorities Act of 1970, as amended, the NPS may not allow the impairment of park resources and values except as authorized specifically by Congress. The NPS must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment to the affected resources and values.

Impairment to park resources and values has been analyzed within this document. Impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation or proclamation of the park; is key to the cultural or natural integrity of the park or to opportunities for enjoyment of the park; or is identified as a goal in the park's general management plan or other relevant NPS planning document. An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated, of an action necessary to preserve or restore the integrity of park resources or values.

Impairment may result from NPS activities in managing the recreation area, visitor activities, or from activities undertaken by concessioners, contractors, and others operating in the recreation area. In this "Environmental Consequences" section, a determination on impairment is made in the conclusion statement of the applicable resource impact topics for each alternative. The NPS does not analyze recreational values, visitor use and experience (unless impacts are resource based), socioeconomic values, health and safety, or park operations in terms of impairment.

Unacceptable Impacts

The impact threshold at which impairment occurs is not always readily apparent. Therefore, the NPS will apply a standard that offers greater assurance that impairment will not occur. NPS Management Policies (2006) requires that park managers evaluate existing or proposed uses and determine whether the associated impacts on park resources and values are acceptable. Unacceptable impacts are impacts that fall short of impairment, but are still not acceptable within a particular park's environment.

Virtually every form of human activity that takes place within a park has some degree of effect on park resources or values, but that does not mean the impact is unacceptable or

that a particular use must be disallowed. For the purposes of this analysis, an unacceptable impact is an impact that individually or cumulatively would

- be inconsistent with a park's purposes or values
- impede the attainment of a park's desired future conditions for natural and cultural resources as identified through the park's planning process
- create an unsafe or unhealthful environment for visitors or employees
- diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values
- unreasonably interfere with
 - park programs or activities
 - an appropriate use
 - the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park
 - NPS concessioner or contractor operations or services

Cumulative Impacts

Cumulative effects are the direct and indirect effects of an alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action. Federal agencies are required to identify the temporal and geographic boundaries within which they will evaluate potential cumulative effects of an action and the specific past, present, and reasonably foreseeable projects that will be analyzed. This includes potential actions within and outside the recreation area boundary. The geographical boundaries of analysis vary depending on the impact topic and potential effects. While this information may be inexact at this time, major sources of impacts have been assessed as accurately and completely as possible, using all available data.

Specific projects or ongoing activities with the potential to cumulatively affect the resources (impact topics) evaluated for the project are identified in this document and described in the following narrative. Some impact topics would be affected by several or all of the described activities, while others could be affected very little or not at all. How each alternative would incrementally contribute to potential impacts for a resource is included in the cumulative effects discussion for each impact topic.

In 2008, Lake Mead NRA finalized a Wireless Telecommunication Facilities Plan and Environmental Assessment which identifies areas within the park suitable for new cellular towers. Both the Cottonwood Cove and Temple Bar developed areas are considered suitable in the plan, and new structures could be permitted in the future. While specific locations have not been identified, cell towers would be constructed in previously disturbed areas, and would have impacts on the park's visual resources in these areas.

Replacement of water and wastewater systems in developed areas park-wide is currently underway, and will impact Cottonwood Cove and Temple Bar. In addition, new entrance

stations are planned for both areas in 2009. These improvement and development projects could have localized impacts on natural resources.

A development concept plan for Cottonwood Cove is currently in the planning process. This plan will reevaluate the layout of the developed area and will include modernization of existing park and concessioner structures and extensive flood mitigation measures for the protection of both employees and visitors. The WTF at Cottonwood Cove would be outside the development concept planning area. However, the redevelopment of Cottonwood Cove may lead to new ground disturbance, and the resulting potential cumulative impacts are identified in the appropriate impact topics below.

Geology and Soils

Laws, Regulations, and Policies

NPS Management Policies (2006) stipulates that the NPS will preserve and protect geologic resources as integral components of park natural systems. Geologic resources include geologic features and geologic processes. The fundamental policy, as stated in the NPS Natural Resource Management (NPS-77, 1991) is the preservation of the geologic resources of parks in their natural condition whenever possible.

