National Park Service
United States Department of the Interior

Death Valley National Park
California and Nevada

Environmental Assessment

Navel Spring Water System Repair and Maintenance Project

November 2013

ENVIRONMENTAL ASSESSMENT

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Summary

Rio Tinto (RT) proposes to perform repairs, maintenance, and improvements to its water collection system at Navel Spring (AKA Naval Springs) in Death Valley National Park, California. U.S. Borax (a subsidiary of Rio Tinto) holds a pre-1914 appropriative water rights claim to the spring and is in the process of conveying this claim to the Death Valley Conservancy (DVC). At Navel Spring proper, the pre-1914 appropriative water rights claim holder proposes to clean out a water collection adit and place a concrete framed steel door at its portal, as well as stabilize a collapsing adit with pervious cellular concrete. A new pipeline would be installed from the edge of the spring canyon down the centerline of the existing Navel Spring access road to a water storage tank, 0.8 miles distant. The existing storage tank would be replaced.

Initial water diversion and collection works at Navel Spring likely date to the early 1900s and supported local borax mining operations and the watering needs of travelers. By the mid-1910s, the spring experienced increased development and usage concurrent with the growth of the historic borax mining camp of Ryan, California, which was later converted to the Death Valley View Hotel. Starting in 1928 and continuing to present day, Navel Spring has served as the sole source of water for all of Ryan's residential, tourist, fire protection, and educational activities. The spring and water works now require repairs and improvements aimed at increasing public safety; better securing the underground workings (water collection adits) from contamination; facilitating cleaning and maintenance; increasing water storage capacities for fire suppression and contemporary and future resident and visitor usage at Ryan; and enhancing the long-term stability and security of the spring and water diversion works.

This environmental assessment examines in detail two alternatives: no-action and RT's proposed action. At Navel Spring, the proposed action involves removal of the existing steel door and framework of the lower portal and the excavation and removal of loose material on the floor of the adit. A new steel door and associated structural components would be constructed slightly inside the portal to increase stability and longevity of the structure. The upper adit would be filled with pervious lightweight cellular concrete in order to stabilize the tunnel and increase public safety. All above ground vegetation from a group of invasive date palms located at the level of the upper adit have previously been cut by the NPS as part of the park's routine resource management of non-native plant species. As a component of the project, the palm stumps would be removed by the project proponent and periodically inspected by the NPS; re-growth would be treated using mechanical means.

From the spring to the water storage tank, a new high-density poly-ethylene (HDPE) pipeline would be buried down the centerline of the Navel Spring access road and the old HDPE pipeline would be removed. The burial of the pipeline would protect it from extreme heat and cold, as well as mitigate visual disturbances.

The badly corroded 10,800 gallon storage tank would be removed and replaced with a 33,788 gallon tank, consistent with the size of the historic tank and historic cultural landscape. The existing tank sits on an historic timber foundation; pursuant to contemporary building codes, the new tank would be placed on a concrete foundation to the southeast and the timber foundation would be undisturbed. The larger storage tank is essential to the adequate fire protection, preservation and restoration activities, and current and projected visitor usage at Ryan, a National Register eligible historic district. To minimize visual impacts, the tank would be low profile and painted a color to blend in with the surrounding natural and cultural landscape.

For the protection of the wildlife using Navel Spring, the proposed action would involve an NPS prohibition on dogs at Navel Spring, from the Navel Spring access road gate.

The proposed action would have no or negligible impacts on designated critical habitat, ecologically critical areas, wild and scenic rivers, and other natural areas; air quality; water quality; prime and unique farmlands; floodplains; park operations; environmental justice; museum objects; Indian Trust resources; soundscapes; lightscapes and night skies; climate change; and paleontological resources.

The proposed action would contribute short-term minor adverse impacts to geology and soils; long-term moderate beneficial impacts to geologic hazards; short-term negligible adverse and long-term moderate beneficial impacts to vegetation; short-term minor adverse impacts to wildlife; short-term minor adverse impacts to special-status species; short-term negligible adverse and long-term minor beneficial impacts to wetlands; overall short-and long-term negligible to minor adverse impacts to archeological resources with long-term, minor, and beneficial impacts to the historic Navel Spring water system (site 10-063-01); short- and long-term negligible impacts to cultural landscapes; short- and long-term moderate beneficial impacts to the Ryan historic district as a whole; short- and long-term minor adverse impacts to contributing elements 10-063-01 and 10-063-03; short- and long-term negligible impacts to ethnographic resources; long-term moderate beneficial impacts to health and safety; long-term minor adverse impacts to scenic resources; short- and long-term minor adverse impacts to visitor use and experience; and long-term moderate beneficial impacts to adjacent landowners and land uses.

Notes to Reviewers and Respondents

If you wish to comment on the environmental assessment, you may mail comments to the name and address below. Our practice is to make comments, including names and home addresses of respondents, available for public review. Individual respondents may request that we withhold their home address from the record, which we will honor to the extent allowable by law. *If you want us to withhold your name and address, you must state this prominently at the beginning of your comment.* We will make all submissions from organizations and businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety.

Please address comments to:

Death Valley National Park; Attn: Navel Spring Water System Repair and Maintenance Project; PO Box 579; Death Valley, CA 92328

Comments may also be submitted electronically at the National Park Service Planning, Environment, and Public Comment (PEPC) website at:
http://parkplanning.nps.gov/NavelSpringEA

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ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effect
CAA	Clean Air Act of 1963
CFR	Code of Federal Regulations
°C	degrees Celsius
DVC	Death Valley Conservancy
°F	degrees Fahrenheit
EA	environmental assessment
ft	feet
HDPE	high density poly ethylene
NEPA	National Environmental Policy Act of 1969, as amended
NHPA	National Historic Preservation Act of 1966, as amended
NPS	National Park Service
NRHP	National Register of Historic Places
PCLWC	pervious cellular lightweight concrete
RT	Rio Tinto
SHPO	State Historic Preservation Office(r)
SR	State Route
USC	United States Code
USFWS	U.S. Fish and Wildlife Service

INTRODUCTION

Rio Tinto (RT) proposes to perform maintenance, repairs, and improvements to its water system at Navel Spring within Death Valley National Park (Figure 1). RT holds a pre-1914 appropriative water rights claim to the spring and is in the process of conveying this claim to the Death Valley Conservancy (DVC). Navel Spring has been the sole source of water for domestic use, fire protection, preservation and educational activities at the longstanding borax mining camp of Ryan for nearly one hundred years; RT and DVC have expressed to the National Park Service that the proper functioning of the Navel Spring water system is crucial to the vitality of this National Register eligible historic district. The National Park Service is responding to the request of the appropriative water rights claimant to perform maintenance on its existing water system.

The project as proposed by the appropriative water rights claim holder has three components: the replacement of the failing water tank; the relocation, replacement, and burial of the water pipeline; and the repair and maintenance of the water diversion works. In terms of the water storage tank, the current badly corroded water tank would be replaced with a factory painted and coated, bolted steel tank. The proposed tank volume would be 33,788 gallons, consistent with the size of the historic tank. RT and DVC have expressed that this size tank would better serve the fire suppression, restoration activities, and increased visitation needs of Ryan Camp than the existing 10,800 gallon storage tank.

The existing pipeline from the spring to the tank is a black high density poly-ethylene (HDPE) pipe running along the surface roughly following the path of the historic pipeline. To mitigate visual impacts as well as to improve the system, a new HDPE pipeline would be buried in a trench along the center line of the Navel Spring access road. The older (non-historic) HDPE pipeline would be removed.

Two underground openings comprise the water collection works at Navel Spring: the lower one is the current as well as the historic water collection adit and the upper was likely a part of the historic water collection system but is no longer in use. At the lower adit, a steel door would be replaced with a properly engineered and installed door and portal support structure. The adit would also be cleaned out to the original grade and supported as necessary. The upper opening would be stabilized using environmentally-friendly, air-entrained, open-cell concrete allowing for permeability.

The NPS has cut several invasive date palms (*Phoenix dactylifera*) from Navel Spring as a course of routine, non-native invasive plant management. Under the proposed action, Ryan personnel would remove the palm stumps and, with NPS staff oversight, would periodically inspect and manage any potential re-growth using mechanical (non-chemical) removal means. Two non-historic mortared rock wildlife guzzlers would be undisturbed by the project proponent and would continue to be maintained or upgraded by NPS personnel in consultation with the water rights claim holder.

As a steward of Death Valley National Park and the natural and cultural resources located therein, the NPS has prepared an environmental assessment (EA) to investigate the potential impacts on the environment which could result from the proposed project at Navel Spring pursuant to the National Environmental Protection Act (NEPA). NEPA requires all federal agencies to (1) prepare in-depth studies of the impacts of and alternatives to proposed "major federal actions"; (2) use the information contained in such studies in deciding whether to proceed with the actions; and (3) diligently attempt to involve the interested and affected public before any decision affecting the environment is made. Although the Navel Spring water system repair and maintenance project does not constitute a "major federal action," it would impact resources on federal land. Thus, concurrent to NEPA, the project is considered a "federal undertaking."

This EA considers a preferred alternative and a no-action alternative and outlines possible effects of each on the environment. It has been prepared in accordance with NEPA of 1969, as amended, and regulations of the Council on Environmental Quality (40 *Code of Federal Regulations* [CFR] 1508.9); *NPS Director's Order 12*: *Conservation Planning, Environmental Impact Analysis, and Decision-making*; and the National Historic Preservation Act of 1966, as amended (NHPA).

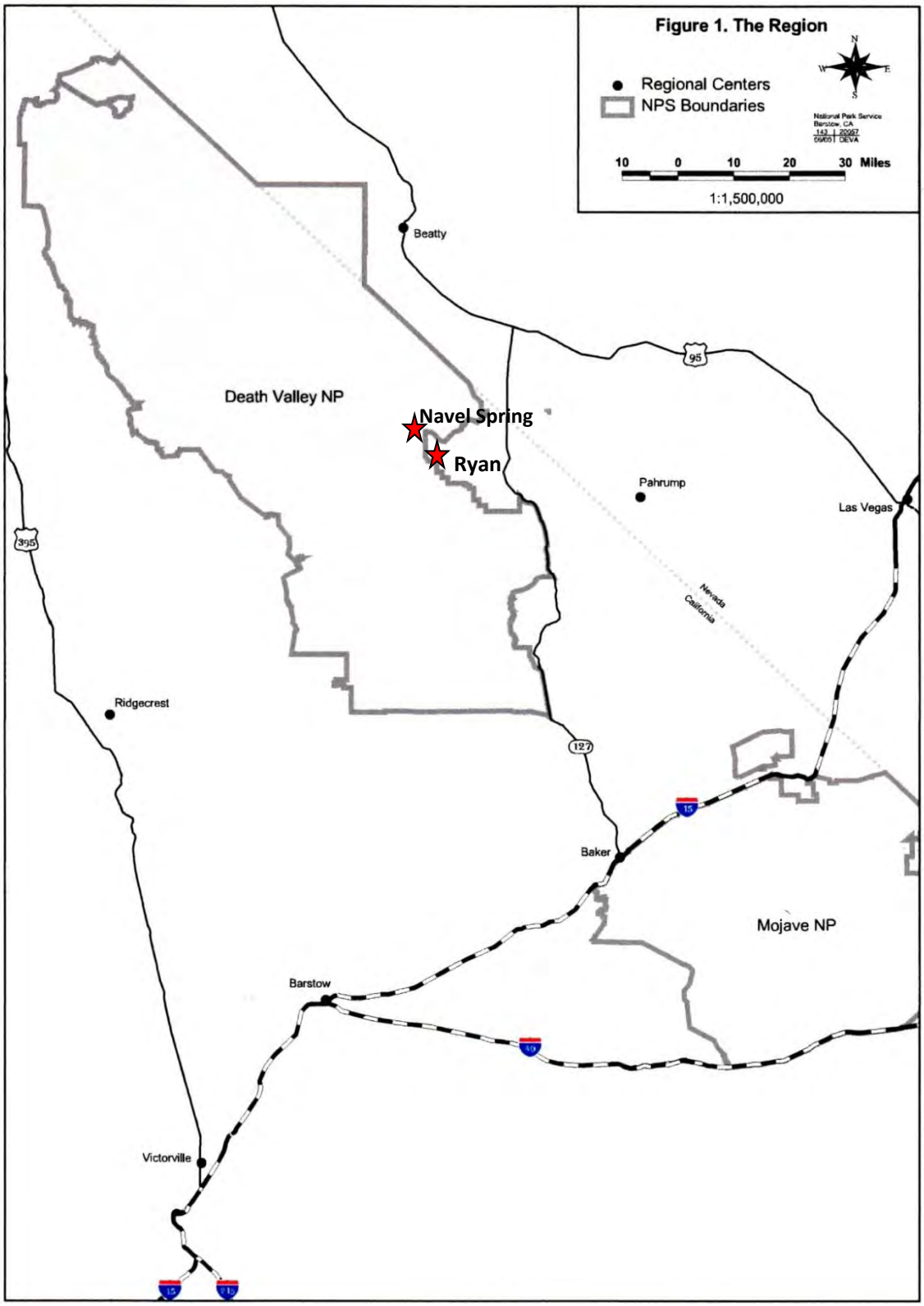


Figure 1. Death Valley National Park and region (from NPS 2002a).

PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to repair and improve the Navel Spring water collection, conveyance, and storage system. Rio Tinto holds a pre-1914 appropriative water rights claim to Navel Spring and the NPS has an obligation under federal law to respond to requests for maintenance of infrastructure connected with valid existing rights such as this pre-1914 appropriative water rights claim.

In addition to this legal obligation, the NPS has identified other purposes for this undertaking. The proposed action would increase public safety by barricading potentially hazardous underground openings, facilitate safe cleaning, maintenance, and security of the water works, secure the underground water collection area from contamination, enhance the long term stability and sustainability of the spring, remove invasive plants from the spring area, and increase water storage capabilities for fire suppression and contemporary and future resident and visitor usage at Ryan.

This action is needed because:

- The current water storage tank is failing due to corrosion around the inlet and base of the tank (Figure 2).
- The current tank, at 10,800 gallons capacity, is undersized for present and future resident and visitor use and effective fire protection at Ryan as informed by the project proponent (W. Adams, pers. comm.).
- The surface HDPE pipeline is exposed to extreme heat and cold and can vapor-lock in the summer and freeze in the winter preventing the flow of water. It also creates a visual impact which is inconsistent with visitor experience, the natural landscape, and the historic cultural landscape.
- The upper and lower adits at Navel Spring are poorly secured and unstable. The upper adit is collapsing underground and may be weakening the stability of the cliff immediately above the portal. Its wire rope netting closure is insufficient to deter public and wildlife access into the opening. The lower adit, where water collection occurs, is subject to contamination. Its steel door is in poor condition and the ground above the door has eroded sufficiently to produce a gap of several inches allowing wildlife to enter and potentially contaminate the water collection area (Figure 3). In addition, periodic flash flooding washes external water and debris into the adit, also causing potential contamination. The floor of the adit contains several inches of material washed into the opening by flash flooding and from erosion of areas within the adit and needs to be cleaned out to its original grade.
- Invasive date palm stumps, at the level of the upper adit, have the potential to re-grow and detract from a natural spring ecosystem (Figure 4).

Figure 2. Water tank corrosion and leakage.

Figure 3. The lower adit at Navel Spring where water is collected.

Figure 4. Invasive date palm stumps at the level of the upper adit.

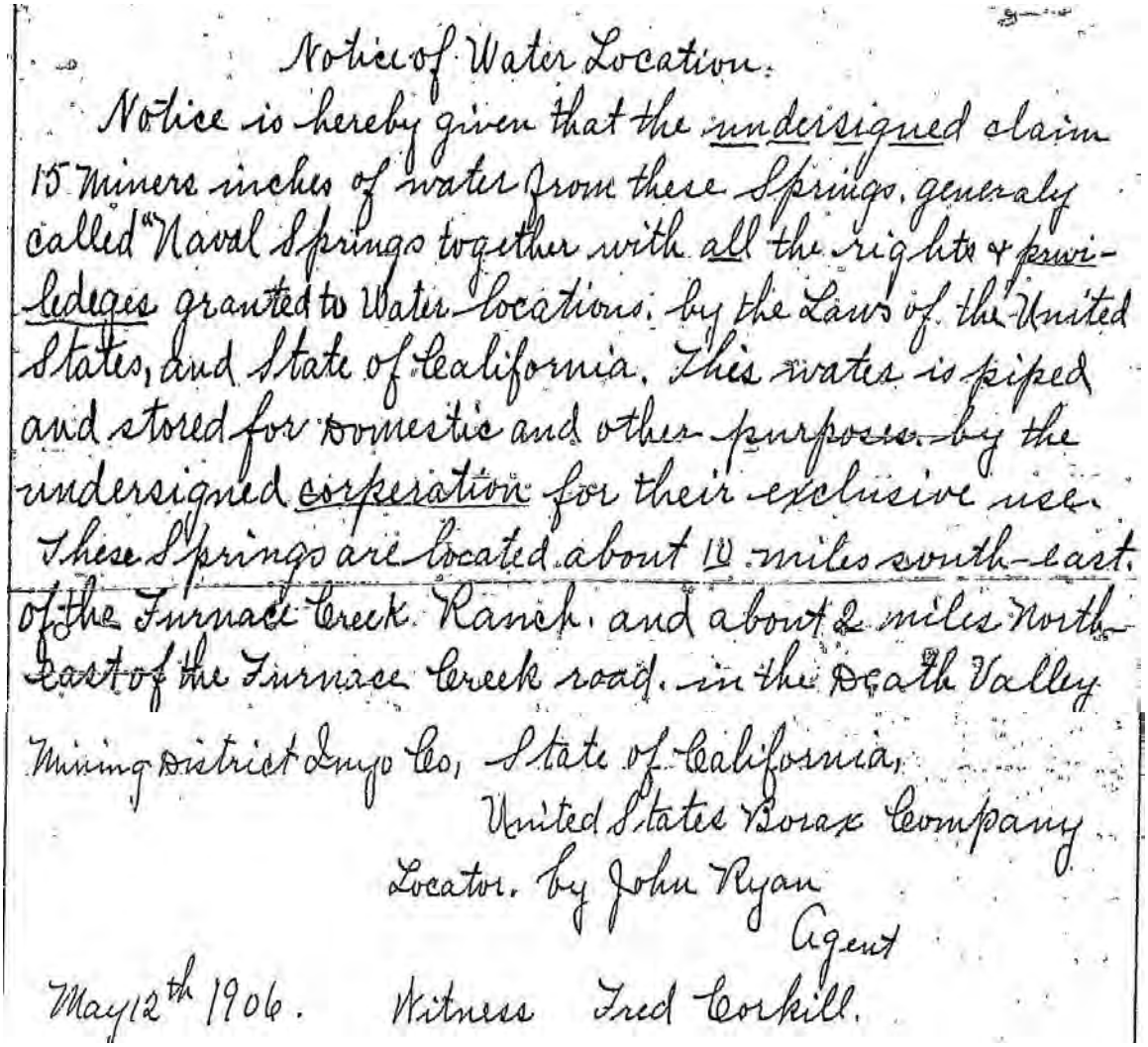
PROJECT BACKGROUND

Navel Spring and Ryan

Water collection and conveyance at Navel Spring by U.S. Borax (now a subsidiary of Rio Tinto) has occurred for over one hundred years. On May 12, 1906, John Ryan, representing U.S. Borax, filed a notice of water location for Naval Springs (Figure 5). The water location notice specifies that "these springs are located about 10 miles Southeast of the Furnace Creek Ranch, and about 2 miles Northeast of the Furnace Creek road, in the Death Valley Mining District…" (Inyo County Records Land and Water Claims, Book A, page 497). The location notice also mentions that "this water is piped and stored for domestic and other purposes, by the undersigned corporation[, United States Borax Company,] for their exclusive use," suggesting that the pipeline and water storage tank were in place before the location notice was filed (Inyo County Records, Land and Water Claims, Book A, page 497). The spring was likely at least partially developed as early as 1905 according to a map showing Navel Spring with a well-defined access road connecting it to the Furnace Creek Wash road (Figure 6)(Bailey 1905).

There is some confusion as to whether the springs were called "Naval" or "Navel". The water location notice refers to the springs as Naval Springs, whereas U.S.G.S. maps and the map distributed by the L.A. Chamber of Commerce, marks the springs as simply Navel, or Navel Spring. Theodore Palmer's (1952:53) *Chronology and Names of the Death Valley Region in California, 1849-1949* lists the origin of Navel Spring as "so named from its location in the face

of a bank from which it issues." He cites Wheat (1939a) as a reference but remarks it was "misspelled Naval Springs." Navel Spring does resemble a navel, or belly-button, so it could be that the misspellings of the U.S. Borax Company are responsible for the name confusion. It is likely this issue will never be resolved; however for the purposes of this EA, Navel Spring, the name used by the U.S.G.S., is the preferred moniker.



Notice of Water Location.

Notice is hereby given that the undersigned claim 15 Miners inches of water from these Springs, generaly called "Naval Springs together with all the rights & privi-ledges granted to Water locations by the Laws of the United States, and State of California. This water is piped and stored for domestic and other purposes by the undersigned corperation for their exclusive use. These Springs are located about 10 miles south-east of the Furnace Creek Ranch, and about 2 miles North-East of the Furnace Creek road, in the Death Valley Mining district Inyo Co, State of California.

United States Borax Company
Locator. by John Ryan
Agent

May 12th 1906. Witness Fred Corkill.

Figure 5. Naval Springs notice of water location
(Inyo County Records, Land and Water Claims, Book A, page 497).

Figure 6. Navel Spring with access road on 1905 map (Bailey 1905).

An early U.S.G.S. topographic map surveyed in 1905-1906 depicts Navel Spring's modern water collection configuration with a collection works at the spring being fed to a storage tank in the wash by a buried pipeline (Figure 7). This map from 1910, reprinted in 1947, is interesting mix of old and new in that it shows the boundary of Death Valley National Monument (post-1933) and also refers to Ryan as Devair, a name not used since 1914.