Soil resources would be protected by preventing or minimizing adverse potentially irreversible impacts on soils, in accordance with NPS Management Policies (2006). NPS-77 specifies objectives for each management zone for soil resources management. These management objectives are defined as: (1) natural zone- preserve natural soils and the processes of soil genesis in a condition undisturbed by humans; (2) cultural zone- conserve soil resources to the extent possible consistent with maintenance of the historic and cultural scene and prevent soil erosion wherever possible; (3) park development zone- ensure that developments and their management are consistent with soil limitations and soil conservation practices; and, (4) special use zone- minimize soil loss and disturbance caused by special use activities, and ensure that soils retain their productivity and potential for reclamation.

Zones within the recreation area have been designated in the Lake Mead NRA General Management Plan, which provides the overall guidance and management direction for Lake Mead NRA.

Criteria and Thresholds for Impact Analysis

The following impact thresholds were established for analyzing impacts to geology and soils in the project area.

- *Negligible impacts*: Impacts have no measurable or perceptible changes in soil structure and occur in a relatively small area.
- *Minor impacts*: Impacts are measurable or perceptible, but localized in a relatively small area. The overall soil structure is not affected.

- *Moderate impacts:* Impacts are localized and small in size, but cause a permanent change in the soil structure in that particular area.
- *Major impacts:* Impact on the soil structure is substantial, highly noticeable, and permanent.
- *Impairment:* For this analysis, impairment is considered a permanent change in a large portion of the overall acreage of the park, affecting the resource to the point that the park's purpose cannot be fulfilled and the resource is degraded precluding the enjoyment of future generations.

Alternative A

Under this alternative, no new WTFs would be constructed, and no impacts to geology and soils would result.

Cumulative Effects: There would be no cumulative effects to geology and soils as a result of Alternative A.

Conclusion: Alternative A would have no effect on geology and soils, there would be no unacceptable impacts, and no impairment would occur.

Alternative B

Under this alternative, two new WTFs would be constructed. The new facilities would be in the Cottonwood Cove and Temple Bar developed areas near existing water delivery and storage structures. While the new facilities would be near existing structures, some new ground disturbance would occur. Each new WTF would have a permanent footprint of approximately 5000 square feet (.11 acres) for a total of 10,000 square feet (0.23 acres) of disturbance. Additional impacts to geology and soils may occur as a result of the installation and improvement of access roads and utilities. To the greatest extent practicable, water and power delivery would occur along existing roads and utility corridors.

Cumulative Effects: Geology and Soils in the developed areas of LMNRA have been previously impacted by the establishment of park facilities and concessioner operations. Other impacts are occurring as the park adapts operations to accommodate the declining lake level. Additional impacts at Cottonwood Cove are anticipated from a planned redevelopment project and the construction of a new entrance station. Both developed areas have been identified as suitable for the future installation of cellular towers. However, current and future activities are largely restricted to areas already disturbed and thus do not have an appreciable effect on the integrity of the park's geology and soils as a whole.

Conclusion: Construction of arsenic WTFs and associated infrastructure would result in long-term, moderate, localized adverse impacts to geology and soils. There would be no unacceptable impacts and no impairment to geology and soils from the implementation of Alternative B.

Vegetation

Laws, Regulations, and Policies

The NPS Organic Act directs the park to conserve the scenery and the natural objects unimpaired for future generations. NPS Management Policies (2006) defines the general principles for managing biological resources as maintaining all native plants and animals as part of the natural ecosystem. When NPS management actions cause native vegetation to be removed, then the NPS will seek to ensure that such removals will not cause unacceptable impacts to native resources, natural processes, or other park resources. Exotic species, also referred to as non-native or alien, are not a natural component of the ecosystem. They are managed, up to and including eradication, under the criteria specified in NPS Management Policies (2006) and NPS-77.

Criteria and Thresholds for Impact Analysis

The following impact thresholds were established for analyzing impacts to vegetation in the project area:

- *Negligible impacts*: Impacts have no measurable or perceptible changes in plant community size, integrity, or continuity.
- *Minor impacts*: Impacts are measurable or perceptible and localized within a relatively small area. The overall viability of the plant community is not affected and the area, if left alone, recovers.
- *Moderate impacts*: Impacts cause a change in the plant community (e.g. abundance, distribution, quantity, or quality); however, the impact remains localized.
- *Major impacts*: Impacts to the plant community are substantial, highly noticeable, and permanent.
- *Impairment*: The impact contributes substantially to the deterioration of the park's native vegetation. These resources are affected over the long-term to the point that the park's purpose cannot be fulfilled and the resource cannot be experienced and enjoyed by future generations.

Alternative A

Under this alternative, no new arsenic WTFs would be constructed and there would be no impacts to vegetation.

Cumulative Effects: There would be no cumulative effects to vegetation from the implementation of Alternative A.

Conclusion: Alternative A would have no effect on vegetation, there would be no unacceptable impacts, and no impairment would occur.

Alternative B

Under this alternative two new WTFs would be constructed, and removal of native vegetation would occur. Both the Cottonwood Cove and Temple Bar WTF sites are lightly vegetated and consist primarily of creosote dominant plant communities. No rare or sensitive plant species occur at either site.

Topsoil salvage would take place before construction activities began, and this topsoil would be used to enhance revegetation in areas disturbed by project activities. To prevent the spread of non-native plant species, construction equipment would be pressure-washed and inspected for foreign soil by a NPS resource manager prior to working within the park.

Vegetation salvage would occur within project boundaries as deemed appropriate by a NPS resource manager. Salvaged plants would be taken to the park's native plant nursery and later returned to the site or a nearby area as appropriate.

Cumulative Effects: Vegetation in the developed areas of LMNRA has been previously impacted by the establishment of park facilities and concessioner operations. Additional impacts at Cottonwood Cove are anticipated from a planned redevelopment project and the construction of a new entrance station. Both developed areas have been identified as suitable for the future installation of cellular towers. However, current and future activities are largely restricted to areas already disturbed and thus do not have an appreciable effect on the integrity of the park's vegetative communities as a whole.

Conclusion: Construction of arsenic WTFs and associated infrastructure would result in long-term, minor, localized adverse impacts to vegetation. There would be no unacceptable impacts and no impairment to vegetation from the implementation of Alternative B.

Wildlife

Laws, Regulations, and Policies

The NPS Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted by the NPS to mean native animal life should be protected and perpetuated as part of the recreation area's natural ecosystem. Natural processes are relied on to maintain populations of native species to the greatest extent possible. The restoration of native species is a high priority. Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and ecological integrity of plants and animals.

The recreation area also manages and monitors wildlife cooperatively with the Arizona Game and Fish Department and the Nevada Division of Wildlife.

Criteria and Thresholds for Impact Analysis

The following impact thresholds were established for analyzing impacts to wildlife and wildlife habitat in the project area:

- *Negligible impacts:* No species of concern are present; no impacts or impacts with only temporary effects are expected.
- *Minor impacts:* Nonbreeding animals of concern are present, but only in low numbers. Habitat is not critical for survival; other habitat is available nearby. Occasional flight responses by wildlife are expected, but without interference with feeding, reproduction, or other activities necessary for survival. Mortality of species of concern is not expected.
- *Moderate impacts:* Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or winter; mortality or interference with activities necessary for survival expected on an occasional basis, but not expected to threaten the continued existence of the species in the park.
- *Major impacts:* Breeding animals are present in relatively high numbers, and/or wildlife is present during particularly vulnerable life stages. Habitat targeted by actions has a history of use by wildlife during critical periods, but there is suitable habitat for use nearby. Few incidents of mortality could occur, but the continued survival of the species is not at risk.
- *Impairment:* The impact contributes substantially to the deterioration of natural resources to the extent that the park's wildlife and habitat no longer functions as a natural system. Wildlife and its habitat are affected over the long-term to the point that the park's purpose is not fulfilled and the resource cannot be experienced and enjoyed by future generations.