During these early years, initial water collection likely supplied water to the local assessment camps of U.S. Borax, since the company held numerous borax claims in the area. In 1913, U.S. Borax began to focus more intently on several of these claims, called the Hillside Group, and created the camp of Ryan as a base of operations for mining in the area. The Hillside Group mines were connected to Ryan via a 24-inch-gauge railroad, called the Baby Gauge; Ryan was in turn connected to the processing center at Death Valley Junction and the Tonopah and Tidewater Railroad by a 20 mile long 36-inch-gauge railroad, the Death Valley Railroad. Based on insurance documents, by September of 1915, Ryan contained 29 insured buildings: 26 dwellings (classed as cottages, cabins, and dwellings), a boarding house with a dining hall and

kitchen, a store, and a lighting plant (Ringhoff 2012:110) (Figure 8). These buildings are in addition to ore bins, water storage structures, a corral, and miscellaneous outbuildings.

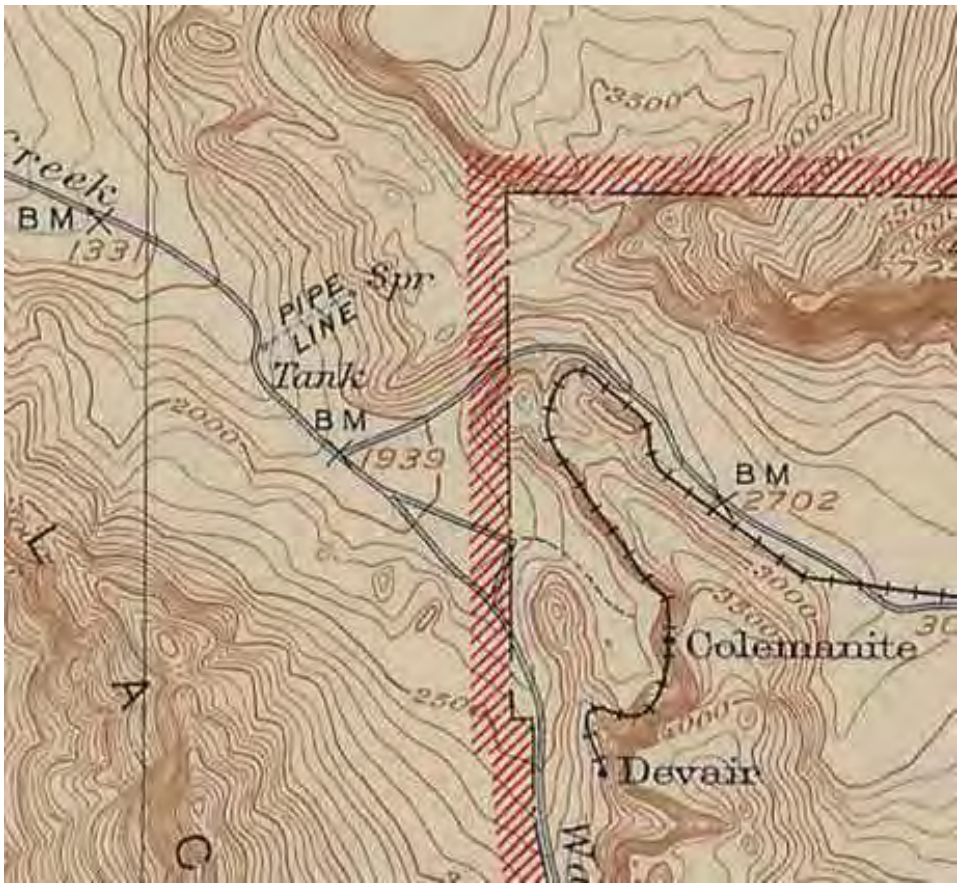


Figure 7. A 1910 topographic map showing Navel Spring, the buried pipeline, and the tank (*Topographic Map of the Furnace Creek Quadrangle, Nevada and California, Scale: 1:250,000*. [U.S. Geological Survey 1910])

Ryan contains no incipient source for water; during the early years before the Death Valley Railroad was constructed, Navel Spring provided the nascent mining camp with water. After the building of the railroad connecting Ryan and Death Valley Junction, U.S. Borax accommodated all of Ryan's water needs by way of the railroad even though Navel Spring was only four miles distant. This is likely because Navel Spring's low discharge rate was not sufficient for full scale mining. However, U.S. Borax company documents indicate that it was always the company's intent to develop the spring for use at Ryan (Faulkner 1919).

The 1920s were a period of much growth and activity at Ryan and its vicinity. Much of the camp underwent restructuring with the addition of two large miners' bunkhouses, a school house, a recreation hall, and state-of-the-art management living quarters. The increase in construction activity likely amplified traffic in the Furnace Creek Wash, perhaps furnishing a need for two tanks at Navel Spring: a large one (30,000-35,000 gallon capacity) for collecting and storing

water for use by U.S. Borax in the area at mines like the Corkscrew, and a much smaller, possibly open, trough for individuals to access water at the site.

Figure 8. Overview of Ryan, looking west from the Upper Biddy mine, 1920. Courtesy National Park Service, Death Valley National Park; DV-RYA 07.

In 1927, U.S. Borax shifted its focus from Ryan and the Hillside group to the Kramer deposit at Boron. By then, the Borax company had extracted over $30 million worth of borates from its mines at old and new Ryan, making it by far the biggest and most profitable mining venture in the Death Valley and Amargosa country (Lingenfelter 1986:396). Seeing the rise in Death Valley tourism, U.S. Borax seized the opportunity to use Ryan for tourist accommodations and remodeled the camp into the Death Valley View Hotel (Figure 9). Unfortunately, the Death Valley Railroad was discontinued with the move and the source for water evaporated.

From about 1930 on, Ryan became solely dependent on water from Navel Spring for fire protection and domestic purposes. Harry Gower, whose wife Pauline operated the Death Valley View Hotel, writes (Gower 1946;1-2):

> There is no water at Ryan. Upon the removal of the rails in 1930 a tank and electric pumping station were installed at the foot of the Ryan hill and to this point water is trucked from [Navel Spring] and thence pumped to the 30,000

gallon concrete storage tank above the camp. A 1200 gallon Ford tank truck is provided and a 3 inch main from the storage tank distributes the water for fire protection or domestic use.

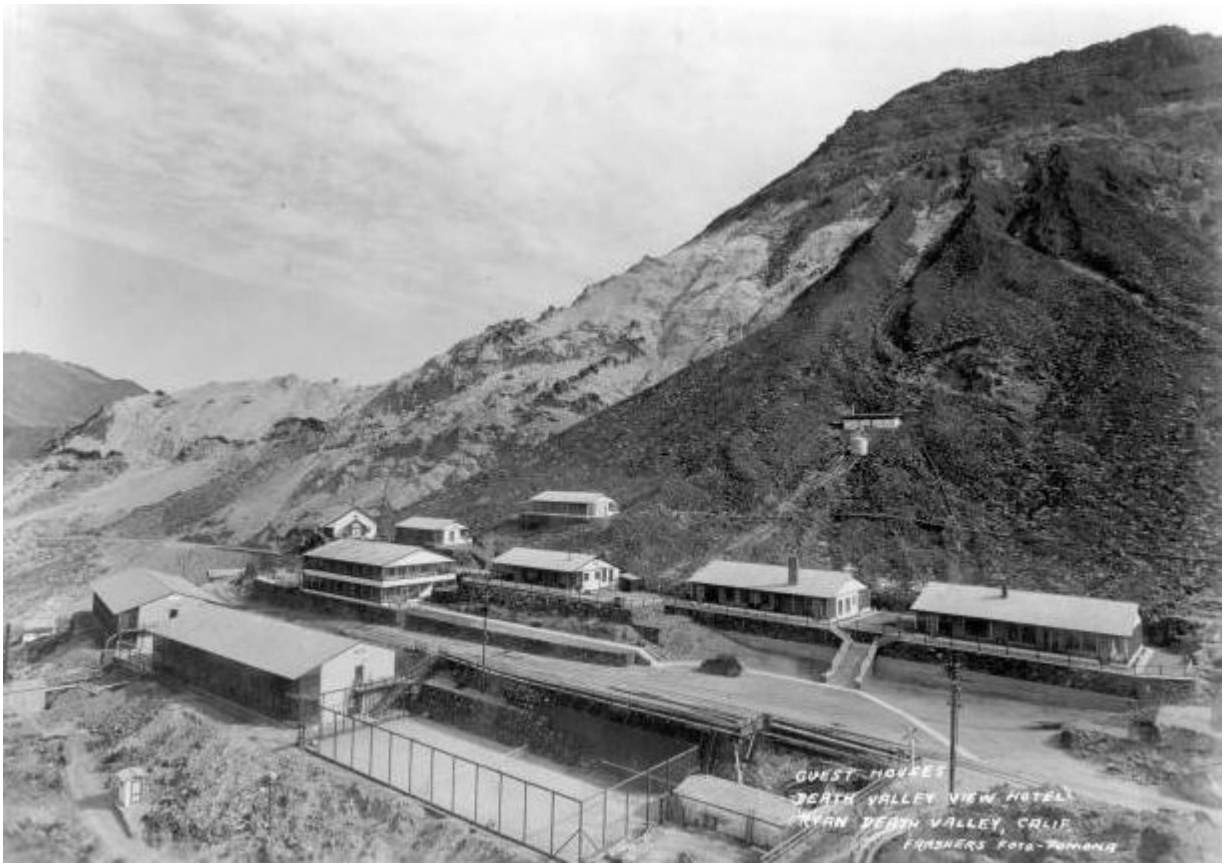


Figure 9. Ryan as the Death Valley View Hotel, 1930.
Photo by Frashers Fotos, Courtesy of the Death Valley Conservancy.

The Death Valley View Hotel operated on a limited basis until 1950. U.S. Borax eventually placed Ryan on "care and maintenance" status and employed several individuals as caretakers of the Ryan property over the years. Fortunately, the Ryan caretakers' logs from 1954 to 1973 survive, providing invaluable insight into the daily lives of the caretakers. Based on these logs, caretakers' duties ranged from camp maintenance, security, hosting school groups, mining at local mines such as the Corkscrew and Gerstley, and mining claim assessment work to hauling water and maintaining the Navel Spring water works. Occasionally, U.S. Borax hired locals to assist in caretaking duties. Although outside of the purview of the caretaker logs, a Timbisha Shoshone elder remembers her father driving the water truck (likely in the 1930s) and the thrill of rapidly coasting down the hill at Ryan Camp in the large truck. Robert "Bobby" Shoshone, a local Timbisha man, was employed by U.S. Borax as a mechanic and water hauler off-and-on from 1958 until his death in 1962. Other Timbisha working for the company during this time period include Charley Shoshone and Raymond "Roy" Kennedy.

The Ryan caretakers' logs provide much insight into the development of Navel Spring in the 1950s-1970s. According to the logs, extensive tunneling occurred at the spring in 1958 by three U.S. Borax employees, Augusto Garcia, Bob Fordham, and Earl Ganby. At one point, the miners had a slusher, compressor, track, ore cars, and timber at the spring. The best guess is that they were focusing their efforts on extending the lower adit. It also appears that the pipeline was replaced at this time, at least in part. This work, performed in the summer and fall, was noted by NPS contractors conducting bighorn sheep surveys (Welles and Welles 1961:182):

> August 27, 1958. It was 119° yesterday. In the morning we went to see how much work has been done since yesterday. Navel Spring will never look the same. Some of the mesquites have been bulldozed out and the floor of the little canyon entrance to the spring has been cleared and leveled. Work not completed, evidently. Timbers for shoring piled around…
>
> …The two-car-wide newly graded road, visible from Highway 190, is an open invitation for anyone to drive up to Navel Spring, to camp beside the water, or to wait at the water to try to force the sheep to come close enough for photography.

The researchers go on to lament that "no record of continued bilateral utilization of spring areas by man and bighorn" exists in Death Valley; fortunately, they were wrong as a healthy population of sheep regularly use Navel Spring to this day.

In 1969, Ryan caretakers, Lyn Moore and Bill Thurman, again worked extensively on the spring, and again likely focused on the lower adit. At this time, the men removed old timbers and some rail from the adit and worked on the water collection system. The miners either used rail already installed for muck removal or installed new rail for this purpose.

In the years between the major development work at Navel Spring, it needed constant maintenance. The spring is located in an alluvial channel and is perpetually subject to flash-flooding. In addition, the old pipeline suffered from leaks and blockages and was often repaired piecemeal. After 1970, no more spring development (tunneling) occurred, however other elements of the water collection system were modified. Jeff Moore, Ryan caretaker from the 1970s-2000s, added a steel door to the lower adit and blocked the upper adit with old mine timbers (J. Moore, personal communication). He also changed the intake pipe inside the lower adit. After several incidents of vandalism and the theft of an ore car from the lower adit, in 1983 with the approval of the NPS, Moore installed a gate on the Navel Spring access road near the tank. NPS personnel installed safety netting on the upper adit in the 1990s. A 10,800 gallon storage tank replaced the historic 30,000-35,000 gallon tank when it failed in 1996.

Rio Tinto and the Death Valley Conservancy

Due in large part to the efforts of Ryan caretakers, Ryan appears today much as it did in 1930 (Figure 10). Its significance as one of the best producing historic borax mining districts in the United States, in combination with its intact historic architecture and archeological deposits

renders it eligible for the National Register of Historic Places. In 2009, Ryan became a Rio Tinto legacy property, or a property that is no longer actively producing a product and for which there are environmental liabilities remaining after operations have ceased. In 2010, after much thought and consideration on the best means to preserve Ryan, Rio Tinto decided to donate Ryan and its water source, Navel Spring, to the non-profit group the Death Valley Conservancy (DVC). In early April 2013, Rio Tinto completed its donation of Ryan to the DVC; the pre-1914 appropriative water rights claim to Navel Spring is expected to be transferred at the completion of this project, should the project be permitted by the National Park Service.

Figure 10. Ryan, 2012.

Established in 2008, the DVC's general mission is (1) to preserve, restore, and enhance the natural beauty and features, the ecological systems, and the cultural and historic heritage of Death Valley National Park and its associated environs and resources; (2) to enhance the educational, interpretive, historical, research, and experimental opportunities relating to Death Valley National Park, in efforts to increase public awareness, enjoyment and appreciation of the Park and its associated environs as well as their collective cultural heritage; and (3) to support the efforts of the NPS and other organizations and individuals in furtherance thereof. The DVC created the Death Valley Fund, specifically aimed at supporting NPS projects with little or no funding.

The DVC has stated its commitment to the long-term preservation, restoration, and protection of Ryan Camp. Its stated approach to the Ryan Camp project is "preserve what is left and restore where possible," with the goal of sensitively developing the site to support education and research while balancing that use with preserving historic and archeological resources to

convey to contemporary visitors the sense of another time and place in the history of Death Valley. The DVC's stated long-term goal for Ryan is for it to function as a living laboratory, supporting scientific research and education in historic preservation, archeology, history, and the biological and physical sciences. All stabilization, restoration, and other construction activities are expected to occur under the auspices of the Secretary of the Interior's *Standards for the Treatment of Historic Properties*, *Standards and Guidelines for Archaeology and Historic Preservation,* and *Guidelines for the Treatment of Cultural Landscapes*; each construction project is anticipated to occur with due consideration for the integrity of historic buildings, structures, and features. General public access and education are expected to be supported via special events, periodic guided tours, publications, and interpretive displays.

As a means to further enable Ryan Camp's preservation and protection, the DVC will nominate the Ryan historic district to the National Register of Historic Places. Due to its profuse and widely distributed historical documentation, numerous quantity of contributing elements such as buildings, structures, and features (including Navel Spring), and the detail required by the California State Historic Preservation Office to nominate a historic property to the National Register, the nomination process will be a lengthy one.

Although Ryan is not a part of Death Valley National Park, its preservation and restoration would be a benefit to the park, as it is expected the preservation of Ryan would further education and knowledge about the history, archeology, geology, biology, and other factors of Death Valley National Park's unique landscape. NPS Management Policies underscore the importance of original scientific research within NPS units. The DVC—by providing support for scientists working in Death Valley in the form of housing and other research support—could assist Death Valley National Park in this regard.

Previous Planning

In December 2011, Ryan personnel met with Death Valley National Park's interdisciplinary team at Navel Spring to discuss the objectives and details of the Navel Spring Water System Repair and Maintenance Project. The NPS interdisciplinary team determined that an Environmental Assessment was the appropriate NEPA pathway to assess the project's potential impacts on natural and cultural resources.

Scoping

Scoping is an effort to involve agencies and the general public in the determination of issues to be given detailed analysis and to eliminate issues not requiring detailed analysis in the EA. Scoping seeks to obtain early input from agencies with jurisdiction by law or expertise, such as U.S Fish and Wildlife Service, and the interested general public. A press release initiating scoping and describing the proposed action was issued on April 18, 2012 (Appendix A), and public comments were solicited during a public scoping period that ended May 18, 2012.

In addition to two agency comments, fifteen public comments were received. The most prevalent concern was the proposal for increasing the size of the tank and its visual impact on the surrounding natural landscape. Another comment involved the importance of area wildlife continuing to have access to water at the spring. Additional concerns stem from misconceptions of the project: that an increase tank size would mean an increase in water diversion (the water diversion rate would remain at 1-2 gallons per minute, which is the rate of the spring flow and below the rate specified in the pre-1914 water rights claim); that the project would be funded by the National Park Service, and hence the public (Rio Tinto would be funding the project); and that public access to Navel Spring would change (public access would remain the same under the proposed action). This EA will address the concerns in greater detail in its alternatives, affected environment, and environmental consequences sections.

In addition to concerns, several positive comments reflected the vital role that water from Navel Spring plays in the continued preservation of the historically significant, and National Register eligible district of Ryan. Although Ryan is not within the boundary of Death Valley National Park, it remains a contributing element of the Park's historical significance. One commentator commended the working relationship between the NPS, Rio Tinto, and the DVC in acting as stewards of Navel Spring and cooperating to balance the water needs of Ryan with the maintenance of a desert spring habitat. Another commentator argued that the Navel Spring water supply system has been in place for over one hundred years, and is now a permanent fixture of the natural landscape. All commentators who mentioned the invasive date palms agreed that their removal would be beneficial to the spring.

Agencies and the general public have an opportunity to review and comment on this EA. For agency scoping comments, see the "Consultation and Coordination" section of this document.

ISSUES AND IMPACT TOPICS

Issues

According to Section 2 of NEPA [42 USC § 4321], the purposes of the Act are:

> To declare a national policy which will encourage productive and enjoyable harmony between [humans] and their environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of [humans]; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality.

In addition, Section 102 (42 USC § 4332) requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic interdisciplinary approach. The interdisciplinary approach insures that all of a project's potential impacts to the human environment are addressed before the project can proceed. Federal agencies are also required to weigh the adverse effects of different project alternatives within a milieu of delineated project issues and impact topics. Issues and concerns affecting this proposed action were identified from past NPS planning efforts, agency and public input from the scoping process, and topics listed in 40 CFR 1502.16 and 40 CFR 1508.27.

Derivation of Impact Topics

Impact topics relevant to the present project were determined based on federal law, regulations, executive orders, NPS *Management Policies 2006*, and NPS knowledge of special or vulnerable resources. An impact topic is measurable means by which to evaluate an issue of concern. For example, one issue that surfaced for the present project is "would bighorn sheep have access to water should this project be approved and implemented?" This question or issue will be addressed in the impact topic of "special-status species," where the effects of the proposed action on bighorn sheep will be analyzed.

IMPACT TOPICS SELECTED FOR DETAILED ANALYSIS

For this environmental assessment, impact topics determined as needing detailed analysis are listed below. Please refer to their individual sections in the "Environmental Consequences" chapter of the EA for a more detailed discussion.

Geology, Soils, and Geologic Hazards
Vegetation
Wildlife
Special-Status Species
Wetland Habitat
Archeological Resources
Historic Districts
Cultural Landscapes
Ethnographic Resources
Health and Safety
Visitor Use and Experience
Scenic Resources
Adjacent Landowners and Land Uses

IMPACT TOPICS DISMISSED FROM DETAILED ANALYSIS

Impact topics are dismissed from further evaluation in this EA if:

- they do not exist in the analysis area
- they would not be affected by the proposal, or the likelihood of impacts is not reasonably expected

Designated Critical Habitat, Ecologically Critical Areas, Wild and Scenic Rivers, Other Unique Natural Areas

No areas within the project corridor are designated as critical habitat or ecologically critical (NPS 2002a), nor are there any existing or potential wild and scenic rivers within the project area, or receiving runoff from the project site. Death Valley is an important natural area, but the proposed action would not threaten the associated qualities and resources that make the park unique. Therefore, these topics were dismissed from detailed analysis in this environmental assessment.

Air Quality

The 1963 Clean Air Act (CAA), as amended (42 USC 7401 et seq.), requires land managers to protect air quality. Section 118 of the CAA requires parks to meet all federal, state, and local air pollution standards. In addition, Section 176(c) requires all federal activities and projects to conform to state air quality implementation plans to attain and maintain national ambient air quality standards. NPS *Management Policies 2006* (Section 4.7.1) addresses the need to analyze potential impacts to air quality during park planning.

The project area is in the Great Basin Unified Air Pollution Control District, as established by the State of California. This district is classified as a California state nonattainment area for particulate matter (fine dust) less than 10 microns in diameter. The general trend in upper air movement carries pollutants to the park from metropolitan areas, industrial areas, and transportation corridors to the west. In the summer, surface winds flow from the southwest, where sources that contribute to air pollution in the park include major population centers, industrial areas, and a dry lakebed. In winter, surface winds flow from the northeast. Because northeast winds comprise an air mass that originates in less developed areas, the air quality of the park is generally better in the winter (NPS 2003).

The proposed project's effect on local air quality would not rise to a level considered for analysis in the context of the overall airshed as it would include only small quantities of fugitive dust and

construction vehicle emissions on a temporary basis. The activities during the construction period would result in both increased vehicle exhaust emissions (hydrocarbons, oxides of nitrogen, and sulfur dioxide emissions), which would be expected to rapidly dissipate, and fugitive dust plumes, which would be minimized by road and construction area watering. These effects would last only as long as construction occurred; impacts would be negligible and short term. Therefore, air quality was dismissed from detailed analysis in this environmental assessment.

Water Quality

The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, is a national policy to restore and maintain the chemical, physical, and biological integrity of U.S. waters; to enhance the quality of water resources; and to prevent, control, and abate water pollution. NPS *Management Policies 2006* provides direction for the preservation, use, and quality of water in National Park system units. While Navel Spring is located in the National Park system, its water is claimed and used by a private entity outside of the National Park system from before the area became a National Monument. Since Navel Spring is not technically a component of U.S. waters, water quality was dismissed from detailed analysis in the EA; instead, water quality is addressed in this document under the impact topic of health and safety.