Alternative A

Under this alternative no new WTFs would be constructed and there would be no impacts to wildlife.

Cumulative Effects: There would be no cumulative effects to wildlife from the implementation of Alternative A.

Conclusion: Alternative A would have no effects to wildlife, there would be no unacceptable impacts, and no impairment would occur.

Alternative B

Under this alternative two new WTFs would be constructed. Both WTF locations are near developed areas and in low quality wildlife habitat. Approximately 0.23 acres of potential wildlife habitat would be permanently impacted as a result of this alternative. During construction activities, a NPS resource manager would be onsite to ensure that no

wildlife is present in the immediate project area, so there would be no direct harm to individual animals. Construction activities may invoke a flight response in birds, reptiles, and small mammals in the immediate project area. Alternative B would result in short-term, negligible, adverse impacts to wildlife near the project area due to the increase in noise and human activity associated with construction of the new facilities.

Cumulative Effects: A redesign plan is currently being developed for the Cottonwood Cove developed area. New construction, upgrades to existing facilities, and flood control measures may have additional adverse impacts on wildlife and wildlife habitat in this area. Both the Cottonwood Cove and Temple Bar developed areas have been identified as suitable locations for new cellular towers, which may cause additional impacts to birds.

Conclusion: Alternative B could result in short-term, negligible, adverse impacts to wildlife during construction of the WTFs, as well as long-term, minor, adverse effects due to the loss of approximately 0.23 acres of potential wildlife habitat. Under Alternative B, there would be no unacceptable impacts and no impairment to wildlife would occur.

Special Status Species

Laws, Regulations, and Policies

Section 7 of the Endangered Species Act mandates all federal agencies determine how to use their existing authorities to further the purposes of the Act to aid in recovering listed species, and to address existing and potential conservation issues. Section 7(a)(2) states that each federal agency shall, in consultation with the Secretary of the Interior, ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

NPS Management Policies (2006) directs the parks to survey for, protect, and strive to recover all species native to National Park System units that are listed under the Endangered Species Act. It sets the direction to meet the obligations of the Act. NPS Management Policies (2006) also directs the NPS to inventory, monitor, and manage state and locally listed species, and other native species that are of special management concern to the parks, to maintain their natural distribution and abundance.

The General Management Plan designated 1,050,030 acres, or 70 percent of the NRA, as natural zones, and areas with known habitat or potential habitat for rare, threatened, or endangered species were further protected by placement in the environmental protection or outstanding natural feature subzone of the natural zone. Management of these zones focuses on the maintenance of isolation and natural process and restoration of natural resources.

Criteria and Thresholds for Impact Analysis

The Endangered Species Act defines the terminology used to assess impacts to listed species as follows:

- *No effect*: The appropriate conclusion when the action agency determines that its proposed action would not affect a listed species or designated critical habitat.
- *Is 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 positive 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 the best judgment, a person would not: (1) able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.
- *Is likely to adversely affect*: The appropriate finding if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action “is likely to adversely affect” the listed species. If incidental take is anticipated to occur as a result of the proposed action, an “is likely to adversely affect” determination should be made.
- *Is likely to jeopardize listed species/adversely modify critical habitat – (Impairment)*: The appropriate conclusion when the action agency or the U.S. Fish and Wildlife Service identifies situations in which the proposed action is likely to jeopardize the continued existence of a listed species or adversely modify critical habitat.

Alternative A

Under this alternative, no new WTFs would be constructed, and there would be no effect on special status species.

Cumulative Effects: There are no cumulative effects to special status species under this alternative.

Conclusion: Alternative A would have no effect on special status species, and no unacceptable impacts or impairment would occur.