Prime and Unique Farmlands

In 1980, the Council on Environmental Quality directed federal agencies to assess the effects of proposed actions on farmland soils classified as prime or unique by the U.S. Department of Agriculture, Natural Resources Conservation Service. Prime farmlands are defined as containing soil, which produces general crops including common foods, forage, fiber, and oil seed; unique farmland produces specialty crops including fruits, vegetables, and nuts. There are no areas or soils where unique crops are produced near Navel Spring; therefore, the topic of prime and unique farmlands was dismissed from detailed analysis in this environmental assessment.

Park Operations

Effects of the proposed action on park operations would be negligible; increased staff or additional equipment would not be required, nor would additional maintenance activities occur. All proposed construction activities would be performed by non-park employees; however, the NPS may employ a site monitor for the duration of the construction activity. Because there would not be impacts to park operations from any of the alternatives, park operations were dismissed from detailed analysis in this environmental assessment.

Environmental Justice

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-income Populations," requires all agency missions to incorporate environmental justice by identifying and addressing disproportionately high and adverse human health or environmental effects of agency programs and policies on minorities and low-income populations or communities. The proposed project would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's *Draft Environmental Justice Guidance* (July 1996). Therefore, environmental justice was dismissed from detailed analysis in this environmental assessment.

Floodplains

Executive Order 11988, "Floodplain Management," was issued "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." The order requires Federal agencies to provide leadership and take action to: 1) Reduce the risk of flood loss; 2) Minimize the impact of floods on human safety, health and welfare; and 3) Restore and preserve the natural and beneficial values served by floodplains. Because of the skeletonized hill geologic structure of Death Valley, nearly all areas within the park are susceptible to flooding during rain events. However, none of the considered alternatives would impact floodplain function. Additionally, the proposed project area is not a public road and there is no maintenance of any infrastructure in a floodplain that would put public safety, health, or welfare at risk. Therefore, floodplains were dismissed as an impact topic in this environmental assessment.

Museum Objects

Museum collections include historic artifacts, associated records and archives, natural specimens, and archival and manuscript material contained in collections and held by the Park in designated storage or display areas. They may be threatened by fire, vandalism, natural disasters, and careless acts. The preservation of museum collections is an ongoing process of preventive conservation, supplemented by conservation treatment when necessary. The primary goal is preservation of artifacts in as stable condition as possible to prevent damage and minimize deterioration. The proposed project at Navel Spring would not impact designated storage or display areas for museum objects of Death Valley National Park; therefore, museum objects were dismissed from detailed analysis in this environmental assessment.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian Trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian Trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. There are no Indian Trust resources in the project area. Therefore, Indian Trust resources were dismissed from detailed analysis in this environmental assessment.

Soundscapes

In accordance with NPS *Management Policies 2006* (Section 4.9) and *Director's Order 47*: *Sound Preservation and Noise Management*, an important part of the NPS mission is preservation of natural soundscapes associated with national park system units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in national park system units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequency, magnitude, and duration of human-caused sound considered acceptable varies among national park system units, as well as potentially throughout Death Valley National Park; being generally greater in developed areas and less in undeveloped areas. In the project area, noise associated with construction activities would be short term and localized. Since the project area occurs along SR 190, a highly traveled route through Death Valley, traffic noise already exists and the project would not adversely impact visitor use and experience. Consideration of noise impacts on wildlife and species of special concern are addressed under those impact topics. Thus, impacts to soundscapes was dismissed from detailed analysis in this environmental assessment.

Lightscapes and Night Skies

In accordance with NPS *Management Policies 2006* (Section 4.10), the NPS strives to preserve natural ambient lightscapes, which are natural resources and values that exist in the absence of human-caused light. Any construction activities would occur during daylight hours and the proposed project would not include the installation of artificial lighting. The effects of the proposed project or its alternatives to lightscapes and night skies would be negligible; therefore, lightscapes and night skies were dismissed from detailed analysis in this environmental assessment.

Climate Change

Global climate change threatens the integrity of national parks. It challenges the NPS mission to leave park resources unimpaired for future generations. In response to this threat, the NPS developed the NPS Climate Change Response Strategy to provide direction to NPS staff to address the impacts of climate change (NPS 2010a). The strategy establishes goals to meet the climate change challenge, and directs the National Park Service toward energy-efficient and sustainable practices to reduce the carbon footprint of the NPS (the amount of greenhouse gases emitted through NPS activities) and integrate these practices into planning and operations. The park has developed an action plan that identifies steps that Death Valley National Park staff can undertake to reduce greenhouse gas emissions. The plan provides goals to reduce greenhouse gas emissions and provides a framework to meet these goals (NPS 2010b).

While the Navel Spring Water System Repair and Maintenance Project is not NPS-sponsored, Rio Tinto and the Death Valley Conservancy are also dedicated to sustainable practices aimed at reducing their carbon footprints. Both entities view water as an extremely precious resource and are committed to water conservation and the practice of responsible water use. The proposed project would incorporate sustainable practices—water system maintenance and associated equipment operation would be reduced and new mesquite trees would be planted in front of the water storage tank replacement. As an effort to further increase the efficiency of the water system as a whole and reduce carbon emissions, the DVC will purchase a new, larger capacity water truck that will reduce the amount of trips needed to meet Ryan's water requirements, thereby reducing vehicle emissions over the long term. Adverse impacts from construction equipment emissions would be temporary and would not measurably contribute to global climate change. Climate change is not expected to significantly impact the regional groundwater resources that contribute to the Navel Spring surface expression. Because effects to climate change would be negligible under any alternative and would not result in any unacceptable impacts, climate change was dismissed from detailed analysis in this environmental assessment.

Paleontological Resources

According to the NPS *Management Policies 2006* (Section 4.8.2.1), paleontological resources, including both organic and mineralized remains in body or trace form, will be protected, preserved, and managed for public education, interpretation, and scientific research. In addition, the NPS will study and manage paleontological resources in their paleoecological context (that is, in terms of the geologic data associated with a particular fossil that provides information about the ancient environment).

The Funeral Mountains are composed partly of Paleozoic formations containing gastropods, ammonites, corals, and trace fossils indicating a time 360 to 320 million years ago when Death

Valley was in a marine environment. A few fossils have eroded out of their depositional context and have been carried by water to the Navel Spring area. Since the fossils are scarce and removed from their paleoecological context, they would be impacted very little by any of the alternatives. Thus, paleontological resources were dismissed from detailed analysis in this EA.

ALTERNATIVES

INTRODUCTION

The alternatives section describes two management alternatives for the Navel Spring water system: Alternative A, the no-action alternative, and Alternative B, the proposed action alternative. Alternatives for this project were specifically developed to resolve the deteriorating elements of the system while protecting the unique natural and cultural resources in the area. Refer to Table 1 for a comparison of the alternatives.

The no-action alternative describes the action of retaining existing water system components and conditions and continuing the present water system management. This alternative provides a basis for comparing the management direction and environmental consequences of the preferred alternative. Should the no-action alternative be selected, Rio Tinto and later the Death Valley Conservancy would respond to future water system maintenance needs and conditions on a piecemeal basis (e.g. pipe leaks and flash flooding damage) and no proactive measures would be taken to address long-term cumulative deterioration, such as portal caving and adit collapse.

The proposed action alternative presents Rio Tinto's proposed action of maintenance, repair, and stabilization of the water system at the spring, the burial of the pipeline, and the replacement of the water storage tank, and defines the rationale for the action in terms of water system efficiency, protection, and management, resource preservation, costs, and other applicable factors. The environmentally preferred alternative and alternatives considered and dismissed from detailed analysis completes this section.

Alternative A: No-Action Alternative	Alternative B: Proposed Action Alternative
There would be no planned improvements to the Navel Spring water system. Ryan personnel would respond to water system deterioration and failures on a case-by-case basis. The badly corroded water tank would be patched as leaks occur and pipeline malfunctions would not be addressed, except on an emergency basis. At the spring, the water collection system would continue to require periodic cleaning and inspection. At the lower adit, Ryan personnel would continue to manually excavate and remove newly deposited gravels after flash flood events. In addition, personnel would maintain a trench in front of the lower adit in effort to prevent surface waters from entering and contaminating the underground collection area. The collection sump would be periodically cleaned of mud and debris. Chicken wire or other patching would be added to the space between the steel door and the sides of the adit as the ground continues to erode. The upper adit would be periodically monitored for on-going ground failures and potentially adverse effects to the lower adit. The date palm stumps would remain in place.	At Navel Spring, the water system would be repaired and improved. The unstable upper adit would be stabilized with pervious cellular concrete and sealed. The lower adit would be cleaned out to its original grade, stabilized, and a steel and concrete door frame structure and a new door would be placed slightly inside the portal. The area immediately in front of the lower adit would be excavated to its original grade. The date palm stumps at the level of the upper adit would be removed. The pipeline would be replaced and buried from the narrows of Navel Spring canyon down the centerline of the Navel Spring access road (a length of 0.9 miles) to the water storage tank. The old HDPE pipeline would be removed. The water tank would be replaced with a 33,788 gallon capacity steel bolted tank. It would be placed slightly east of the existing tank in a disturbed area on a concrete foundation, as per contemporary building codes. Mesquite trees would be planted in front of the tank, watered by tank overflow. Dogs would be prohibited from the Navel Spring access road beyond the gate and at Navel Spring.

Table 1. A comparison of the no-action and proposed action alternative.

ALTERNATIVE A: NO-ACTION ALTERNATIVE

The no-action alternative describes the continuation of current Navel Spring water system conditions and repair procedures. The alternative, in that it includes no change to the current system, can act as a basis for comparison for the preferred alternative. Current spring conditions as well as existing maintenance practices are summarized below.

Current Conditions

U.S. Borax first developed Navel Spring in 1906. The current configuration of the Navel Spring water system, with the exception of the reduced tank size, is unchanged from that first development. A portion of the water at the spring is collected and diverted; this water flows by gravity through a pipeline to a 10,800 gallon tank in Furnace Creek Wash approximately 0.8 miles west of the spring. From the storage tank, the water is trucked about four miles southeast to Ryan Camp for fire protection, domestic purposes, and drinking (after on-site treatment). Thus, the Navel Spring water system is comprised of three main elements: the spring and water collection works, the pipeline for water conveyance, and the water storage tank (Figure 11).

Navel Spring itself is comprised of a number of seeps in a moderately consolidated conglomerate, located both inside two short adits driven to collect water and on the surface in the surrounding area. The two adits are parallel, driven almost due east, and the upper (probably the older) is about 10 to 20 ft vertically above the lower. In addition, the portal for the upper adit is about 70 ft further east from that of the lower. Figure 12 shows the current configuration of the lower adit portal. Figure 13 shows the current configuration of the upper adit portal. Several invasive date palms (*Phoenix dactylifera*) were removed by the NPS as a part of routine resource management in early 2013; however the palm stumps remain. Two non-historic mortared rock wildlife guzzlers (circa 1969) are present near the palm stumps (Figure 14).

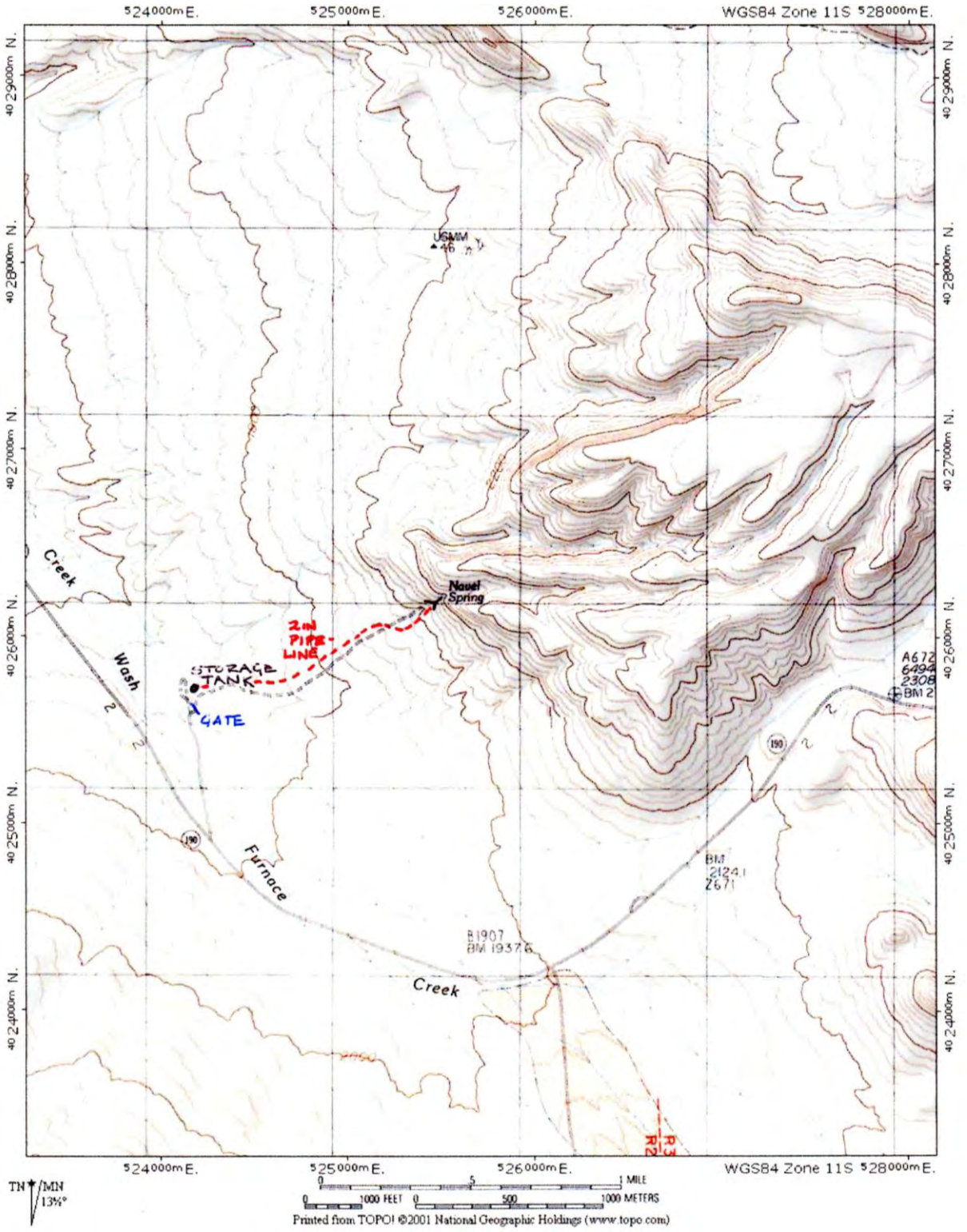


Figure 11. Navel Spring water system configuration (adapted from Echo Canyon and Ryan, CA, USGS 7.5’ Series topographic maps).

Figure 12. Lower workings at Navel Spring. View: 74° Date: 4/26/2012.

Figure 13. Upper adit at Navel Spring. View 295°.

Figure 14. One of two rock and mortar guzzlers and invasive date palms (before removal). View: 280°.

Figure 15 is a sketch of a section along the centerline of the adits showing the assumed spatial orientation of the workings. Unfortunately, there is no known information available on the original configuration of the upper adit or lower adit beyond the caved material about 70 ft in from the portal. Inspection inside the lower adit indicates that much of the water currently produced flows from the toe (base) of the aforementioned caved material.

The water collected from inside the lower adit near the portal flows by gravity through a 2 in. HDPE pipe laid mostly on the surface to an existing 10,800 gallon bolted steel tank 0.8 mile west of the spring (Figure 16). The Ryan water truck is loaded via a fill pipe connected to the storage tank. The Navel Spring access road is maintained by Ryan personnel and allows vehicular access to the water tank, the power lines, and the spring from SR 190 by Ryan personnel, NPS staff, Southern California Edison, and members of the Timbisha Tribe.

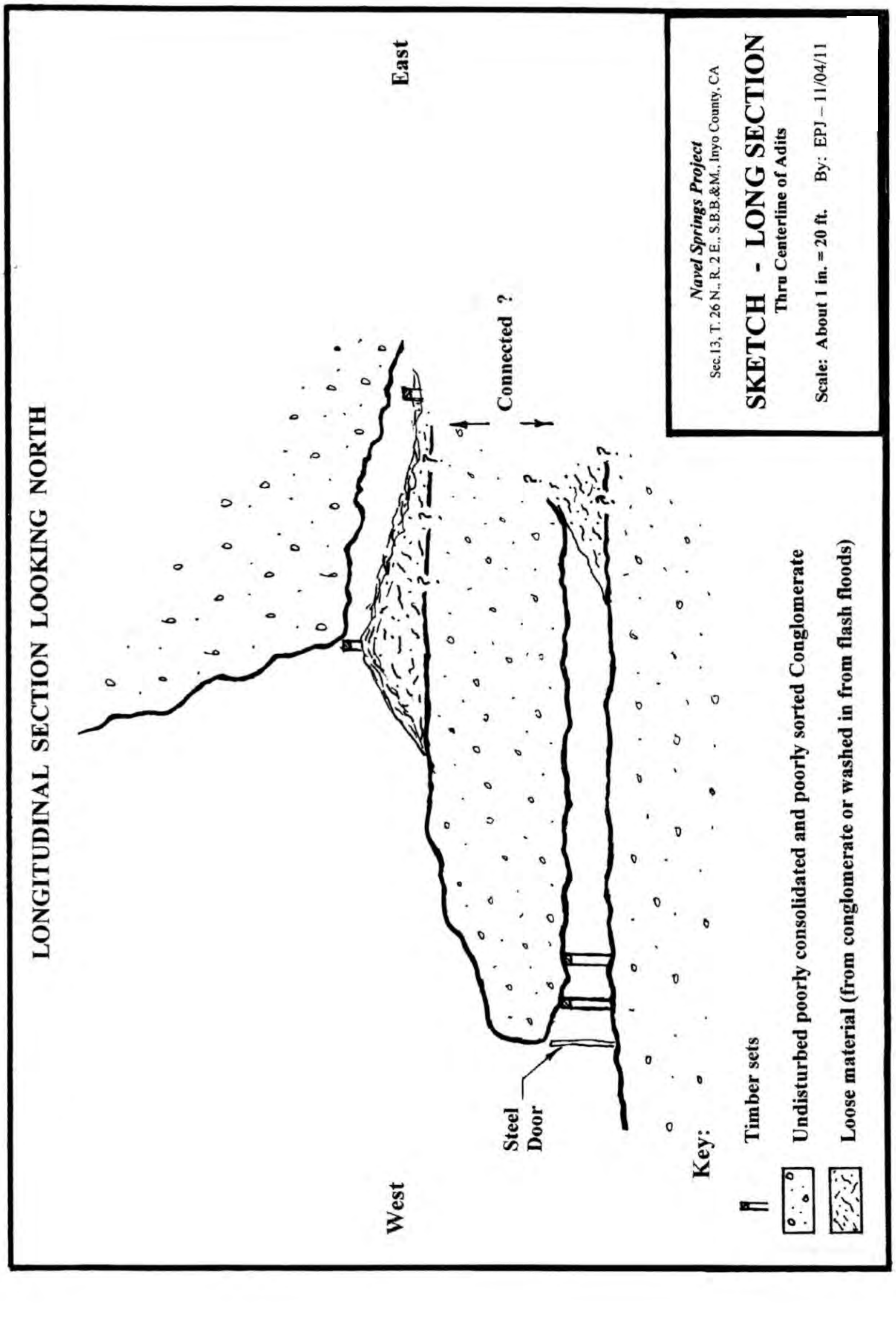


Figure 15. Longitudinal section of the Navel Spring water collection adits.

Figure 16. The Navel Spring water storage tank and pipe for filling the water truck. View: 80°.

Existing Maintenance Practices

The no-action alternative would allow for a continuation of the maintenance practices currently in place. At Navel Spring, the water collection system would continue to require periodic cleaning and inspection. At the lower adit, Ryan personnel would continue to manually excavate and remove newly deposited gravels after flash flood events. In addition, personnel would maintain a trench in front of the lower adit in effort to prevent surface waters from entering and contaminating the underground collection area. The collection sump would need to be periodically cleaned of mud and debris, continuing a Ryan personnel safety issue. Chicken wire or other suitable materials would need to be added to the space between the steel door and the sides of the adit as the ground continues to erode, perpetuating a public safety issue. The upper adit would be periodically monitored for on-going ground failures and potentially adverse effects to the lower adit. The date palm stumps would remain in place, preventing the return to a more natural habitat.

The no-action alternative would allow for the inspection and repair of the pipeline as needed but would not address the freezing of the pipe in the winter nor the vapor-locking and stoppage of flow in the summer. This alternative also permits the continued attempts at

repairing the existing corroded and leaking water storage tank, subjecting Ryan personnel to potentially unsafe confined space work.

ALTERNATIVE B: PROPOSED ACTION ALTERNATIVE

Alternative B is the appropriative water rights claim holder's proposed action. The proposed action alternative defines the rationale for the action in terms of water system efficiency, safety, management, and park natural and cultural resource protection. The proposed action alternative meets the project's purpose and need and satisfies the NPS obligations under federal law to respond to maintenance requests from an existing pre-1914 appropriative water rights claim holder. The proposed action alternative has been developed to maximize the efficiency of the water system while protecting natural and cultural resources in Death Valley National Park. All proposed work under this alternative would be accomplished by the project proponent unless otherwise noted.

The Navel Spring Water Collection Works

The proposed action alternative includes repairs and a sustainable maintenance system for the water collection works at Navel Spring. The upper adit would be filled and stabilized with pervious cellular lightweight concrete (PCLWC); the door of the lower adit would be replaced with a slightly-recessed portal structure and door. In addition, the adit would be excavated to its original grade and ground support would be added as needed. The area directly outside of the adit would also be excavated to its original grade. A historic mine car track (circa 1950s) in the front of the adit would not be disturbed.

It is important to note that the original configuration of the underground workings cannot be determined beyond the areas that can be safely accessed because there are no known "as built" drawings and a significant amount of ground fall has occurred over the last several decades. Consequently, as the underground work proceeds much will be learned and the planned work within the adits may be amended as long as the overall scope of the action and impact levels are consistent with the proposed action as described.

While flood events in this location are infrequent, proposed modifications to the existing system would be designed to minimize the adverse impact of future flash flooding.

Upper Adit

The upper adit cannot be safely accessed due to caved ground. However, most of the open area is visible from the portal. A significant amount of material has fallen in from the back (ceiling) and the ribs (sides) of the original adit. Some of the material may have been washed in as a result of a flood event. Additionally, a set of tension cracks located on the cliff face just

above the portal may indicate that the failure of the upper adit is an active and on-going process. The void inside the portal was estimated to have a volume of approximately 40 cubic yards. There are a few tops of timber sets (caps and the tops of posts) visible above the fill. The portal timber was installed and repaired by Mr. Jeff Moore (former Ryan Area Manager for U.S. Borax) several times, the latest being in 1988. The closure of the portal with wire rope netting was done in the mid-1990s by the NPS. The installation has since deteriorated and could allow for wildlife and public access.

The proposed action would involve closure and stabilization of the upper adit by the project proponent. This would be accomplished by filling the void with porous material, allowing for spring seepage to still drain to the lower adit. The fill material would be cementatious with good permeability and environmental soundness that water could flow through but that would be sufficiently strong and coherent to allow safe removal of material from the lower adit. Pervious cellular lightweight concrete (PCLWC) would serve this application. PCLWC is a pumpable and self-leveling material. The pumpability of PCLWC allows for staging of the concrete equipment well away from the immediate area. Approximately 40 cubic yards of material would need to be pumped in to secure the upper adit.

As a component of the work at the upper adit, the project proponent would remove several palm stumps (*Phoenix dactilifera*) left in place when the NPS felled all above ground palm vegetation from Navel Spring as a course of routine resource management. The stumps would be extracted using manual excavation and a winch. The stumps would be loaded onto a truck in the already established staging area and removed from the area for proper offsite disposal. Due to the possible leaching of chemicals into the water catchment area, no pesticides would be used. The area would be periodically inspected for palm re-growth by the project proponent and the NPS, and any re-growth would be treated mechanically by the project proponent.

Two specimens of the rare plant *Juncus cooperii* were identified by the NPS botanist, Jane Cipra, in 2012 at the level of the upper adit. These plants would be protected by plywood boxes while any work is ongoing in their vicinity.

Lower Adit

The lower adit presently has a steel door set in a steel door jamb, two timber sets just beyond the door, approximately sixty feet of bald head (no artificial support) drift, and at the end of the open workings, loose material coming down from either a raise (vertical underground opening driven in an upward direction) to the upper adit or a caved area that penetrates to the upper adit. There are several inches of fine mud in the floor of this adit.

The existing portal door and timber sets would be removed by the project proponent to allow for replacement. The replacement portal structure would be composed of two steel sets bolted to two concrete curbs. The sets would be placed on 4 ft centers. The outby (first) steel set would be located approximately 2 ft in from the current brow. This position would

provide for protection of the installation from potential future flash-flooding. The two sets would be blocked tight to the rock with timber blocking. The opening between the sets would be lagged with timber or composite decking material. A steel door with a shielded lock and continuous hinge would be mounted to a steel door jamb that would be scribed tightly to the surrounding rock. The door and jamb assembly would be secured to the outby steel set. A 4-inch reinforced concrete slab would be placed between the two concrete curbs; this slab would serve as a secure threshold for the door. Two removable dam boards placed into hitches cut into the conglomerate would serve as settling and collection points for the water system. Figures 17, 18, and 19 show the proposed portal structure details.

The muck pile at the end of the adit (about 70 ft in from the portal) has come in from above. There is no evidence to indicate whether it is from caved ground in the back (ceiling) of the adit, material that has fallen down a raise (vertical opening) from the upper adit, or from some other source. Nor is there any evidence of how much further the caved area extends. There may or may not be more open adit beyond the fallen-in material.

Once the upper adit is stabilized, the lower adit portal structure is complete, and the lower adit is cleaned down to the original grade level, the muck pile at the east end of the adit would be investigated in order to determine its source. Depending on the source of the material the area would be either completely mucked-out, spiled through (ground support method to mine through caved ground), or left as is. If there is more adit beyond this area it would also be cleaned out down to original grade. All native material removed from the adit during construction and clean-up would be spread evenly in the wash bottom below the lower adit.

Guzzler

Death Valley National Park staff would replace the pipe to the east drinker, coordinating with the project proponent to ensure that pipe would be installed prior to the permeable concrete application in the adit. In consultation and agreement with the water rights claim holder, Death Valley National Park may provide additional supplemental water to sheep if water availability is reduced to the point where sheep are water stressed, as indicated by: 1) reduction in the amount of available water, 2) ewes with lambs visiting the site and behavioral demonstration of stress in these individuals, 3) sheep mortality at the site or in the locality associated or attributable to water deprivation. Existing basins may be stabilized, repaired, or replaced as required.

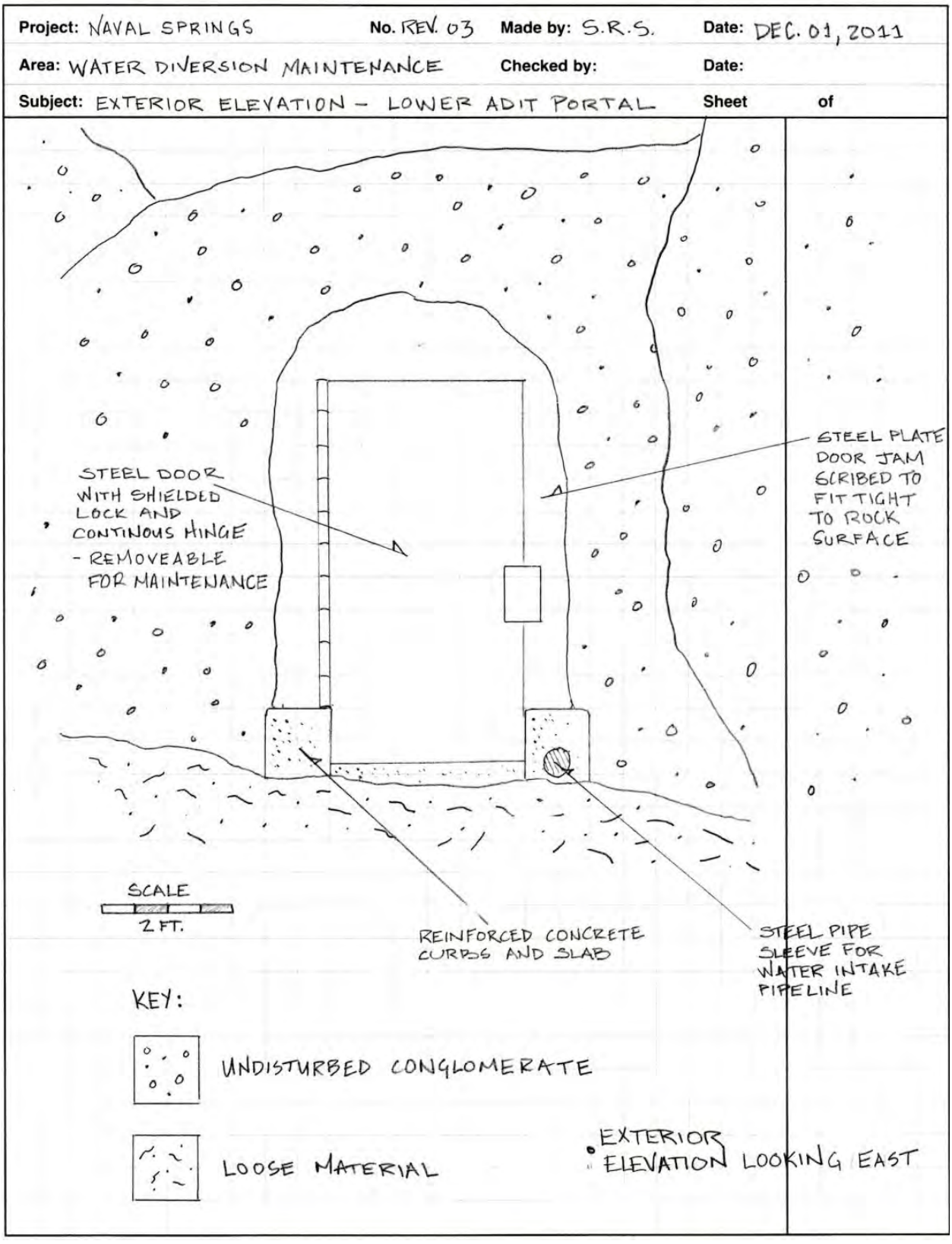


Figure 17. Exterior elevation of proposed lower portal structure.

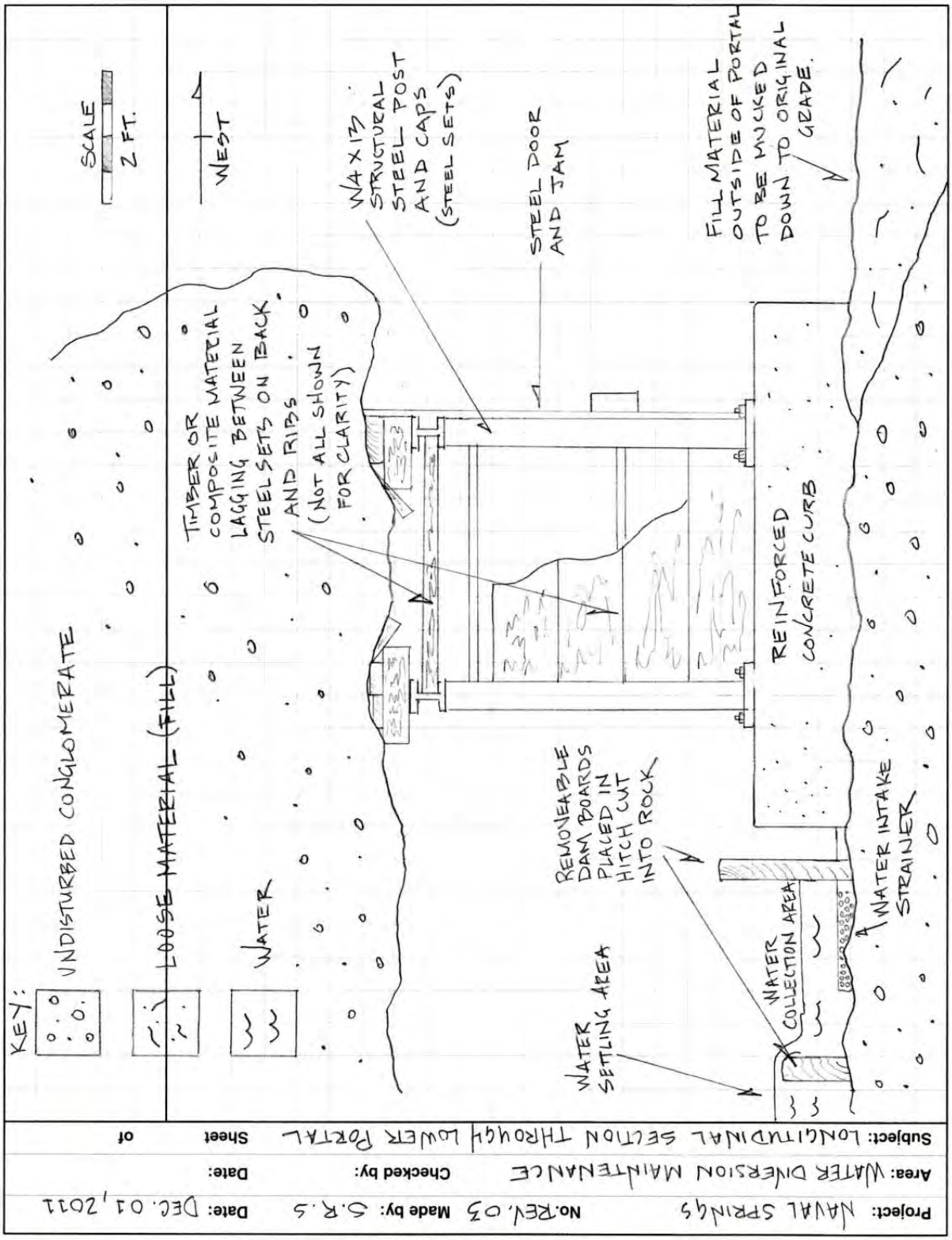


Figure 18. Longitudinal section through proposed lower portal structure.

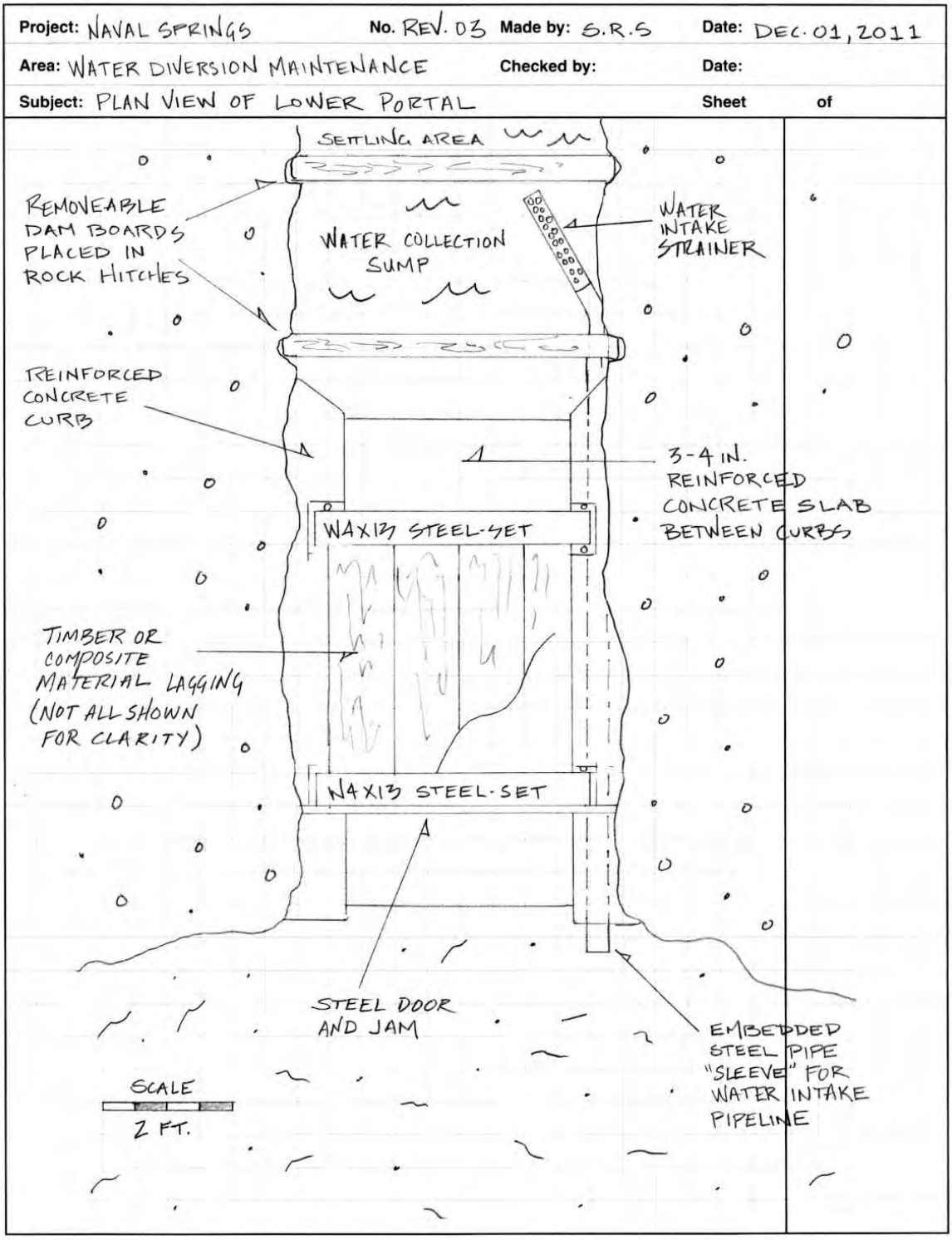


Figure 19. Plan view of proposed lower portal structure.

The Navel Spring Water Conveyance Pipeline

The current pipeline is a 2-inch high-density polyethylene (HDPE) line, installed between 1990 and 1991, which runs from slightly inside the portal door of the lower adit to the 10,800 gallon water storage tank 0.8 mile west of the spring. To mitigate visual impacts as well as to improve the system, two new fusion (heat) welded HDPE pipelines would be buried 18 inches deep in a trench along the center line of the Navel Spring access road. One pipeline would be used for water conveyance and the other would be held in reserve as a spare in case of pipeline failure. The older (non-historic) HDPE pipeline would be removed and disposed of as part of the project.

The Navel Spring Water Storage Tank

The existing 10,800 gallon bolted steel tank is corroded around its base and piping connections, and in August 2012 the tank began to leak. The rate of the leak exceeded the rate of spring flow resulting in a complete tank failure. Three attempts were made to repair the tank, with the final method showing some measure of success; however the tank continues to leak. Due to the level of corrosion, the tank is likely to fail again in the near future. Under the proposed action alternative, the existing tank would be removed and replaced with a 33,788 gallon capacity steel tank, consistent with the size of the historic water tank (Figure 20).

The replacement tank would be a 26’ – 8 15/16” diameter by 8’ – 1/2” high bolted steel 33,788 gallon potable water tank set on an engineered concrete ring foundation. The tank would be manufactured to A.W.W.A. D103-09 standards and be factory-coated inside and out (exterior would be a shade of brown determined by the NPS to blend in with both the natural and cultural landscape).

To minimize impacts to cultural resources the replacement tank would be placed east of the existing tank in an area of existing ground disturbance and the historic timber tank foundation would be left in place. To alleviate visual impacts, the tank would be low profile and two or three native mesquite trees (with a Death Valley genotype) would be planted in front of the tank; tank overflow would water these mesquite trees.

Figure 20. March 1968 photograph of the historic 30,000-35,000 gallon storage tank. Photograph by Lyn Moore, courtesy of Randy Moore.

Prohibition of Dogs

The proposed action alternative would specifically prohibit the walking of dogs past the gate on the Navel Spring access road and prohibit them from Navel Spring, with this closure to dogs accomplished by the NPS and noted in the Superintendent's Compendium. This use restriction would be established for the protection of sensitive wildlife, specifically bighorn, which may be scared away from water by dogs. Bighorn access to water is especially important during breeding and lambing seasons, as well as during periods of extreme heat. A "no dogs" sign would be posted on the Navel Spring access road gate by the NPS. The proposed action alternative would not prohibit human foot traffic to Navel Spring.

Area of Potential Effect (APE)

The area of potential effect (APE) for the proposed action alternative begins at the junction of SR190 and the Navel Spring access road and is confined to the existing road bed (width varies from 8 to 10 ft) from SR190 to its end at the Navel Spring canyon (Figure 21). Vehicles

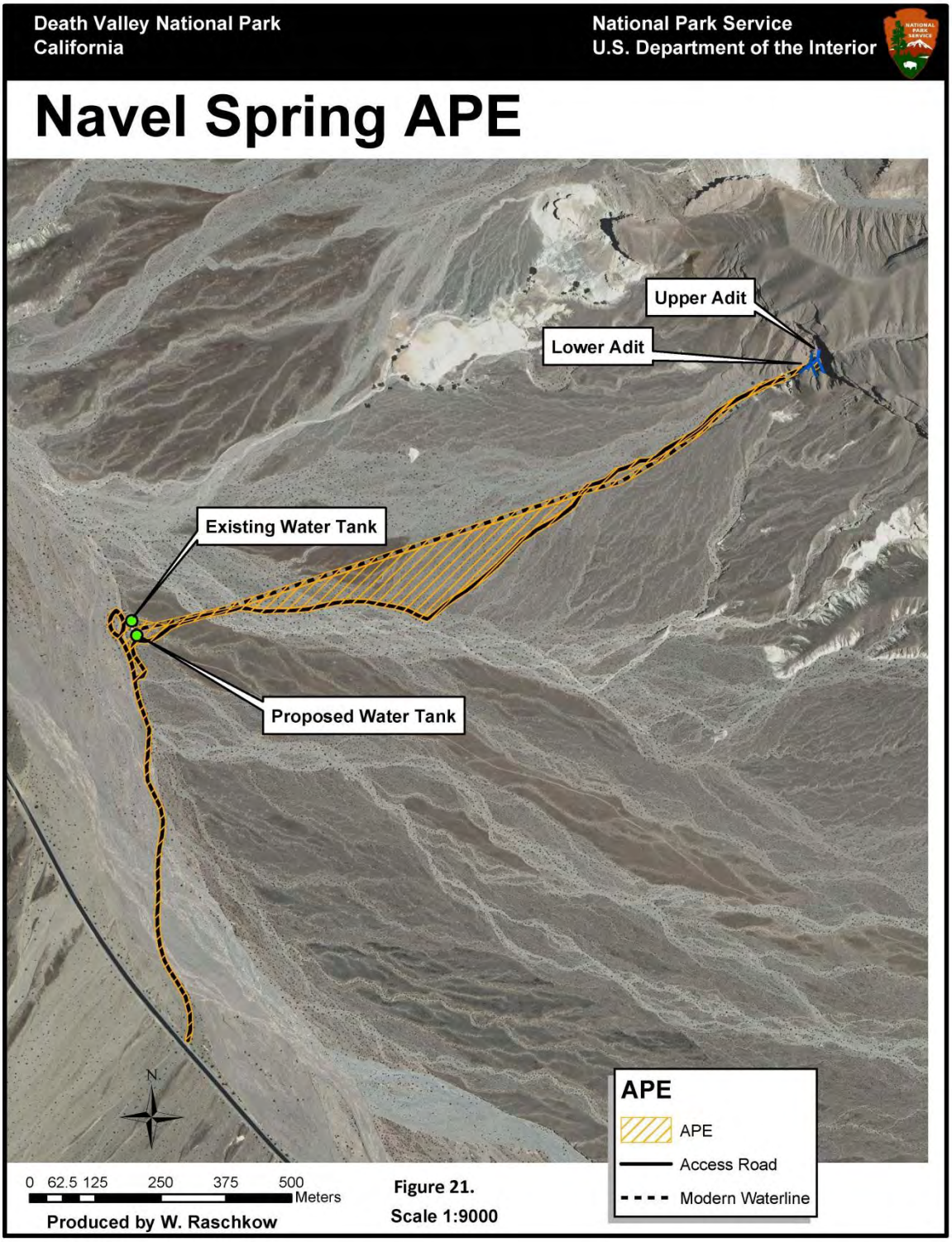


Figure 21. Area of Potential Effect (APE) of the Navel Spring project.

traversing the access road would include light vehicles such as pick-up trucks as well as heavy equipment such as a front end loader, excavator, rough-terrain fork lift, concrete-mixer truck, skid-steer loader, and a boom truck or crane. Three pre-existing turnouts would be used by vehicle traffic: the area of disturbance near the tank (described below), the terminus of the access road at Navel Spring canyon, and the wide area where the power lines intersect the road. Radio communication would be employed as to avoid opposing traffic; however, in the event that two vehicles are traveling in opposite directions on the road the turn-outs described above would be used. The area of disturbance at the tank, the water truck filling area in the wash below and southwest of the water tank, and the area where the access road terminates at the Navel Spring canyon (a gravel area approximately 15 ft by 100 ft west of the access road) would also serve as parking, turnaround, and equipment staging areas. Fugitive dust from vehicular traffic and equipment operation would be addressed by watering the road and work areas as necessary.