Alternative B

Both arsenic WTF sites would be located in potential desert tortoise habitat. The Mojave population of the desert tortoise is listed as federally threatened under the Endangered Species Act, which includes tortoises occurring at the Cottonwood Cove site in Nevada.

Tortoises occurring at the Temple Bar site in Arizona are protected by state law. Both WTF sites would occur in low quality desert tortoise habitat.

A NPS resource manager would survey the project areas for tortoises prior to construction, and remain onsite during project activities to ensure that no tortoises are harassed or harmed. Before construction begins, a qualified NPS biologist would provide on-site training to workers which would include information on desert tortoise biology, legal protection of the species, and all required mitigation and reporting requirements. All trash would be disposed of in appropriate containers and removed from the project site daily to avoid attracting ravens, which may feed on juvenile desert tortoises and other wildlife. All open trenches or holes would be covered at night to prevent desert tortoises and other wildlife from becoming trapped. During the day, all open trenches would be checked in the morning, afternoon, and evening. Trenches would be checked immediately prior to backfilling. All areas to be disturbed would have boundaries flagged before beginning the activity, and all disturbance would be confined to the flagged areas. All project personnel would be instructed that their activities must be confined to locations within flagged areas. Disturbance beyond the actual zone would be prohibited.

Both WTF sites occur in potential burrowing owl habitat, a species of management concern. Project areas would be surveyed for owls and burrows prior to construction. If burrows are identified, they would be avoided if possible or collapsed while unoccupied.

Cumulative Effects: Construction activities associated with the redevelopment of the Cottonwood Cove area may result in additional impacts to the desert tortoise, including individual mortality or loss of habitat. Appropriate mitigation measures would be implemented to ensure impacts are minimal.

Conclusion: While construction of WTFs would occur in desert tortoise habitat, mitigation measures would ensure that impacts are minimal. Alternative B is not likely to adversely affect the desert tortoise. There would be no unacceptable impacts, and no impairment to special status species under this alternative.

Visual Resources

Laws, Regulations, and Policies

The enabling legislation of Lake Mead NRA specifically addresses the preservation of the scenic features of the area. The NPS manages the natural resources of the park, including highly valued associated characteristics such as scenic views, to maintain them in an unimpaired condition for future generations.

The intent of this analysis is to identify how each alternative would affect the overall visual character of the area. The assessment of potential visual impacts involves a subjective judgment concerning the degree of landscape modification allowable before a threshold of impact is exceeded. Human preference for landscape types or characteristics is not uniform across cultures and populations, but there are common preferences among

visitors to federal lands, and natural-looking landscapes are thought to be the most appealing.

In determining impacts on the visual resource, the NPS considered the visual sensitivity of the area and the level of visual obtrusion each alternative would have on the existing landscape. Visual sensitivity is dependent on the ability of the landscape to absorb the potential impact and the compatibility of the change with the overall visual character of the area. Absorption relates to how well the project will blend into the landscape, taking into account factors such as form, line, and color. Compatibility considers the character of the visual unit and how much contrast is created by the project.

Criteria and Thresholds for Impact Analysis

The following impact thresholds were established for analyzing impacts to visual resources in the project area:

- *Negligible impacts:* The impact is at the lower level of detection and causes no measurable change. The effects of the project do not dominate the landscape and are essentially imperceptible. The ability of the landscape to absorb the effects is very high, and the change is compatible with the existing visual character of the area.
- *Minor impacts:* The impact is slight but detectable and the change would be small. The project effects are subordinate to the surrounding landscape and relatively low in dominance. The ability of the landscape to absorb the effects is high, and the change is compatible with the existing visual character of the area. If mitigation is needed to offset adverse effects, it is simple and likely to be successful.
- *Moderate impacts:* The impact is readily apparent and the change attracts attention and alters the view, and the dominance of the effects on the landscape is high. The ability of the landscape to absorb the impact is low, and the change is moderately compatible with the existing visual character of the area. Mitigation measures are necessary to offset adverse effects and are likely to be partially successful.
- *Major impacts:* The impact is severe and the change would be highly noticeable. The effects of the project dominate the landscape. The ability of the landscape to absorb the impact is very low, and the impact has very little compatibility with the overall visual character of the area. Extensive mitigation measures are needed to offset adverse effects, and their success is not guaranteed.
- *Impairment:* The impact occurs within an extremely visually sensitive area. The impact is not compatible with the overall visual character of the area, the landscape is unable to absorb the impact, and mitigation measures are unsuccessful in alleviating the impact. The impact contributes substantially to