The pipeline would be buried in the center of the Navel Spring service road from the road terminus at the Navel Spring canyon to the tank site. A bulldozer with a ripper would be used to excavate a trench 6 inches wide by 18 inches deep. All excavation activity would be confined to the existing road bed. Excavated dirt would be replaced in the trench and compacted. The existing HDPE pipe would be cut into 10 ft sections using a cordless reciprocating saw. The sections would be bound and hand carried onto the existing access road bed where they would be loaded and taken from the site. No vehicles would be used to transport pipe sections to the road bed and the removal would result in no surface disturbance.

At the tank, the APE includes the existing tank location as well as an area of disturbance (approximately 5,000 ft^2) to the southeast of the existing tank. Equipment needed to replace the tank includes a back-hoe or excavator, dump truck, concrete truck, semi-tractor and trailer and small crane or boom truck as well as light vehicles. Equipment would be confined to the APE during the demolition and removal of the existing tank as well as the excavation and installation of the concrete tank foundation and the replacement tank. No equipment would travel beyond (to the northwest) the existing tank. The replacement tank would be located in the area of the disturbance southeast of the existing tank and tank foundation. A circle 28 ft in diameter would be excavated approximately 18 inches deep directly adjacent to the existing wooden tank foundation for the new concrete tank foundation. Dirt removed from this excavation would be placed in the wash to the south and below the tank. The concrete would be formed in a ring around the edge of the circle and the remaining area would be filled with gravel.

The APE at Navel Spring includes the entire area between the canyon walls to the north, west, and east. At the spring, the major pieces of mobile and plant equipment required for the work (e.g. concrete trucks and pumping equipment, air-compressor, generator, and welder) would be staged at the end of the road just below the canyon entrance. However, several small pieces of mobile equipment (skid-steer loader and/or track-hoe) would be required at the lower adit portal area. Some road work would need to be done to get this equipment up to

the lower adit; this work would entail plucking large boulders from the road using a track-hoe and placing them in the canyon bottom. The track-hoe would also be used to fill in low spots with material from the wash bottom.

At the upper adit, a timber bulkhead would be installed at the portal. Timber would be stored at the staging area (at the canyon mouth) and transported to the adit when needed. Pervious cellular lightweight concrete (PCLWC) would be pumped into the upper adit to permanently close this opening. The PCLWC would be pumped from a concrete truck located in the staging area at the mouth of the canyon via a slickline. The stumps of several date palms removed by the NPS in January 2013 would be extracted using equipment placed at the level of the lower adit. Dirt around the stumps would be manually excavated; then the stumps would be loosened and plucked using a winch.

At the lower adit, the area in front of and inside the portal would be excavated down to the level of the ore car rail using a small excavator and a skid steer loader. Removed material would be placed in the wash bottom. Materials for the replacement door and frame (including a small concrete mixer) would be stored at the staging area at the canyon mouth and transported to the site when needed.

General Construction Schedule

The project as proposed is dependent upon the conclusion of the NEPA process and NPS approval. The proponent anticipates approximately four weeks of work at the spring proper, three weeks of work at the tank locale, and three weeks of work burying the pipeline. The construction activities at the spring and the pipeline burial would occur after October 1 and before March 1 to mitigate impacts to local bighorn sheep populations and migratory birds. The tank replacement would occur as soon as practicable, subject to approval.

Sustainability

The National Park Service has adopted the concept of sustainable design as a guiding principle of facility planning and development. The objectives of sustainability are to design park facilities to: (1) minimize adverse effects on natural and cultural values (reflecting the environmental setting) and to maintain and encourage biodiversity, (2) construct and retrofit facilities using energy-efficient materials and building techniques, (3) operate and maintain facilities to promote their sustainability, and (4) illustrate and promote conservation principles and practices through sustainable design and ecologically sensitive use.

While the Navel Spring Water System Repair and Maintenance Project is not NPS-sponsored, the project proponent has stated its concurrence with sustainable practices. This project incorporates sustainable practices in that water system maintenance and associated equipment operation would be reduced and new, native-stock mesquite trees would be planted in front of the water storage tank replacement. In addition, invasive palm stumps

would be removed from the spring, likely reversing the water-consumptive effects of palm trees. In an effort to further increase the efficiency of the water system as a whole, the DVC would purchase a new, larger capacity water truck that would reduce the amount of trips needed to meet Ryan water requirements, thereby reducing vehicle emissions over the long term. As an additional sustainable measure, redundancy would be incorporated into the system by burying two pipelines in the trench; in case one fails, the other would be employed without having to use construction equipment to excavate and re-bury a replacement pipeline. The work would increase the long-term stability, and hence the sustainability, of the water system.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

In accordance with *Director's Order 12*, the National Park Service is required to identify the environmentally preferred alternative in all environmental documents, including environmental assessments. The environmentally preferred alternative is determined by applying the criteria suggested in NEPA, which is guided by the Council on Environmental Quality. The environmentally preferred alternate must promote NEPA by [NEPA, section 101 (b)]:

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

NEPA was enacted to protect the "human environment"; thus, the environmentally preferred alternative is the one that causes the least damage to the biological and physical environment, as well as the one which best protects, preserves, and enhances historic, cultural, and natural resources.

The proposed action alternative is the environmentally preferred alternative because it promotes the balance of humans and the environment, providing for the enhancement of a desert spring habitat while meeting the obligations of the NPS to provide for the reasonable maintenance of a water system associated with a pre-1914 appropriative water rights claim.

More specifically, the proposed action alternative:

- Creates a more efficient and sustainable water system which allows for easier and safer maintenance of the underground workings, as well as a reduction of maintenance required on the pipeline and the new, properly designed and sized storage tank. Maintenance equates to fossil fuel use, labor hours, and increased vehicle emissions, thus the preferred alternative would reduce the carbon footprint of the Navel Spring water system for the benefit of future generations (criterion 1; criterion 3; criterion 6).
- Addresses safety issues by stabilizing potentially hazardous mine openings and geologic hazards and health issues by helping to ensure that water consumed at Ryan by residents and visitors is clean and safe (criterion 2).
- Provides an example of a successful balance between population and resource use in terms of a responsible use of a precious resource while protecting the natural desert spring habitat and the cultural landscape of Navel Spring (criterion 3; criterion 5). In particular, the control of the invasive palms is expected to encourage native vegetation to flourish at the spring and make more water available for wildlife.
- Helps to protect and preserve for future generations a historic district significant to our national heritage – Ryan. The updated water system would provide protection for Ryan from structure fires and other emergencies. It would also allow for preservation and restoration work to be completed by fulfilling water needs (criterion 1; criterion 4).
- Demonstrates a cooperative working relationship between the federal government (NPS) and private entities (Rio Tinto and later the DVC) to encourage preservation and restoration activities while allowing for a wide sharing of life's amenities (all criteria).

The no-action alternative is not the environmentally preferred alternative because it:

- Further defers "deferred maintenance" of the Navel Spring water works, allowing system components to deteriorate until the system is non-functional and may endanger cultural and natural landscapes with geologic hazards, erosion, and in the case of complete tank failure, water damage (criterion 1; criterion 4).
- Does not support a responsible stewardship of Ryan, a National Register eligible historic district, by limiting the amount of water available for daily domestic and visitor use as well as that available in the event of a fire or other emergency (criterion 4).
- Does not address the safety issues of hazardous mine openings at the spring; nor does it address the right of residents and visitors at Ryan to have access to safe, clean, and uncontaminated drinking water (criterion 2).

- Does not allow the widest range of beneficial uses of the environment in limiting the efficiency and effectiveness of the water system (criterion 3; criterion 5).
- Does not promote preservation and restoration of cultural and natural landscapes for future generations. Natural spring habitat, archeological sites, and cultural landscapes in the Navel Spring area would be better preserved by the stabilization of the Navel Spring water system and the removal of the date palm stumps (criterion 1).
- Does not increase sustainability or reduce the carbon footprint of the water system (criterion 6).

ALTERNATIVES CONSIDERED BUT DISMISSED

The Council on Environmental Quality (CEQ) suggests that governmental agencies rigorously explore and objectively evaluate all reasonable alternatives to a proposed project (40 CFR 1502.14). The CEQ defines reasonable alternatives as those that are technically and economically feasible and that show evidence of common sense. These alternatives also meet project objectives, resolve need, and alleviate potentially significant impacts to important resources. The following alternatives were considered early in the NEPA process but were dismissed because they did not meet the requirements of reasonable alternatives as established by CEQ.

1. Catchment basin - One alternative considered but dismissed involved developing a catchment basin at the spring. Under this alternative, a large (approximately 30 ft by 50 ft) basin would be excavated at the mouth of Navel Spring canyon and partially lined with an impervious membrane. Collection pipes would be placed in the basin, feeding into the pipeline going to the tank. The basin would be filled with pervious gravels. The catchment would collect ground water as it flowed underground out of the spring. Under this alternative, the pipeline would be buried in the center line of the road and the tank would be replaced with one of a 33,788 gallon capacity. The original water collection works would subsequently be abandoned and there were no plans to stabilize the underground workings.

   The catchment basin alternative was dismissed for several reasons. First, it involved large-scale excavation and ground disturbance at the spring, a naturally and culturally sensitive area. This excavation was beyond the scope of reasonable access for maintenance activities inherent in the pre-1914 water rights claim. In addition, the basin would require constant maintenance to keep the area above the basin free of contamination caused by the roots of vegetation and animal activity. Furthermore, the catchment basin would prevent water from naturally flowing underground into the wash, negatively impacting vegetation and wildlife. Also, this alternative would not address the instability of the underground workings at the spring. The significant expansion of infrastructure and impacts associated with this alternative, as well as lack of technical feasibility caused this alternative to be dismissed.

2. Horizontal wells – This alternative proposed drilling a series of horizontal wells in an effort to collect and divert subsurface spring water. The well heads would be plumbed together and tied to the pipeline running to the tank. Like the previous alternative, the pipeline would be buried in the centerline of the road, the original water collection works would be abandoned, and there would be no plans to stabilize the underground workings.

   This alternative was attractive to the project proponent in that it would increase the diversion rate of the spring. A faster flow and a quicker filling of the storage tank would greatly reduce the time required for tank recharge.

   This alternative was primarily dismissed because it was a significant expansion beyond the historic footprint of water collection infrastructure. Additionally, it would result in potential ground disturbances and impacts to cultural resources at the spring caused by drill rigs and other heavy machinery. Further, the impact of diverting more subsurface water surface waters is unknown, and could negatively affect wetland vegetation and wildlife access to water.

3. More underground development – In this alternative, the length of the underground workings would be increased in an effort to divert and collect additional water. The lower adit would be cleaned out to its original grade and extended in the direction of flowing water. The upper adit would be stabilized and sealed with pervious cellular concrete and the lower adit would be stabilized and sealed with a replacement door frame and door as in the preferred alternative. Materials excavated from the adit would be evenly distributed in the wash. The water catchment area would remain inside the adit. The pipeline would be buried in the centerline of the road.

   This alternative would have less ground disturbing potential than the previous two alternatives in that major development work would occur underground. In addition, this alternative would satisfy the need for stabilizing the underground workings. However, this alternative is not cost effective and the impact to surface water, and thus to vegetation and wildlife at the spring, is unknown. Because of the unpredictability of impacts to associated park resource, this alternative was dismissed from further consideration.

4. A 10,800 gallon tank – This alternative would allow for the work at the spring and the burial of the pipeline as included in the proposed action alternative; however it would limit the water storage tank to a 10,800 gallon capacity, as exists on the site at present. The existing tank rests on an historic timber foundation. Current building codes disallow the placement of potable water tanks on timbered foundations; hence, to avoid impacting historic structures, the location of the replacement tank would be to the east of the existing tank on a newly poured concrete foundation.

Although this alternative decreases the potential visual impact to passing motorists on SR 190, it was dismissed because the pre-1914 appropriative water rights holder has expressed a need for infrastructure consistent with the historic capacity of the water system and infrastructure. A larger tank, consistent with water use as stipulated in the pre-1914 appropriative water rights claim and documented by historic use, is required to collect and store more diverted water on site for domestic use and in case of a structure fire or water system failure at Ryan.

5. Float valve – A fifth alternative would allow for the work at the spring, the burial of the pipeline, and the 33,788 gallon capacity storage tank as presented in the preferred alternative; however, it would also include the addition of a float valve in the storage tank. A float valve would prevent the flow of water into the tank when it was full. Thus, when the tank filled, water would stop filling the tank and overflowing onto the ground as it does at present. Once the tank was full, water would flow out of the catchment area of the lower adit and likely pool in front of the underground workings. Ideally more water would be available for vegetation and wildlife at the spring, although the water would not be added to the wetland habitat at the level of the upper adit but would be collected below it in alluvial gravels.

   This alternative contains both technical and resource challenges. First, the pipeline conveys water a distance of 0.8 miles long with an elevation change of 300 feet; a filled tank and hence closed float valve would create a significant amount of water pressure (approximately 130 lb/in.) in the pipeline. The pressure is likely to strain certain pipeline components and has the potential to cause component failure at the tank. Failure of components due to pressure is a safety hazard and would result in unknown consequences. Second, due to calcification and mineralization the float valve would require constant maintenance and periodic replacement to function properly. Third, a float valve in preventing the flow of water and disallowing the refreshing of stored water, would cause the water in the tank to become stagnant. In addition, the activated float valve in causing water to flow out of the lower adit would likely increase erosion and have negative impacts on one of the only historic elements at the spring located in front of the lower adit, the mine car track. Water would pool in front of the lower adit and not be added to the established wetland area. Because of safety and feasibility issues, as well as the potential adverse effects to cultural resources, this alternative was dismissed from further consideration.

Two other alternatives included constructing a pipeline to Ryan from Navel Spring and burying the water tank. After some analysis these alternatives were dismissed because of engineering difficulties and the potential for significant impacts to natural and cultural resources.

MITIGATION MEASURES OF THE PROPOSED ACTION ALTERNATIVE

Mitigation measures are presented as part of the proposed action alternative in Table 2. These actions have been developed to lessen the adverse effects of the proposed action and would be completed by the project proponent under the guidance of NPS personnel.

Table 2. Mitigation Measures of the Proposed Action Alternative

Resource Area	Mitigation
General Considerations	The project manager would ensure that the project remains confined within the parameters established in the compliance documents and that mitigation measures would be properly implemented.
	Construction zones would be identified and flagged before beginning construction and all disturbances would be confined to the construction area. All project personnel would be instructed that their activities must be confined to locations within flagged areas and all equipment and materials must remain within these areas. Disturbances beyond the construction zone would be prohibited.
	Best management practices for drainage and sediment control would be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas. Use of best management practices in the project area for drainage area protection will include all or some of the following actions, depending on site-specific requirements: (1) keeping disturbed areas small to minimize exposed soil and the potential for erosion; (2) evenly distributing excavated materials in the alluvial fan; (3) conducting regular site inspections during construction to ensure that erosion-control measures are properly installed and functioning effectively; (4) maintaining the Navel Spring access road with erosion control channels and preventing the road from becoming below grade, and (5) storing, using, and disposing of chemicals, fuels, and other toxic materials appropriately.
	A hazardous spill plan would be in place, stating what actions would be taken in the case of a spill, notification measures, and preventive measures to be implemented, including the placement of refueling facilities, storage, and handling of hazardous materials.
	All equipment on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from automotive fuels, lubricants, and other fluids. All equipment would be inspected daily.
	All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond work area boundaries.
	The proponent and any contractors would be required to properly maintain construction equipment (e.g. mufflers) to minimize noise of equipment use.

Table 2. Mitigation Measures of the Proposed Action Alternative *(Continued)*

Resource Area	Mitigation
General Considerations	All fuel, oil, transmission, or brake fluid leaks, or other hazardous waste leaks, spills, or releases would be reported immediately to the NPS. The project proponent would be responsible for spill material removal and disposal to an approved off-site landfill and, if necessary, would notify the appropriate federal agency.
	Material stockpiling, machinery storage, and vehicle parking would only be permitted in designated staging areas.
	All tools, equipment, surplus materials, and rubbish would be removed from the project area upon project completion. All demolition debris, such as the existing water tank, would be removed from the project site.
	Unnecessary construction vehicle engine idling would be limited to reduce noxious emissions.
	Construction would be scheduled to avoid the excessively high summer temperatures. Construction would take place during the winter, spring, and fall months to the extent practicable.
	Staging for construction vehicles and equipment would be located in previously disturbed areas approved by the NPS and would be clearly identified in advance.
	Construction debris would be immediately hauled from the Park to an appropriate disposal location.
Geology and Soils	Erosion and sediment control would be required (see "General Considerations").
	Disturbed areas would be raked perpendicular to the slope. Native vegetative material which was removed during construction would be laid lengthwise across the disturbed areas (perpendicular to the slope).
Vegetation	Disturbed areas would be returned to natural conditions with minor treatments.
	Undesirable plant species would be controlled (using mechanical means) as necessary. To prevent the introduction and minimize the spread of non-native vegetation and noxious weeds the following measures would be taken: 1) Construction equipment would be pressure washed to ensure that all equipment, machinery, rocks, gravel, or other materials are clean and weed-free before entering the project area; 2) All construction equipment transporting material outside the project area would be brushed down after every drive; 3) Palm stumps would be removed and the area monitored for palm re-growth and controlled mechanically.
	Rare and special status plants would be protected during construction activities.
	Native spring vegetation (primarily *Schoenoplectus americanus*) would be allowed to recover to pre-construction conditions.
Wildlife/Special-Status Species	Construction activities at the spring would occur between October 1 and March 15 to avoid disturbing the use of the spring by migrating birds, insects, and bighorn sheep during periods of excessive heat.
	Construction activities would take place only during daylight hours, Monday through Friday.
Wetland Habitat	The upper spring pool would be avoided to the extent possible during construction activities and the removal of the palm stumps.
	Material removed from the lower adit would be evenly spread in the gravel wash bottom, and the 0.11 acres of wetland habitat would be avoided.

Table 2. Mitigation Measures of the Proposed Action Alternative *(Continued)*

Resource Area	Mitigation
Air Quality	Fugitive dust plumes would be reduced to the extent possible by water sprinkling the soil during earth-disturbing activities.
Archeological Resources	If, during construction, archeological resources are discovered, all work in the immediate vicinity of the discovery would be halted and the park archeologist would be notified. All necessary steps would be taken to protect the resources until they can be assessed and documented by the park archeologist. If it is determined that the archeological resources are significant, an appropriate mitigation strategy would be developed in consultation with the California State Historic Preservation Office (SHPO) and the Timbisha Shoshone Tribe.
	Should human remains, funerary objects, sacred objects, or objects of cultural patrimony be discovered during construction, Park staff would follow provisions outlined in the Native American Graves Protection and Repatriation Act of 1990.
	Culturally sensitive areas near staging areas and access roads would be flagged and avoided during work hours. Flagging would be removed at the end of each work day. Work near sensitive areas would be monitored by park archeology staff.
	Paleontological remains and archeological specimens found within the construction area would only be removed by the NPS or by NPS-designated representatives.
	A project Area of Potential Effect (APE) for cultural resources would be defined and archeological survey of the area will occur. All archeological resources within the APE would be identified and recorded. A report of the findings of the survey and a determination of eligibility for each resource would be submitted to the SHPO as per Section 106 of the National Historic Preservation Act of 1966, as amended.
Historic Districts	Two sites at Navel Spring (10-063-01 and 10-063-03) would be included as contributing elements of the Ryan Historic District in the nomination of Ryan to the National Register of Historic Places.
Cultural Landscapes	Cultural landscapes within the project area would be identified and recorded.
	Existing areas of disturbance would be used as staging areas so as to maintain the setting and feeling of the Navel Spring cultural landscape.
	The modern HDPE pipeline would be removed in an effort to restore the historic landscape.
	A 33,788 gallon water storage tank, as existed historically at the site, would replace the existing water tank, thus restoring the historic feeling of the Navel Spring cultural landscape.
	The newly installed steel door at the lower adit would be placed slightly within the portal to reduce its visibility.
Scenic Resources	Native mesquites (of a genotype selected by the NPS botanist) would be planted in front of the water tank to limit visual disturbances.
	The modern HDPE pipeline would be removed.
	The replacement tank would be low profile and of a color that blends into the natural and cultural environment.

Table 2. Mitigation Measures of the Proposed Action Alternative *(Continued)*

Resource Area	Mitigation
Health and Safety	The following fire protection measures would be employed during construction activities: 1) All mobile and plant equipment would be equipped with fire extinguishers as well as spark arrestors (if applicable); and 2) A water truck with 1,000 gallon capacity, equipped with a pump and hose would be on site during construction activities.
	All work would conform to the standards established by the Occupational, Safety and Hazard Administration (OSHA), as applicable.
	Radio and satellite communication devices would be on site during work hours.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES / IMPACT COMPARISON MATRIX

Potential Environmental Impacts		
Impact Topic	**Alternative A: No-Action Alternative**	**Alternative B: Proposed Action Alternative**
Geology, Soils, and Geologic Hazards	Continued maintenance practices would have short- and long-term, negligible to minor, adverse impacts to the alluvial wash and drainage system and short- and long-term, moderate, adverse impacts on the back wall of Navel Spring canyon	Cleaning out the lower adit, the movement of construction equipment to the work area, removal of the palm stumps, trench excavation, increased traffic, and water tank foundation excavation would have short-term, minor, adverse impacts to natural erosion and deposition processes. Stabilization of the upper adit would have long-term, moderate, beneficial impacts to the structure of the back wall of Navel Spring canyon
	Short- and long-term, negligible, cumulative adverse impacts to geology and soils and short- and long-term, minor adverse cumulative impacts to geologic hazards	Short-term, minor, cumulative adverse impacts to geology and soils and long-term, minor, beneficial cumulative impacts to geologic hazards
Vegetation	Continued maintenance practices would cause short- and long-term negligible adverse impacts; however, not controlling invasive palm re-growth would cause long-term, minor, adverse impacts	Vegetation removal and trampling during construction in travel corridors and in the drainage below the lower adit, construction dust, and the palms' total removal would cause short-term negligible adverse and long-term moderate beneficial impacts to native vegetation at Navel Spring
	Short- and long-term, minor adverse cumulative impacts to vegetation	Short- and long-term negligible cumulative impacts to vegetation

Wildlife	Continued maintenance practices and vehicle traffic on roadways would have short- and long-term negligible adverse impacts to wildlife species and habitats in the Navel Spring area Short- and long-term negligible cumulative impacts to wildlife habitat	Construction activities and human presence would prevent some wildlife from accessing Navel Spring and increased construction traffic could disturb wildlife causing short-term minor adverse impacts to wildlife habitat Short-term minor cumulative impacts to wildlife
Special Status Species	Continued maintenance practices would have short- and long-term minor impacts on special status species, namely *Ovis canadensis nelsoni* (bighorn sheep) Short- and long-term minor cumulative impacts to special status species habitat	Construction activity, noise, and human presence would prevent special status species from accessing Navel Spring during working hours causing short-term minor adverse impacts to special status species Short-term minor cumulative impacts to special status species
Wetland Habitat	Continued maintenance practices would have short- and long-term minor impacts to wetlands Short- and long-term minor cumulative impacts	Activities at the level of the upper adit including filling the adit with concrete and removing the palm stumps would have short-term negligible adverse and long-term minor to moderate beneficial impacts to wetlands Long-term minor beneficial cumulative impacts from the removal of palms and palm stumps
Archeological Resources	Continued natural deterioration processes would cause short- and long-term negligible impacts to archeological resources in the Navel Spring area The potential for collapse of the upper adit would result in a long-term minor adverse impact Short- and long-term negligible cumulative impacts to archeological sites	Ground disturbance associated with construction activities would cause short-term negligible to minor adverse impacts to archeological resources in the Navel Spring area Long-term minor beneficial impacts to the historic Navel Spring water system (site # 10-063-01) Short- and long-term minor adverse cumulative impacts

Historic Districts	Retention of the current water system would have short- and long-term moderate adverse impacts to the Ryan historic district Short- and long-term negligible to minor adverse cumulative impacts	Construction activities would cause short- and long-term minor adverse impacts to contributing elements 10-063-01 and 10-063-03. Impacts to the Ryan historic district as a whole would be short- and long-term moderate beneficial Short- and long-term minor adverse and moderate beneficial cumulative impacts to historic districts
Cultural Landscapes	Continued deterioration caused by natural processes would have short- and long-term negligible impacts to the Navel Spring cultural landscape Short- and long-term negligible cumulative impacts	Impacts to specific archeological features are discussed under archeological resources. Overall impacts to the cultural landscape would be short- and long-term negligible Short- and long-term negligible cumulative impacts
Ethnographic Resources	Continued maintenance practices would cause short- and long-term negligible impacts Short- and long-term minor adverse cumulative impacts	Construction activities would not alter features of the spring and would restore the spring pool causing short- and long-term negligible beneficial impacts Short- and long-term minor adverse cumulative impacts
Health and Safety	Potentially hazardous underground openings, water contamination, and a limited capacity water tank would cause short- and long-term minor adverse impacts to health and safety Short- and long-term minor adverse cumulative impacts on health and safety	Securing of the adits and a larger volume water storage tank would cause long-term moderate beneficial impacts Short-term and long-term minor beneficial cumulative impacts
Scenic Resources	Retention of the 10,800 gallon tank would cause short- and long-term negligible adverse impacts to scenic resources Short- and long-term minor adverse cumulative impacts	Placement of a 33,788 gallon tank would cause long-term minor adverse impacts to scenic resources Long-term moderate adverse cumulative impacts
Visitor Use and Experience	Continuing to allow dogs at Navel Spring would cause short- and long-term negligible adverse impacts to visitor use and experience Short- and long-term minor adverse cumulative impacts	Prohibiting dogs from Navel Spring would cause short- and long-term minor adverse impacts to visitor use and experience Short- and long-term minor adverse cumulative impacts
Adjacent Landowners and Land Uses	Retention of the water system would cause short- and long-term moderate adverse impacts to adjacent landowners and land uses	Repairs, deferred maintenance, and upgrades to the water system would cause long-term moderate beneficial impacts to adjacent landowners and

Adjacent Landowners and Land Uses	Short- and long-term moderate adverse cumulative impacts	land uses Long-term moderate beneficial cumulative impacts

AFFECTED ENVIRONMENT

This section provides a brief description of the Navel Spring natural and cultural setting and identifies resources which may be potentially impacted by the alternatives under consideration.

LOCATION AND GENERAL DESCRIPTION OF THE PARK

Death Valley National Park is one of the largest national park system units in the United States (in the lower 48 contiguous states), encompassing 3,396,192 acres (1,374,390 hectares)(refer to Figure 1). The majority of park lands are located in Inyo County, but a small portion is in the Nevada counties of Nye and Esmeralda and the California county of San Bernardino. Access within the park occurs primarily from SR 190, which crosses east to west from Death Valley Junction, California to Lone Pine, California, and from SR 178 from south to north (Shoshone, CA to Scotty's Castle). The connecting park road access is via SR 374 to Beatty, Nevada, over Daylight Pass and SR 267 to Scotty's Junction through Grapevine Canyon.

The Death Valley basin is bordered by the Panamint Range including the smaller Owlshead Mountains, Nelson Range, Cottonwood Mountains, and Saline Range to the west and the Amargosa Range including the smaller Black Mountains, Greenwater Range, Funeral Mountains, Grapevine Mountains, and Last Chance Range to the east. Telescope Peak in the Panamint Range is the highest elevation in the park, rising 11,049 feet (3,368 meters) above sea level, and lies approximately 15 miles from the lowest elevation in the western hemisphere—Badwater Basin salt pan at 282 feet (86 m) below sea level (NPS 2002a).

The desert mountain ranges rise in contrast to the broad, creosote bush-dominated, alluvial fans and valleys. The mountains are particularly attractive to visitors during the hot summers, providing cooler temperatures and wooded habitat. The low elevation landscape within the park is open, providing expansive vistas of basins, valleys, canyons, hills, ridges, slopes, dunes, and desert mountain ranges; geologic exposures throughout are dramatic. Early miners and ranchers developed roads and trails that today provide visitors the opportunity to drive to many remote areas where backcountry camping is allowed. Expansive wilderness areas offer backpackers and hikers opportunities to explore the geology and landscape while observing vegetation and wildlife. There are many cultural sites interpreted for visitors; they include prehistoric sites used by Indian tribes (most recently by the Timbisha Shoshone Tribe) and historic sites including abandoned mining districts and the Scotty's Castle residential area (NPS 2002a). Detailed information on resources in Death Valley National Park may be found in the

general management plan (NPS 2002a) and on the Internet website: <http://www.nps.gov/deva>.

THE PROPOSED PROJECT AREA

Navel Spring's natural and cultural resources are rich and intricate. The spring is located at the base of the Funeral Mountain Range in the Furnace Creek Wash corridor on the eastern edge of Death Valley, CA. Furnace Creek Wash begins in Greenwater Valley, approximately 3200 ft in elevation, and travels northerly separating the Black Mountains from the Funeral Range. Its terminus is the saltpan of Death Valley, slightly below sea level. Furnace Creek Wash connects Death Valley in the west to the Amargosa Desert to the east; near Navel Spring, a pass through the Funeral Range just south of Pyramid Peak links Furnace Creek Wash to Ash Meadows and the Amargosa Valley, NV.

As a major thoroughfare, Furnace Creek Wash has always been replete with cultural activity. Local tribes likely used it as a route for migration, trade, and hunting, while in historic times it connected mining and agricultural settlements in Death Valley to larger population centers in the east. Navel Spring, as one of the few springs in upper Furnace Creek Wash, provided a vital resource to travelers and settlers in prehistoric and historic times. The spring continues to play a role in local economy as it supplies the water needs of Ryan Camp, a National Register eligible historic district. State Route 190 runs to the south of the dirt access road to Navel Spring and its associated infrastructure, including the water tank, which lies less than half a mile from the highway.

NATURAL SETTING

Climate and Hydrology

Death Valley is the hottest and driest place in North America. Climatic data from Furnace Creek, 190 ft below sea level, indicates that an average daily temperature for January, the coldest month ranges from 37°F-65°F, and for July, the hottest month, temperatures range between 87°F-116°F. However, these are mere averages and summer temperatures can easily top 120°F. In the Navel Spring area, which ranges from 1680-2200 ft elevation, the temperatures are slightly (about 5°F-10°F) cooler. Rainfall totals average 2.4 inches per year with most of the precipitation occurring in the winter and summer months.

Although very little precipitation falls on the valley floor, a surprising amount of water reaches Death Valley through a regional ground and surface water flow system. High evaporation rates render the water extremely saline and non-potable. Faulting controls the occurrence of several springs with potable water around the rim of the valley and in the mountains. These springs both ascend along faults and either issue from the base of alluvial gravels where they overlie

impermeable geological deposits (Hunt 1975) or issue directly from the faults. In the Furnace Creek area three springs (Texas, Travertine, and Nevares) provide ample water to support settlement and tourist accommodations. Whereas the Furnace Creek springs issue from steep faults and are high discharge; Navel Spring, located 13 miles to the east, is a collection of seeps issuing from a gently dipping fault and is low discharge. Despite its low flow, Navel Spring provides the only source of potable (after treatment) water in the Furnace Creek Wash above the perennial flow near Furnace Creek.

Navel Spring contrasts with the higher output springs in another respect: its source. The source for Texas, Travertine, and Nevares springs is a complex topic and not entirely understood by hydrologists (Anderson 2002; Anderson et al. 2006; Belcher et al. 2009). While some argue that the source of the springs stems from a combination of interbasin, regional groundwater flow originating from the Amargosa Valley and the contribution of local precipitation, others surmise that the high discharge springs originate solely from regional groundwater. Navel Spring, on the other hand, appears to be fed not by regional ground flow but from local precipitation (Anderson 2002). Its chemical signatures, temperatures, and discharge rate suggests that Navel Spring does not share a source with the higher discharge springs but may represent flow from a localized aquifer. In fact, Anderson (2002:57-58) suggests that local precipitation (recharge) is more than sufficient to sustain the water discharged from Navel Spring.

Periodic sampling of waters diverted from Navel Spring indicates elevated levels of arsenic (above drinking water standards as per Title 22 of the California Code of Regulations) and the occasional presence of coliform bacteria (introduced into the water via wildlife entry into the water collection adit as well as from the flow of contaminated surface water into the adit). Although proposed repairs to the water diversion system would have no effect on arsenic levels (which are addressed by water treatment at Ryan), should the project be completed, the potential for bacteriological contamination would be greatly reduced.

Geology

The geology and geomorphology of Navel Spring is related to the ongoing erosion and alluvial deposition of material from the Funeral Mountains into Furnace Creek Wash. The oldest representative of this alluvial deposition dates to the early Quaternary (2 or 3 million years ago) and is represented by a cemented fan, termed a fanglomerate (and also referred to as the Funeral Formation)(Hunt 1975:116). The fanglomerate is characterized by a dissected, deformed, and cemented alluvial fan with material ranging in size from boulders to silt and is derived from the rocks of the Funeral basement complex, Paleozoic age limestone and dolomite (Pistrang and Kunkel 1964: Plate I). A section of the fanglomerate has been uplifted by faulting and forms a wind and water eroded ridge running parallel to the Furnace Creek Wash (Figure 22). Water erosion has carved the fanglomerate at the ridge resulting in the steep overhangs and narrow walls of Navel Spring canyon.

The movement of water run-off through Navel Spring canyon has had a long occurrence and is apparent not only in the erosion of the older fanglomerate but in the deposition of late-

Pleistocene alluvium. These alluvial deposits are composed of mainly boulders, cobbles, pebbles, and interstitial sand and silt derived from Paleozoic age limestone and dolomite from the Funeral Mountains and are termed “older alluvium”(Pistrang and Kunkel 1964: Plate I). The older alluvium is moderately cemented and where it is undissected, the surface material is covered with desert varnish and well-developed desert pavements. This older alluvium composes the majority of the geology in the project area as it makes up the desert pavement terraces located in between Navel Spring and the water storage tank.

Alluvial erosion and deposition is ongoing at Navel Spring and is apparent in the system of active drainages in the area. Recent, or younger, alluvial deposits are mainly well-rounded cobbles and pebbles derived in large part from the older alluvium (Pistrang and Kunkel 1964: Plate I). The younger alluvium lacks desert varnish.

Figure 22. The uplifted ridge of the Funeral Range fanglomerate carved by runoff to form Navel Spring canyon. (See also younger alluvium in fan near central power pole and older alluvium with desert varnish and pavements, center). View: 70°. Date: 4/26/2012.

Vegetation

The vegetation in the project area between Navel Spring and State Route 190 is comprised of the *Larrea tridentata* (creosote) shrubland alliance with *L. tridentata* as the predominant plant. This alliance is tightly tied to drainages and inset fans made up of younger alluvial fan deposits (Annable 1985:24). Predominant flora in this alliance are *Atriplex hymenelytra* (desert holly), *Tidestromia oblongifolia* (honeysweet), *Bebbia juncea* var. *aspera* (sweetbush), *Eriogonum hoffmannii ssp. hoffmannii* (Hoffman's buckwheat), *Hymenoclea salsola* (cheesebush), and *Ambrosia dumosa* (burrobush). *E. hoffmannii ssp. hoffmannii* is recognized by the California Native Plant Society as a rare plant; there are several specimens south of the water storage tank in Furnace Creek Wash. Other plants observed in this part of the project area include *Opuntia basilaris* (beavertail cactus), *Echinocactus polycephalus* (cottontop barrel cactus), *Psorothamnus* sp. (indigo bush), *Eunide urens* (rock nettle), *Peucephyllum schottii* (pygmy cedar), and *Psathyrotes ramosissima* (turtleback).

The water discharged at the storage tank creates a suitable environment for a giant *Prosopis glandulosa* (honey mesquite), a water loving plant, and various grasses including *Bromus madritensis ssp. rubens* (red brome) and possibly *Muhlenbergia* sp. or *Cynodon dactylon* (Bermuda grass). Daffodils, planted in the 2000s, are also found at the tank.

Near Navel Spring, the vegetation varies. In 1985 study of the flora of the Funeral Mountains, Carol Annable (1985) identified an *A. hymenelytra* (desert holly) association above the 2000 ft elevation contour just southeast of and encompassing the spring. This association includes plants established on older alluvial boulders, cobbles and finer-grained materials with large areas of desert pavement. The plant community is similar to that of the *L. tridentata* alliance except that *A. hymenelytra* rather than *L. tridentata* is the predominant plant.

At Navel Spring proper, the vegetation consists of a wide variety of flora including *P. glandulosa* (mesquite), *A. hymenolytra* (desert holly), *Physalis crassifolia* (ground cherry), *Camissonia brevipes* (golden evening primrose), *Schoenoplectus americanus* (sedges), *E. urens* (rock nettle), *C. dactylon* (Bermuda grass), *Polypogon monspeliensis* (rabbit's foot grass), *Cryptantha* sp. (popcorn flower), *Viguiera reticulate* (Death Valley goldeneye), *Anulocaulis annulatus* (Death Valley sticky ring), *B. juncea* var. *aspera* (sweetbush), and *Juncus cooperi* (rush). *J. cooperi* is recognized by the California Native Plant Society as being rare. There are two specimens at the level of the upper adit. A large group of invasive date palms (*Phoenix dactylifera*) were found at the level of the upper adit; these palms were removed in January 2013 by the NPS. The stumps would be removed as a part of the project.

During a compliance project survey at the spring in 1996, NPS personnel observed a rare endemic plant, *Salvia funerea* (Death Valley sage), at the mouth of Navel Spring canyon. This plant was not observed during the vegetation surveys in 2012.

Wildlife

Navel Spring acts as a refuge for local and migratory wildlife in Death Valley. Several species of wildlife have been observed or are likely to frequent the Navel Spring project area. Endemic animals include reptiles such as *Uta stansburiana* (side-blotch lizard), *Cnemidophorus tigris tigris* (Great Basin whiptail), *Dipsosaurus dorsalis* (desert iguana), *Phrynosoma platyrhinos* (desert horned lizard), *Callisaurus draconoides (*zebra-tailed lizard), *Gambelia wislizenii* (leopard lizard), *Crotalus stephensi* (Panamint rattlesnake), *Masticophis flagellum* (coachwhip), *Coluber constrictor* (red racer), *Pitunophis catenifer* (gopher snake), and *Coleonyx variegatus* (western banded gecko).

Year-round birds include *Carpodacus mexicanus* (house finch), *Catherpes mexicanus* (canyon wren), *Sayornis saya* (Say's phoebe), *Buteo jamaicensis* (red-tailed hawk), *Corvus corax* (common raven), and *Streptopelia decaocto* (Eurasian collared dove), an exotic species. Migratory birds observed at Navel Spring include *Contopus cooperi* (olive-sided flycatcher), *Myiarchus cinerascens* (ash-throated flycatcher), *Cathartes aura*, (turkey vulture), *Falco sparverius* (American kestrel), *Dendroica petechia* (yellow warbler), *Carduelis psaltria* (lesser goldfinch) and *Calypte* sp. (hummingbird).

Mammals include the small species of *Dipodomys* (kangaroo rats), *Neotoma* (wood rats), *Peromyscus* (mice), *Ammospermophilus leucurus* (squirrels) and black-tailed jackrabbit (*Lepus californicus*). Larger mammals include *Spilogale gracilis* (western spotted skunk), *Bassariscus astutus* (ring-tail cat), *Vulpes macrotis* (kit fox), *Canis latrans* (coyote), and possibly *Felis concolor* (mountain lion). Although it prefers higher elevation habitats, a badger (*Taxidea taxus*) was observed at the spring in the 1980s (J. Moore, personal communication). Perhaps the mammal to most frequently use Navel Spring is *Ovis canadensis nelsoni* (desert bighorn sheep) discussed in more detail in the Special-Status Species section.

Special-Status Species

Consultation with the US Fish and Wildlife Service for this project confirmed that there are no federally listed, proposed, or candidate species, nor is there critical habitat for these species occurring in the project area. For the purpose of this environmental assessment and with particular consideration of the water resources present at Navel Spring, the National Park Service is analyzing Nelson's desert bighorn sheep (*Ovis canadensis nelsoni*) as a special-status species. Desert bighorn, and more specifically the subspecies found in Death Valley, Nelson's desert bighorn, is considered species of management concern in Death Valley (*General Management Plan 2001*) and is on the Nevada Watch List for species. The Nevada Natural Heritage Program considers the desert bighorn a species of "long term concern, though now apparently secure, usually rare in parts of its range, especially at its periphery." Several springs, including Navel, in the Funeral Mountains support a healthy population of desert bighorn sheep. According to the NPS biologist and research conducted by Dr. Charles Douglas, Death Valley populations of desert bighorn are presumed currently stable (L. Manning, pers. comm.).

Hunting blinds located in the vicinity of Navel Spring canyon and Timbisha Shoshone oral tradition indicate the presence of bighorn sheep at Navel Spring in prehistoric and early historic times; however, no photographs or records have been located specifying the size or composition of bighorn herds, the frequency of use, or how much open water was available for bighorn at the spring before spring development. One historical account suggests that Navel Spring may have never contained much open water. William Lewis Manly, traversing Furnace Creek Wash in 1849, describes a clay formation in a narrow, perpendicular canyon where "a little water seeped down its face. Here the Indians had made a clay bowl and fastened it to the wall so that it would collect and retain about a quart of water" (Manly 1894:135-136). C.I. Wheat (1939a) believes the spring in Manly's recollection is Navel, although this has never been corroborated.

The first bighorn surveys conducted by the National Park Service in the newly established Death Valley National Monument occurred in 1935. At that time, Navel Spring had been developed and used by U.S. Borax for approximately thirty years. A wildlife technician visiting Navel Spring noted a "small flow of good water, very little vegetation. Practically all the water is piped two [*sic*] miles to a tank to be used by a small borax mine. There is a little water in a short tunnel suitable for small birds and mammals but no water for large birds or sheep. There was no evidence of sheep at this spring except one lower leg bone" (Joseph S. Dixon, Field Naturalist, memo to George M. Wright, Chief, Wildlife Division, National Park Service, Washington,D.C. November 1, 1935).

In the mid-1950s, Ralph and Florence Welles working for the NPS commenced a several year long, intensive study of the desert bighorn in Death Valley, which eventually culminated in the seminal work *The Bighorn of Death Valley* (1961). The Welles, fearing that local bighorn populations did not have ample access to open water in the Funeral Mountains region, excavated three catch basins at Navel Spring in 1955 (Figure 23; Figure 24). The Welles did not note the presence of bighorn at the spring before the basins were installed – on the contrary, Ralph Welles' notes suggest that the catch basins sat unused for eight months before bighorn began to use the spring (Welles and Welles 1967: 5). Once the bighorn discovered the catch basins, however, they took quickly to the open water supply. Frequent flash flooding hindered the functioning of the catch basins and they were eventually replaced with several ½ drums totaling a 75-gallon water capacity. In the end, the Welles studied the eating and drinking patterns, behavior, reproduction, and herd composition of over thirty individual bighorn at Navel Spring. Over the duration of their study, the researchers noted that the bighorn relied on Navel Spring for water especially during summer months and all year during periods of drought.