the degradation of the overall scenic quality to the point that the park's purpose cannot be fulfilled, and resource degradation precludes the enjoyment of future generations.

Alternative A

Under this alternative, no new WTFs would be constructed. There would be no impacts to visual resources.

Cumulative Effects: There would be no cumulative effects to visual resources under this alternative.

Conclusion: There would be no effects to visual resources under this alternative, and no unacceptable impacts or impairment would occur.

Alternative B

Under this alternative, two new WTFs would be constructed. WTF locations would be in very close proximity to two existing water tanks at each location. Both facilities would be hidden by natural elevational contours and existing structures to the greatest extent practicable.

New permanent structures would be constructed using pre-colored building materials that match surrounding buildings and natural features, and any necessary external lighting would be downshielded. Chain-link fencing would surround the new WTFs, and would include neutral inserts to reduce visual impacts. New WTFs would result in long-term, minor adverse impacts to visual resources.

Cumulative Effects: Planned future redevelopment projects for the Cottonwood Cove developed area could contribute to visual impacts, although no new disturbance should occur near the WTF area. Both the Cottonwood Cove and Temple Bar developed areas have been identified as suitable locations for cellular towers, which may have additional impacts to visual resources in the future.

Conclusion: Mitigation measures would limit impacts to visual resources at each location, resulting in long-term, minor, adverse impacts. There would be no unacceptable impacts and no impairment of visual resources would occur.

Park Operations

Criteria and Thresholds for Impact Analysis

Park operations refer to the ability of the park to adequately protect and preserve vital park resources and to provide for an enjoyable visitor experience. Operational efficiency is influenced not only by park staff, but also by the adequacy of the existing infrastructure used in the day to day operation of the park. Analysis of impacts to park operations must consider (1) employee and visitor health and safety, (2) the park's mission to protect and preserve resources, and (3) existing and needed facilities and infrastructure. The

following impact thresholds were established for analyzing impacts to park operations in the project area:

- *Negligible impacts:* Park operations are not affected, or the effects are at low levels of detection and do not have an appreciable effect on park operations.
- *Minor impacts:* The effect is detectable and likely short-term, but is of a magnitude that does not have an appreciable effect on park operations. If mitigation is needed to offset adverse effects, it is simple and likely to be successful.
- *Moderate impacts:* The effects are readily apparent, likely long-term, and result in a substantial change in park operations in a manner noticeable to staff and to the public. Mitigation measures are necessary to offset adverse effects and are likely to be successful.
- *Major impacts:* The effects are readily apparent, long-term, and result in a substantial change in park operations in a manner noticeable to staff and the public. Changes are markedly different from existing operations. Extensive mitigation measures are needed to offset adverse effects, and their success is not guaranteed.

Alternative A

Under this alternative, no new WTFs would be constructed. There would be no impacts to park operations.

Cumulative Effects: There would be no cumulative effects to park operations under this alternative.

Conclusion: There would be no impacts to park operations under Alternative A.

Alternative B

Under this alternative, two new WTFs would be constructed. Operations and maintenance of each WTF site would require approximately 20-25 man-hours per week. There would be additional operating costs for the new facilities, including power, treatment chemicals, and the occasional replacement of arsenic treatment media. At this time, it is not expected that new positions would be created to fund, operate, or maintain the new WTFs. Instead, the operating costs and workload would be absorbed by the utilities branch, a part of the maintenance division. Approximately half of the funding for the utilities branch comes from the sale of water at developed areas, while the other half comes from NPS base funding.