After much difficulty in keeping the ½ drums functional and free of debris, in 1969 NPS personnel replaced them with two permanent rock and mortar guzzlers at the level of the upper adit (refer to Figure 14)(Fodor 1969). These guzzlers remain at the spring to date. Despite the updated guzzlers, in the 1970s a Death Valley National Park-wide bighorn survey did not detect evidence of bighorn at Navel Spring. Park Service volunteers observed Navel Spring for four days in August/September 1974 and remarked "many old game trails. None seem to have been

recently used. No tracks or droppings. Checked surrounding washes for signs of sheep, none. Many small tracks possibly fox. Some coyote" (Desert Bighorn Sheep Census, Upper Naval Spring, August 30, 1974). The volunteers go on to surmise "…Naval Springs open to highway and mining across highway [Tenneco Boraxo Pit]. No way for sheep to hide for security"(Water Source Report, Upper Naval Spring, August 30, 1974). Based on helicopter surveys and water hole counts also conducted in the 1970s, the California Department of Fish and Game estimated the bighorn population in the Nevares Spring, Echo Canyon, and Navel Spring area at 15 animals (Weaver 1972).

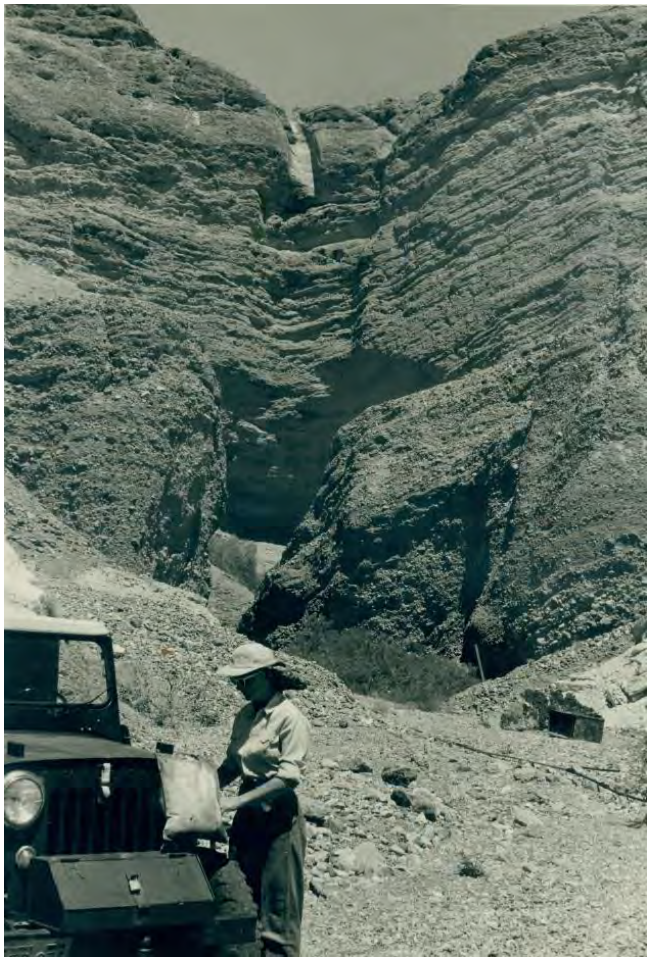


Figure 23. Florence Welles, a desert bighorn researcher, at Navel Spring in the mid-1950s. (From Welles and Welles 1961; Figure 15)

Based on the limited bighorn surveys discussed above, it appears that bighorn use of Navel Spring fluctuates. This may be due to natural oscillations in bighorn population or the bighorn occupation or abandonment of a given "patch" in its range (McCullough 1989). In recent years, bighorn are once again using the spring. In an effort to collect data on bighorn, and more generally wildlife use of Navel Spring, NPS resources personnel installed a wildlife camera at the level of the guzzlers in early 2011. Photographic data from the camera suggests that bighorn

frequented Navel Spring almost every day from mid-winter to mid-summer and then left in mid-summer and did not reappear on a regular basis until mid-winter (L. Manning, pers. comm.). The bighorn source for water during their absence from Navel Spring is unknown.

Figure 24. The bighorn guzzlers (foreground left) constructed in the 1950s at the level of the upper adit (background, right). These guzzlers were removed in the late 1960s. (Courtesy DEVA Photo Archives: Classification 551.49, Negative 2198, March 1960)

Wetland Habitat

The U.S. Department of Fish and Wildlife recognizes Navel Spring as a wetland of 0.11 acres in size. For regulatory purposes under the Clean Water Act, the term wetland means "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." According to the EPA, hydrology largely determines how the soil develops and the types of plant and animal communities living in and on the soil. The prolonged presence of water creates conditions that favor the growth of specially adapted plants (hydrophytes) and promote the development of characteristic wetland (hydric) soils. Many inland wetlands are seasonal (they are dry one or more seasons every year), and, particularly in the arid and semiarid West, may be wet only periodically.

Although its soil has not been thoroughly examined, the area at the level of the upper adit is water saturated and supports hydrophytic plants and other organisms (Figure 25). Several samples were collected from the Navel Spring surface water in March 2012 to determine the type and quantity of the organisms present. Analysis by the NPS suggests that there are a whole suite of major groups of algae including : *Chlorophyta* (green algae), cyanobacteria (blue-green algae), and *Chrysophyta* (diatoms). For invertebrates there were dipterans (aquatic flies), mosquito larvae, protozoans (ciliates and rotifers), and a couple of nematodes (as per K. Wilson 2012, pers. comm.).

The group of palms that were present at this level were likely detrimental to the wetland habitat and the organisms found therein. Palms are extremely thirsty plants, which use up to hundreds of gallons of water per day. Above ground palm vegetation has been removed by the NPS.

Figure 25. The spring pool at the level of the upper adit.

CULTURAL SETTING

Death Valley Prehistory

Death Valley has a lengthy and varied record of human inhabitation. Archeologists (e.g. Hunt 1960) have traditionally divided Death Valley prehistory into four temporal categories, Death Valley I-IV, although Giambastiani et al. (2005) recognize three main distinctions corresponding to the Early, Middle, and Late Holocene. The following is a brief summary of the major cultural components of each temporal period; please see Giambastiani et al. (2005) for more detail.

Death Valley's first human imprints are found in the early Holocene, when its environment was cooler and wetter. Archeological sites associated with this period are generally classified in the Death Valley I (DV I) temporal sequence (9,000-7,000 years ago). People during this time had a broad settlement pattern which included not only lacustrine-based subsistence, associated with prehistoric Lake Manly, but habitation around areas of extant springs and major drainages and also settlements in higher elevations, especially near quarries. Many DV I sites are located on alluvial terraces with desert pavements and contain desert-varnished features such as hunting blinds, cleared circles, and rock mounds.

During the middle Holocene in the arid west approximately 7,500 to 4,500 years ago, human adaptation reflected a more regularized subsistence to correspond to a warming, drying climate. This is expressed archeologically in the presence of more groundstone indicating a greater reliance on vegetal materials (Giambastiani 2005:79). In Death Valley, archeological sites dating from the middle Holocene are considered Early DV II and are rare. William Wallace (1978) attributed this absence to the effects of increased temperatures and aridity during this period, rendering Death Valley virtually uninhabitable.

Late Holocene imprints of human activity in Death Valley are largely characterized by an intensification of subsistence strategies and an effective exploitation of local plant and animal communities, as well as an increase in inter-cultural interaction, exemplified by long-distance trade. Approximately 4,500 years ago, artifact assemblages, site types, and site locations began to diverge from patterns seen in the previous period and grow in complexity. Late DV II (4,000-1,500 years ago) archeological deposits include tool assemblages reflecting a greater use and processing of seed grasses, mesquite pods, and pinyon pine nuts that continues into the DV III and DV IV periods. The emergence of petroglyphs is also attributed to this period (Wallace 1977).

During the DV III period (1,500-650 years ago), the trend in site location diversification continues with an overall rise in site number and variety ranging from campsites and rockshelters in the uplands, to rock mounds, alignments, cleared circles and mixed campsites around the salt pan. Additional components of DV III archeological assemblages are the presence of Puebloan ceramics, suggesting the existence of trading networks, smaller, corner-

notched projectile points indicating the introduction of the bow and arrow, and an abundance of grinding stones, suggesting an increase in the use of milling equipment (Giambastiani et al. 2005:82; Hunt 1960:111).

The last phase of the prehistoric occupation in Death Valley, DV IV (650-100 years ago), is in many ways continuous with the previous temporal periods. DV IV deviates from earlier periods with the appearance of smaller projectile points, the development of a local pottery tradition, the use of basketry, and the occupation of dune fields. While many DV IV sites have components of earlier periods, it appears that sites near springs above the salt pan were not reoccupied during this period (Hunt 1960:163).

Ethnography

Today, the Timbisha Shoshone Tribe regard Death Valley, or the *Tumpisa*, as their homeland. It is beyond the scope of this report to elaborate on origins of the Timbisha and how they relate to Death Valley prehistoric inhabitants; the Timbisha believe that they originated in Death Valley and they have always lived there (Historic Preservation Committee of the Timbisha Shoshone Tribe 1994:5). Traditionally, the Timbisha were egalitarian with tribe leadership roles falling to those individuals, mostly males, who had exceptional skills, such as hunting ability or oratorical acumen. They were organized into small family groups, with each family procuring resources from a particular territory in Death Valley. The small family groups were essentially autonomous, however several families would gather at certain times of the year (e.g. in fall and winter or for communal hunts). The Timbisha practiced a general division of labor, with men being responsible for hunting and tool making and women in charge of making baskets and procuring and processing plant foods.

The Timbisha Shoshone were extremely well-adapted for life in the *Tumpisa*. They practiced the seasonal round, spending the cool seasons on the valley floor and the warm ones near the upland springs of the Panamint Mountains. The seasonal round allowed the effective exploitation of the Tribe's two key foods: mesquite pods and pinyon pine nuts. From winter to early summer, Timbisha established mesquite camps on the valley floor consisting of semi-permanent dwellings, often circular and un-roofed and made of arrowweed (*Pluchea sericea*) and willow (*Salix* spp.) (Fowler et al. 1994). They used the pulp from young mesquite pods to make a drink and processed ripe pods into a flour and then into cakes that could be stored until they returned to the camp in the winter. Pine nuts, called *tuba*, were harvested in late summer and early fall at summer camps in the mountains. Pine cones were collected, fired, and pounded until the *tuba* were released. Once released, the nuts were shelled, roasted, and then ground into a flour. Several other plants provided nourishment for the Timbisha including chia (*Salvia columbariae*), green ephedra (*Ephedra viridis*), whitestemmed blazing star (*Mentzelia albicaulis*), Joshua tree buds (*Yucca brevifolia*), wolfberry (*Lycium andersonii*), chokecherry (*Prunus melanocarpa),* barrel cactus (*Echinocactus polycephalus*), beavertail cactus (*Opuntia brasilaris),* and wild rose *(Rosa woodsii),* among others.

Plant foods were supplemented with meat from desert bighorn sheep (*Ovis canadensis nelsoni*) and small animals (e.g. jackrabbit [*Lepus californicus*], cottontail [*Sylvilagus audubonii],* ground squirrel [*Spermophilus tereticaudus*], woodrat [*Neotoma lepida*], kangaroo rat [*Dipodomys deserti*], pocket gopher [*Thomymus bottae*], and chuckwalla [*Sauromalus ater*]). While women likely assisted in the hunting or capturing of small mammals, the desert bighorn was a highly prized and valuable animal hunted exclusively by males. Bighorn live in the mountains and tend to gather around montane springs. According to Steward (1941:273-274), bighorns were hunted either by individuals or cooperative groups. In cooperative hunts, hunting blinds, constructed of rock walls, brush walls or lines of stone cairns were essential in concealing one group of hunters while another group chased animals into a canyon, mountain pass, or other area of entrapment. Once trapped, the concealed men killed them with arrows.

The Timbisha are tied physically and spiritually to the *Tumpisa*. They believe that their "history is not what has been written in books. [It] is in the Creator's belongings: the rocks and the mountains, the springs and in all living things" (Historic Preservation Committee of the Timbisha Shoshone Tribe 1994:5). Thus, almost all physical locations have dual functions as they are endowed with practical as well as spiritual properties associated with the Tribe's cultural history. For example, Nevares Spring "was important because the hot spring there was used for healing physical illnesses and also mental conditions, such as grief. People would camp there as long as they needed to…This spring was also important as a place to hunt bighorn sheep" (Historic Preservation Committee of the Timbisha Shoshone Tribe 1994:9).

Navel Spring, like Nevares Spring, served dual functions for the Timbisha. Navel Spring was recognized for its association with tribal religion and subsistence in a draft traditional cultural property nomination prepared for the tribe in 1996 (Jones and Beck 1996). Oral tradition indicates that the spring was an important bighorn hunting locale and the spring was likely significant as a water source, especially for Timbisha and members of other tribes traveling through the Furnace Creek Wash. Project updates and discussions have occurred at several NPS and Timbisha quarterly meetings beginning January 24, 2012. Formal government to government consultation was initiated on April 5, 2012. On February 10, 2012 Timbisha elders visited Navel Spring with representatives of the NPS and Ryan personnel. The Timbisha Tribal Historic Preservation Officer (THPO) visited the project location with the park archeologist on March 7, 2013. The Timbisha Shoshone have not formally commented on or expressed concerns about the proposed repair and maintenance project. Tribal members who visited the project area expressed interest in native plants present at the spring and support for providing water for bighorn sheep.

Historic Period

Navel Spring and the Furnace Creek Wash corridor witnessed much activity in historic times. In fact, the history of Navel Spring represents a microcosm of the broader Death Valley regional history.

Exploration and Survey

As has been described in the literature many times, Death Valley's entry into the popular conscience came with the ill-fated migration of the '49ers in 1849 (see Lingenfelter 1986; Wheat 1939a; Koenig 1974; Latta 1979; and Powell 1936 for more detail; Nusbaumer 1967 and Manly 1894 are first-hand accounts). In brief, a large group of westward emigrants from the eastern states aspired to reach the goldfields of California under the direction of Captain Hunt. Their original route included a crossing over the Sierra Nevada Mountains, however the wagon train's extremely slow pace landed it in Salt Lake City, Utah, in the late fall. Instead of continuing westward over the mountains and facing impassable winter weather, the group headed southwest into the Mojave Desert. With little water and tough terrain, the trek proved much more challenging than anticipated and caused the group to faction into smaller parties to attempt to pass through the area and on to the goldfields. Two of these factions traversed the Furnace Creek Wash corridor and are relevant here: the Jayhawkers and the Bennett-Arcan group of which William Lewis Manly was a part (Figure 26).

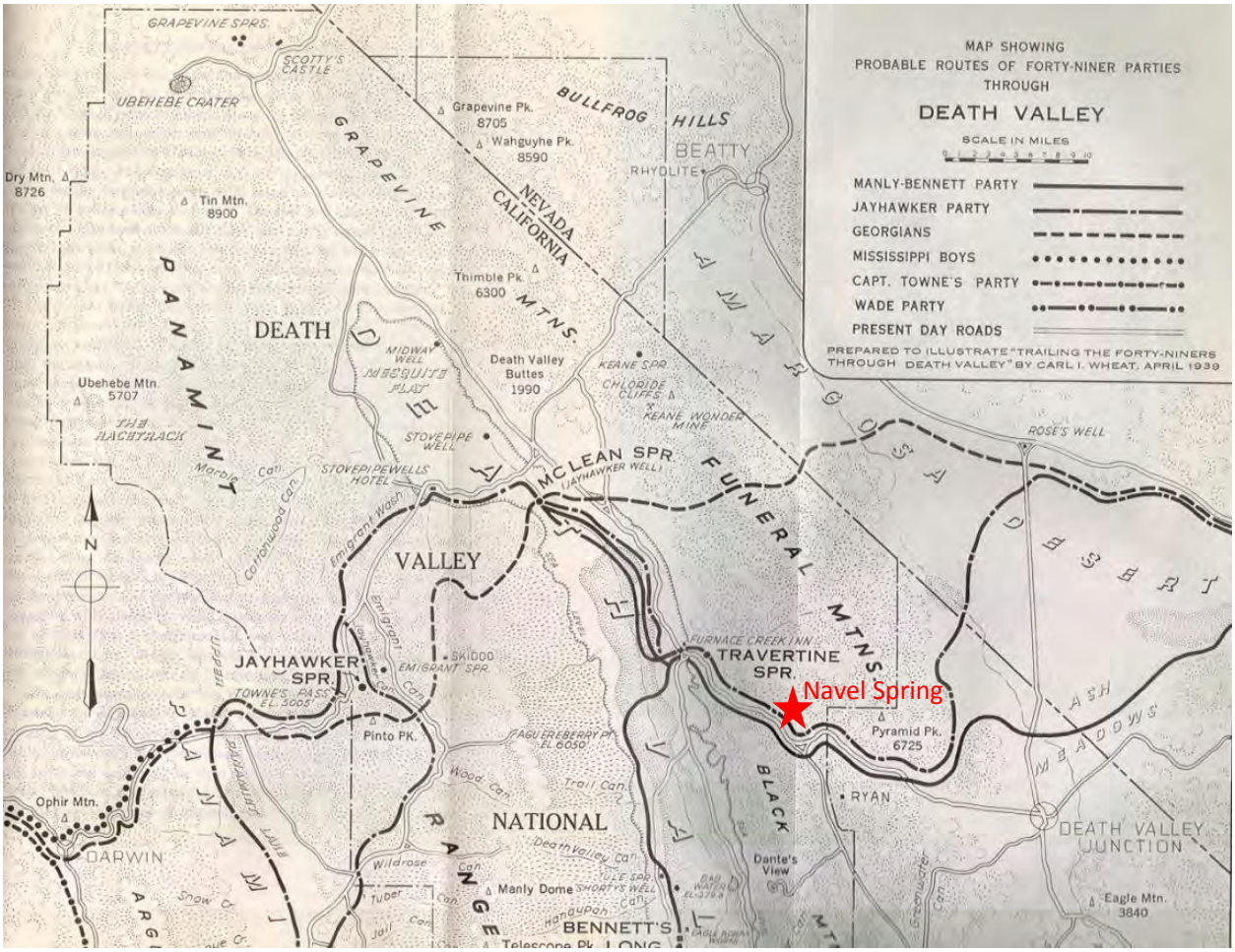


Figure 26. The routes of the Forty-niner parties, with Navel Spring added. (Adapted from Wheat 1939a).

The Jayhawkers were the first to enter Death Valley through the Furnace Creek Wash. Not able to find a suitable crossing through the Funeral Mountains in the northern Amargosa Valley, they headed south until they encountered a horse trail leading to the west and followed it to the Death Valley sink (Lingenfelter 1986:41). This trail was likely a prehistoric trading route. Manly, scouting for the Bennett-Arcan party followed the Jayhawkers' trail into "a narrow, dark canyon high on both sides and perpendicular and quite so in many places" (Manly 1894:135). He then discovered the seep, described above, which Wheat (1939a) surmises is Navel Spring. After camping there the night, he went down the wash until he encountered the Brier family at Travertine Springs. After some reconnaissance in the area, Manly traveled back up the Furnace Creek Wash corridor only to travel back down again leading the members of his party into Death Valley.

The outcome of the Forty-Niners' excursion into Death Valley is not relevant here except to say that the valley proved to be hostile country. What is germane to this report is the road carved by the men, women, children, oxen, horses, and wagons through Furnace Creek Wash during 1849 to 1850. This well-worn route acted as a virtual sign post for explorers and surveyors tasked with mapping Death Valley in later years. For example, while their maps of Death Valley are largely suspect, the San Bernardino Meridian Survey party led by General Henry Washington in 1854 encountered an "old road" in close parallel to the present route through Furnace Creek Wash (Koenig 1986:31). In addition, the Darwin French expedition of 1860 and the Boundary Survey Party of 1861 noted the road; a member of the Boundary Party traversing through the Amargosa Valley remarked crossing "the faint trail of some emigrant wagons driving to the southwest, made in the year 1849 by a party on their way to California" (Wheat 1939b:11).

While early survey expeditions often noted the route through the Furnace Creek Wash corridor, there is no mention of Navel Spring until 1864-1865. In those years, D.E. Buel and E.W. Welton from Austin, Nevada, prospecting in the area, traveled into Death Valley and mapped several springs along the Furnace Creek Wash (Welton 1865). One spring, likely Navel, is located near the intersection of the Furnace Creek Wash and the Furnace Creek Wash road (modern State Route 190)(Figure 27). Another significant inclusion on this map is the labeling of both Death Valley and Furnace Creek (Koenig 1986:58).

A couple of other early survey parties are of note. In 1866, Nevada Governor Henry G. Blasdel led a party of state officials including the State Mineralogist on a quest to determine viable routes to the newly discovered Pahranagat mines in southeastern Nevada and to verify the California-Nevada boundary line. The expedition was a catastrophe with Blasdel's party aimlessly wandering in Death Valley without water and proper provisions. The party grew mutinous; some members set off on their own with fatal results (Lingenfelter 1986:89-90). When Blasdel finally left Death Valley via the Furnace Creek Wash, a member of his party penned the following (in Koenig 1986:70):

> The grade up Furnace Creek is heavy, probably 100 feet to the mile…and when the summit was reached the team was so completely exhausted that a

> dry camp was inevitable. The party, however, had found a wagon track during the day, which was supposed to have been Buel's and as there was no return track accompanying it the conclusion was pretty logical that it went to water…

The "wagon track" while attributed to and likely used by Buel, of the Buel-Todd party discussed above, is likely the nascent Furnace Creek Wash wagon road.