Cumulative Effects: Park operations face challenges due to the increasing costs of materials and labor, forcing the park to try to do more with less. In addition, low water conditions have increased planning and maintenance workloads dramatically. Large scale projects initiated by outside entities, such as Southern Nevada Water Authority's

third intake structure and the Clean Water Coalition's System Conveyance and Operations Program, require the input and coordination of several key members of park staff.

Conclusion: This alternative would have long-term, minor, adverse effects on park operations at Cottonwood Cove and Temple Bar due to the lack of additional funding for facility operations.

Safety and Visitor Use and Experience

Laws, Regulations, and Policies

NPS Management Policies (2006) states that the enjoyment of the park's resources is part of the fundamental purpose of all parks and that the NPS is committed to providing appropriate, high-quality opportunities for visitor enjoyment.

Part of the purpose of Lake Mead NRA is to offer opportunities for recreation, education, inspiration, and enjoyment. Consequently, one of the park's management goals is to ensure that visitors safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of the park's facilities, services, and appropriate recreational opportunities.

Criteria and Thresholds for Impact Analysis

Public scoping input and observation of visitation patterns, combined with an assessment of what is available to visitors under current management, were used to estimate the effects of the actions in the various alternatives of this document. The impact on the ability of the visitor to safely experience a full range of Lake Mead NRA resources was analyzed by examining resources and objectives presented in the park's significance statement. The potential for change in visitor experience proposed by the alternatives was evaluated by identifying projected increases or decreases in use of the areas impacted by the proposal, and determining how these projected changes would affect the desired visitor experience. The following impact thresholds were established for analyzing impacts to safety and visitor use and experience:

- *Negligible impacts:* Safety would not be affected, or the effects are immeasurable and do not have an appreciable effect on visitor or employee health and safety. The visitor is not affected, or changes in visitor use and experience are below or at the level of detection. The visitor is not likely to be aware of the effects associated with the alternative.
- *Minor impacts:* The effect is measurable, but does not have an appreciable effect on health and safety. Changes in visitor use and experience are detectable, although the changes would be slight. Some visitors are aware of the effects associated with the alternative, but the effects are slight and not noticeable by most visitors.

- *Moderate impacts:* The effects are measurable and result in substantial effects to health and safety on a local scale. Changes in visitor use and experience are readily apparent to most visitors. Visitors are aware of the effects associated with the alternative and might express an opinion about the changes.
- *Major impacts:* The effects are readily apparent and result in substantial, noticeable effects to health and safety on a regional scale. Changes in visitor use and experience are readily apparent to all visitors. Visitors are aware of the effects associated with the alternative and are likely to express a strong opinion about the changes.

Alternative A

Under this alternative, no new WTFs would be constructed. Arsenic content in potable water at the Cottonwood Cove and Temple Bar developed areas would remain above acceptable standards as identified by the EPA. Prolonged exposure to arsenic contamination can result in a variety of health issues.

Cumulative Effects: Arsenic, like many substances to which humans are frequently exposed, is a known carcinogen. In addition to its presence in water, arsenic is also used in the treatment of lumber, as well as in paints, dyes, and metals.

Conclusion: Under this alternative, continued exposure to arsenic levels above the MCL identified by the EPA could result in long-term, moderate, adverse effects to safety and visitor use and experience.

Alternative B

Under this alternative, two new WTFs would be constructed. Drinking water supplies at Cottonwood Cove and Temple Bar would comply with arsenic standards identified as acceptable by the EPA. In addition to being a known carcinogen, chronic arsenic exposure can result in a variety of health issues. Lowering arsenic concentrations in drinking water would result in beneficial impacts to human health.

Cumulative Effects: There would be no cumulative effects under this alternative.

Conclusion: Alternative B would have long-term, moderate, beneficial impacts to safety and visitor use and experience, due to a decrease in measurable arsenic levels in drinking water.

PUBLIC AND AGENCY INVOLVEMENT

A 30-day public scoping period occurred from February 2, 2009 to March 2, 2009. A scoping press release (Appendix A) was sent to television stations, newspapers, magazines, and radio stations in Las Vegas, Henderson, Boulder City, Pahrump, Overton, Logandale, Laughlin, Nevada; Meadview, Kingman, Phoenix, and Bullhead City, Arizona; and Needles and Los Angeles, CA. The press release was also posted on the Lake Mead NRA internet website and on the NPS Planning, Environment, and Public Comment (PEPC) internet website. No public comments were received.

A press release announcing the availability of this environmental assessment is sent to the above entities and is posted on the park and PEPC websites. In addition, the announcement is posted at the Cottonwood Cove and Temple Bar ranger stations.

Lake Mead NRA's mailing list is comprised of 237 federal, state, and local agencies; individuals; businesses; and organizations. The environmental assessment is distributed to those individuals, agencies, and organizations likely to have an interest in this project. Entities on the park mailing list that do not receive a copy of the environmental assessment receive a letter notifying them of its availability and methods of accessing the document.

The environmental assessment is published on the Lake Mead NRA internet website at (<http://www.nps.gov/lame>) and on the NPS PEPC internet website at <http://parkplanning.nps.gov/>. Copies of the environmental assessment are available at area libraries, including: Boulder City Library, Clark County Community College (North Las Vegas), Clark County Library, Las Vegas Public Library, Green Valley Library (Henderson), James I. Gibson Library (Henderson), Sahara West Library (Las Vegas), Mohave County Library (Kingman, AZ), Sunrise Public Library (Las Vegas), University of Arizona Library (Tucson, AZ), University of Nevada Las Vegas James R. Dickinson Library, Meadview Community Library, Moapa Valley Library (Overton, NV), Mesquite Library, Mohave County Library (Lake Havasu City, AZ), Laughlin Library, Searchlight Library, and Washington County Library (St. George, UT

A copy of the environmental assessment can also be obtained by direct request to:

National Park Service, Lake Mead NRA
Attention: Compliance Office
601 Nevada Way
Boulder City, Nevada 89005
Telephone: (702) 293-8956

Comments on this environmental assessment must be submitted during the 30-day public review and comment period. Comments on the EA can be submitted in writing to the address above or on the PEPC website at <http://parkplanning.nps.gov/>.

Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

LIST OF PREPARERS

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Michael Boyles, Environmental Compliance Specialist

Joe Hutcheson, Geographer

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APPENDIX A: SCOPING PRESS RELEASE

National Park Service
U.S. Department of the Interior

LAKE MEAD NATIONAL RECREATION AREA News Release

For Immediate Release: Jan. 30, 2009
Release No.; 2009-06
Contact: Andrew S. Muñoz, 702-293-8691

NPS SEEKS PUBLIC COMMENT ON PROPOSED WATER TREATMENT FACILITIES

LAS VEGAS - The National Park Service is seeking public comment on the proposed construction of two new water treatment facilities at its Cottonwood Cove and Temple Bar developed areas in the Lake Mead National Recreation Area. The park service will be preparing an environmental assessment to evaluate the potential impacts associated with the new construction.

The assessment will analyze the construction of new buildings at each location, including laboratory and office space, vehicle parking, utility hookups and access roads. These new facilities are needed to treat groundwater for arsenic content in order to comply with new stricter Environmental Protection Agency regulations.

Comments and recommendations concerning the scope of the environmental assessment, the issues it should cover, the alternatives to consider, and other resource concerns will be accepted through March 2, 2009. They may be submitted by U.S. Mail to Lake Mead National Recreation Area, Compliance Office, 601 Nevada Way, Boulder City, NV 89005 or via the internet at <http://parkplanning.nps.gov/>.

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