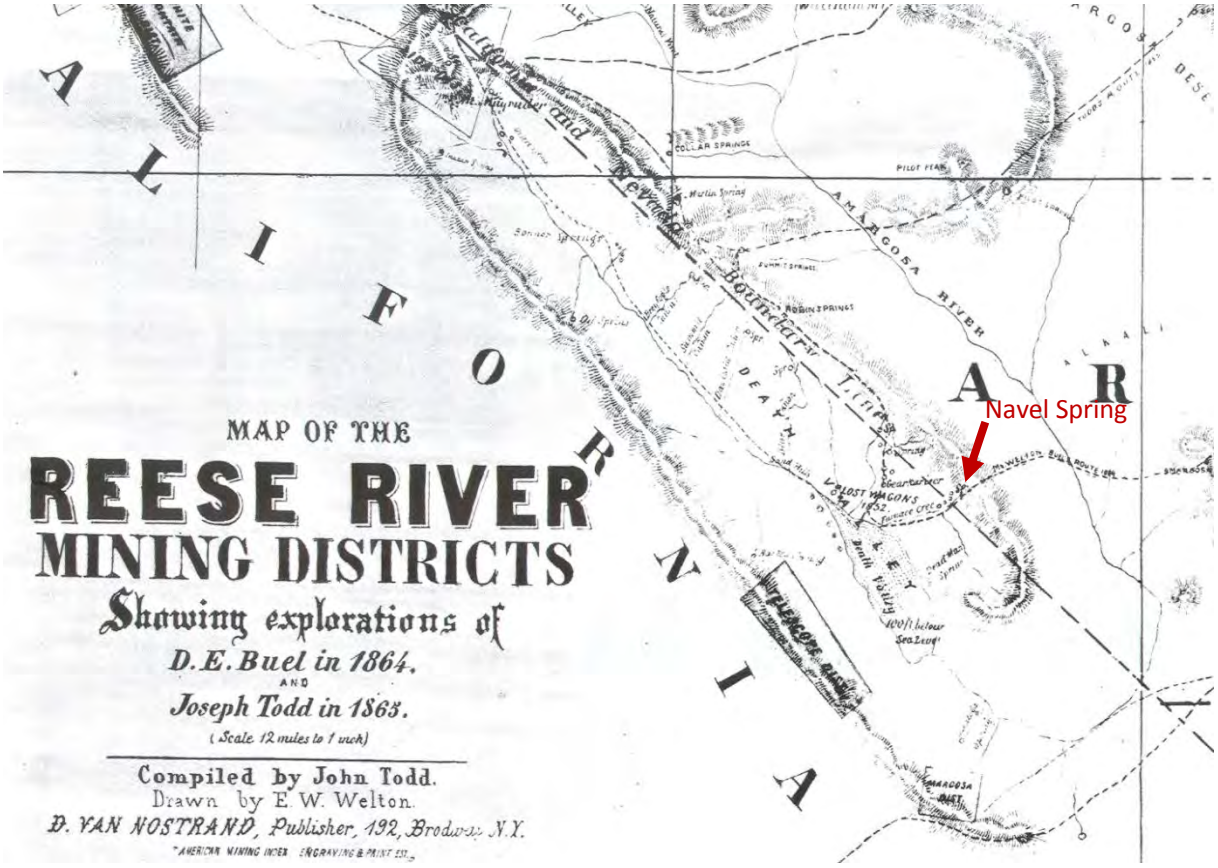


Figure 27. Navel Spring mapped during the 1864-1865 Buel-Todd expedition (adapted from Welton 1865).

From the 1870s, Death Valley expeditions were more focused on accurately describing the physical features of the country. Lt. George Wheeler leading an extensive topographic and scientific survey west of the 100th meridian came to Death Valley in 1871. More than 80 men were in the party, including geologists, mineralogists, naturalists and a photographer as well as those essential for cartography – topographers, surveyors, astronomers, and meteorologists. Although it lost two guides, the survey produced an excellent map depicting the Furnace Creek Wash road (Figure 28).

By 1891, when the Death Valley Expedition arrived with the intent to conduct a biological survey of the region, the Furnace Creek Wash road was an established route. Frederick

Coville, the party's botanist, produced a report with some field notes on his itinerary in Death Valley as well as a catalog of species he observed. While he never mentions Navel Spring, he passed by the site at least three times and likely visited there while "[taking] the trail to Furnace Creek" from Ash Meadows (Coville 1893:7). The biological survey produced a map, with Coville's route marked with a solid red line (Figure 29).

Figure 28. A section of the map drawn by the Wheeler survey party in 1871 showing the Furnace Creek Wash road. (U.S. Army Corps of Topographical Engineers 1871)

The U.S. Geological Survey arrived in the Death Valley region for detailed topographic survey in the early 1900s (Benedict 1931). By this time, mining and agriculture in the region furthered the evolution of Furnace Creek Wash road from a trail to a major thoroughfare. In addition, by 1906 when the U.S.G.S. mapped Navel Spring, it was developed with a pipeline and a tank and employed as a source of water for mining in the area, as detailed in a previous section.

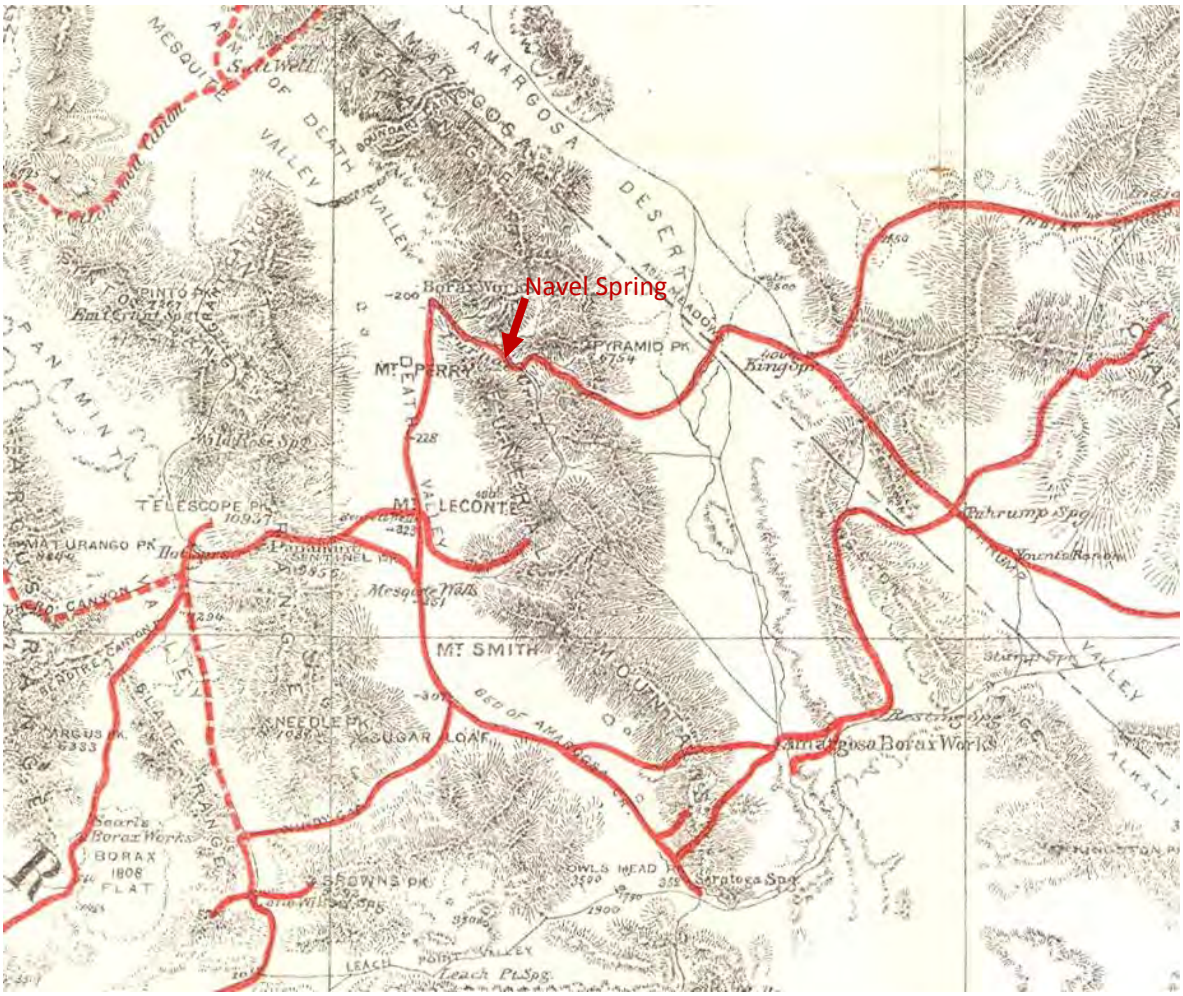


Figure 29. A portion of the map of routes taken by the botany division of the Death Valley Expedition in 1891, with Coville's route marked by a solid red line and Navel Spring added (from Coville 1893).

The First Wave of Mining– 1880s

While the incipience of metals mining in the Death Valley region dates to the 1860s, borate mining activity commenced in the 1880s. Borates had been noticed by prospectors in the 1870s, however the first borate deposit considered mineable in Death Valley was discovered by Aaron Winters in 1881 near the site of the Harmony Borax Works (Ringhoff 2012). William Tell Coleman and Francis Marion Smith, recognizing the potential for borate mining in Death Valley, organized the Death Valley Borax and Salt Mining District in 1881 and began an intensive program of prospecting and claiming borate deposits (Lingenfelter 1986:174). Along with the deposits on the saltpan which were to become the Harmony Borax Works associated with the famous Twenty-Mule Team Borax Wagons, the gentlemen claimed several deposits in the Furnace Creek Wash area, including the Monte Blanco, Corkscrew, and the Hillside group, all within a few miles of Navel Spring. While early records of water use at Navel Spring have not been found, it is reasonable to assume that the spring, as the only source for water

in upper Furnace Creek Wash was essential to these early mining endeavors. According to mining claim location notice records at the Inyo County Courthouse in Independence, California, some of the early claims adjacent to Navel Spring include the Biddy McCarthy (1883), Widow (1885), Grandview (1883), Lizzie V. Oakley (1884), Mammoth Queen (1886), Hope (1883) and the White Monster (1885).

While the Furnace Creek Wash borate deposits were claimed in the 1880s, little mining occurred at this time as Coleman and Smith focused on working the deposits at Borate south of Death Valley. Attention returned to Death Valley, however, when the Borate deposits were depleted around 1903. The Pacific Coast Borax company, with Smith at its head, began mining at the Lila C on the east side of the Funeral Mountains in Amargosa Valley. It soon established the town of (old) Ryan, and constructed a railroad, the Tonopah and Tidewater, which connected local mining centers to the Atchison Topeka and San Francisco (AT&SF) rail line in Ludlow, California. Mining at the Lila C along with the new railroad spurred the second wave of mining activity in Furnace Creek Wash.

The Second Wave of Mining– 1900s

From 1899 to 1906 the Pacific Coast Borax company (referred to as U.S. Borax in this document for consistency) represented by John Ryan, Fred Corkill, W. Cahill, and others filed location notices on several placer deposits in upper Furnace Creek Wash (Inyo County Records, Index to Mining Locations Book 3: 1896-1903; Inyo County Records, Index to Mining Locations Book 4: 1900-1904). Especially relevant here are the Furnace Borax, the Congress Borate, and the Naval Borate claims filed by Fred Corkill in May 1906. The Furnace Borax claim is described as “situated on the north side of Funeral [sic] Creek Wash wagon road…about 8 miles southeast of Furnace Creek Ranch” (Inyo County Records, Mining Locations Book M) and likely adjoined both the Congress Borate and the Naval Borate claims although no specific location information appears on their respective location notices.

The same day that Fred Corkill located the Naval Borate claim, John Ryan filed a notice of water location for Naval Springs (refer to Figure 5). This is interesting given that the borate claim allowed its holder “all water or water privileges thereon or appurtenant thereto” (Inyo County Records Mining Locations Book M). As previously discussed in the “Project Background” section of the EA, the water location notice specifies that “these springs are located about 10 miles Southeast of the Furnace Creek Ranch, and about 2 miles Northeast of the Furnace Creek road, in the Death Valley Mining District…” (Inyo County Records Land and Water Claims, Book A, page 497). The location notice also mentions that “this water is piped and stored for domestic and other purposes, by the undersigned corporation[, United States Borax Company,] for their exclusive use,” suggesting that the pipeline and water storage tank were in place before the location notice was filed (Inyo County Records, Land and Water Claims, Book A, page 497). The spring was likely at least partially developed as early as 1905 according to a map showing Navel Spring with a well-defined access road connecting it to the Furnace Creek Wash road (Bailey 1905)(refer to Figure 6).

No historical information detailing the exact use of the water from Navel Spring in the early years has been found; however Harry Gower, an assistant superintendent with U.S. Borax, remembers that it "was for many years the source of water for our assessment camps in the neighborhood" (Gower 1933). It was likely also used at the burgeoning camp of (new) Ryan before the completion of the Death Valley Railroad and for the watering needs of travelers through the Furnace Creek Wash corridor. Gower recalls traveling from Furnace Creek Ranch to one of the camps inhabited during the construction of the Death Valley Railroad in 1914 (Gower 1969:7):

> Though the thermometer still showed around 100° we took off at 10:00 p.m. for camp stopping an hour in the relative coolness at Travertine Springs and then, walking myself half the time, headed up the sandy road three hours to the Navel Spring tank. There I sat for awhile on the horse, both of us under splashing water from the filling spout, until refreshed for the last four-mile pull to camp at milepost 14 of the new railroad.

The Ryan Years

As previously discussed, Ryan Camp contains no incipient source for water; from 1914 to 1930, U.S. Borax accommodated all of Ryan's water needs by way of the Death Valley Railroad even though Navel Spring was only four miles distant. This is likely because Navel Spring's low discharge rate was not sufficient for full scale mining; Navel was not even mentioned by Gerald Waring in his 1915 seminal work *Springs of California*. Never-the-less, U.S. Borax realized the water procuring potential at Navel Spring. This is apparent in company's protection of the water source from a claim jumping episode in 1919. In this year, two men, W.S. Russell and Monohan, filed a borate claim adjacent to a U.S. Borax claim at the foot of Ryan hill and began a small-scale mining operation. This caused much consternation among the U.S. Borax management especially when the men seemed interested in the water at Navel Spring (Faulkner 1919). H.W. Faulkner, superintendent of Ryan, writing to C.R. Dudley remarks:

> I think it would be a good thing while these parties are in the neighborhood and evidently considering water possibilities, that we should make certain that our water rights [at Navel Spring] are fully protected and to have the rock monuments properly in place and everything in perfect order.

Concurrent with Russell's prospecting activity, U.S. Borax's foreman of assessment work, J.M. Jensen camped at Navel Spring for the purpose of developing water there, discovered a cinnabar deposit and filed four claims "to protect his and the Company's interest" (Faulkner 1919). The vein apparently "passed along the gulley where Naval Springs are situated" and may have overlapped the Naval Placer claims. Faulkner, concerned about the security of the Navel Spring water right, writes that

> it also appears that a considerable flow of water can be developed at Naval Springs, which would be extremely useful to have for the purposes of our camps; and if Jensen or anyone else should develop the mining claims there is

> likely to be a conflict between the mineral and water rights. I am not well versed in such matters and I would like the whole question investigated by more competent authorities on the subject.

The issue seemed to be quickly resolved after a visit from C.W. Rasor, U.S. Borax's field engineer. He confirmed that U.S. Borax's "rights to the Naval Springs are not endangered by anything that has been done by Jensen or anyone else as we have many years of continuous usage to clinch our title" (Dudley 1919b). C.R. Dudley goes on to say that "the supposed cinnabar location of Jensen has been proved to be a myth…and therefore do not think we will have anymore trouble in that quarter." Jensen's motives are unknown, although it is likely that he sought a pay-out from U.S. Borax. It is also unclear as to what happened to him after his bogus claims were dismissed.

The W.S. Russell story had quite a different ending. As it turned out, Russell discovered that the old Clara claim, which U.S. Borax had applied for a patent on in 1905 was actually on State of California school land and had never been properly claimed. He requested that the land be returned to the federal government pursuant to the law, so that he could patent it for mining. Whether or not he actually intended to mine it or the pockets of U.S. Borax is indeterminate; the case ended up in court where the judge ruled for Russell, much to the chagrin of U.S. Borax (Lingenfelter 1986:394).

The Jensen and Russell incidents caused U.S. Borax to get its house in order and set off a flurry of activity in the Furnace Creek Wash. According to Inyo County records, proof of labor filings, a requisite to hold a claim, were commenced for the Naval Placer claim in 1920, and continued in 1924, 1926, 1927, and 1929 (e.g. Inyo County Records Proof of Labor Book M, Page 16). In addition, a Naval Borate lode claim was filed in 1922 (Inyo County Records Mining Locations Book 27, page 492). Legal questions arose as to whether some borax deposits should be located as lodes instead of placer deposits, so just to be safe, many deposits were claimed as both (Lingenfelter 1986:392).

The 1920s were a period of much growth and activity at Ryan and its vicinity. Much of the camp underwent restructuring with the addition of two large miners' bunkhouses, a school house, a recreation hall, and state-of-the-art management living quarters. The increase in construction activity likely amplified traffic in the Furnace Creek Wash, perhaps furnishing a need for two tanks at Navel Spring: a large one (30,000-35,000 gallon capacity) for collecting and storing water for use by U.S. Borax in the area, and a much smaller, possibly open, trough for individuals to access water at the site. It is likely that the smaller water tank was added in the late 1910s to early 1920s as Harry Gower, traveling through Furnace Creek Wash in 1914, only mentions one Navel Spring tank (Gower 1969:7).

Although no historical information has been found describing the exact configuration of the dual water tanks, three independent sources hint not only at the presence of the two tanks, but at the area having the colloquial name of "The Tanks" (Figure 30)(Gower 1933:1; Foshag 1924:8-10; Faulkner 1919:1). In a letter from H.W. Faulkner, superintendent of Ryan, to C.R. Dudley of

Pacific Coast Borax, dated April 23, 1919, Faulkner mentions that J.M. Jensen, the foreman of assessment work, "has been camped at *the tanks* for the purpose of developing water at Navel Springs"(emphasis added). In 1924, W.F. Fostag of the U.S. National Museum, conducting a survey of mining in the area describes how the Monte Blanco mining district on the north side of the Black Mountains could be reached from Ryan "by continuing down the Wash past *The Tanks* and taking the only road to the south…" (emphasis added)(Fostag 1924:8). Finally, Harry Gower in a letter to J.R. Holtum regarding inquiries about Navel Spring, remarks that "water from it runs down to what is called *the Tanks* in Furnace Creek Wash, five miles below Ryan" (emphasis added)(Gower 1933). For reasons discussed below, sometime before the 1960s the smaller tank was removed.

Figure 30. Navel Spring water tank, 1930s-1940s. There may have been a smaller tank out of view of this photo to the left of the large one. Courtesy National Park Service, Death Valley National Park; DV-RYA 29.

The Navel Spring tanks provided an ideal campsite for travelers and U.S. Borax employees alike. Sources indicate that a few individuals set up permanent campsites at the tanks in the late 1910s-1920s. Jensen, the foreman of assessment work, as mentioned above lived at the tanks as did a local stone mason working at Ryan. He and his wife, a Timbisha woman, lived at the tanks for several months while he built rock walls at Ryan.

Harry Gower, in describing a flash-flooding incident that occurred at Navel Spring, offers much information as to the configuration and equipment of people living at the spring (Gower 1969:129-130):

> Once we put a couple of miners to work on a project to develop water at Naval Springs for use at Ryan four miles away. These fellows cooked and slept in a big tent equipped with stove, beds, ice box, chairs, etc., but unfortunately located in a dry wash. On account of frequent strong winds the tent was well guyed with ropes; the side walls and flaps rolled up for ventilation.
>
> Though good miners they were the world's worst housekeepers, threw everything on the dirt floor and never swept out in spite of orders by the management to clean up the joint. One afternoon the roar of an approaching flood from a desert cloudburst barely allowed them time to escape from the shaft and tunnel which filled quickly with mud and rocks.
>
> The deluge left the tent standing but stripped it clean of all, I mean every item of goods and furnishing [sic] and rolled their truck head over heels for half a mile. Later we came along to appraise the damage and found the men shivering in their Levis, their only remaining possessions. Their account of the disaster was sarcastic and brief. "We were cleaning the tent and the water got away from us."

While Gower attaches no date to his anecdote, it is safe to assume that it occurred before 1930, when mining at Ryan ceased and he was transferred to run the Amargosa Hotel at Death Valley Junction. The incident likely happened in the mid to late 1920s; the men living at the spring were "miners" and they seem to be working on a "shaft and tunnel." It is likely that the tunnel Gower refers to is the lower adit. The shaft might be either a winze sunk in the tunnel or a wholly separate working, not present at the site today. Unfortunately, there are no records detailing specific construction plans for the spring from this period, however water tunnels were being driven elsewhere in the area (U.S. Borax 1957). According to a historic photo, the lower adit was definitely present by the 1930s (Figure 31).

A Focus on Navel Spring

In 1927, U.S. Borax shifted mining operations from Ryan to the Kramer deposit at present-day Boron, California. Ryan, the mining camp, became the Death Valley View Hotel offering tourist accommodations to visitors of Death Valley. In 1930, the Death Valley Railroad, which had brought water to Ryan for many years was removed, leaving Ryan without water. From 1930 to present day, Ryan relies on Navel Spring for all of its water. Harry Gower, whose wife Pauline operated the Death Valley View Hotel at Ryan, surmises that the hotel accommodations "could not be made to pay without transportation or water so were closed to be used through the succeeding years only for emergency housing…Water in small quantities came by truck from Navel Springs…in these emergencies" (Gower 1949). Please refer to the "Project Background" section of the EA for more information about the vital relationship between Ryan and Navel Spring from 1930 onward.

Figure 31. The lower adit at Navel Spring, likely 1930s.
Courtesy National Park Service, Death Valley National Park; DV-RYA 32.

Tourism Comes to Death Valley

Tourist travel in Death Valley evolved concurrently with other activities; however for the sake of clarity, it is given its own section. It did not begin at any definite time, but was a rather gradual development (Woodman [1941]). In the 1910s, the Automobile Club of Southern California encouraged automobile tourism in Death Valley with the distribution of a series of detailed road maps (Automobile Club of Southern California 1916)(Figure 32). In the 1920s and 1930s, U.S. Borax constructed several hotels in the area including the Furnace Creek Inn and the Furnace Creek Ranch, and transformed abandoned mining properties into the Death Valley View Hotel at Ryan and the Amargosa Hotel at Death Valley Junction. To provide access to their facilities the Borax company regularly maintained regional roadways.

In 1933, President Hoover signed the proclamation creating Death Valley National Monument and accentuating the burgeoning Death Valley tourist industry. In 1934, Death Valley roads

were taken into the state roads system providing a 223 mile loop tour (Vickrey 1934:4). The route from Lone Pine to Death Valley Junction and south to Baker was named CA-127 and was oiled (and paved in some locations) (Lowden 1936). According to the State Highway engineers, it was estimated that in 1935 approximately 50,000 visitors to Death Valley used CA-127 leading to points of interest (Lowden 1936:6).

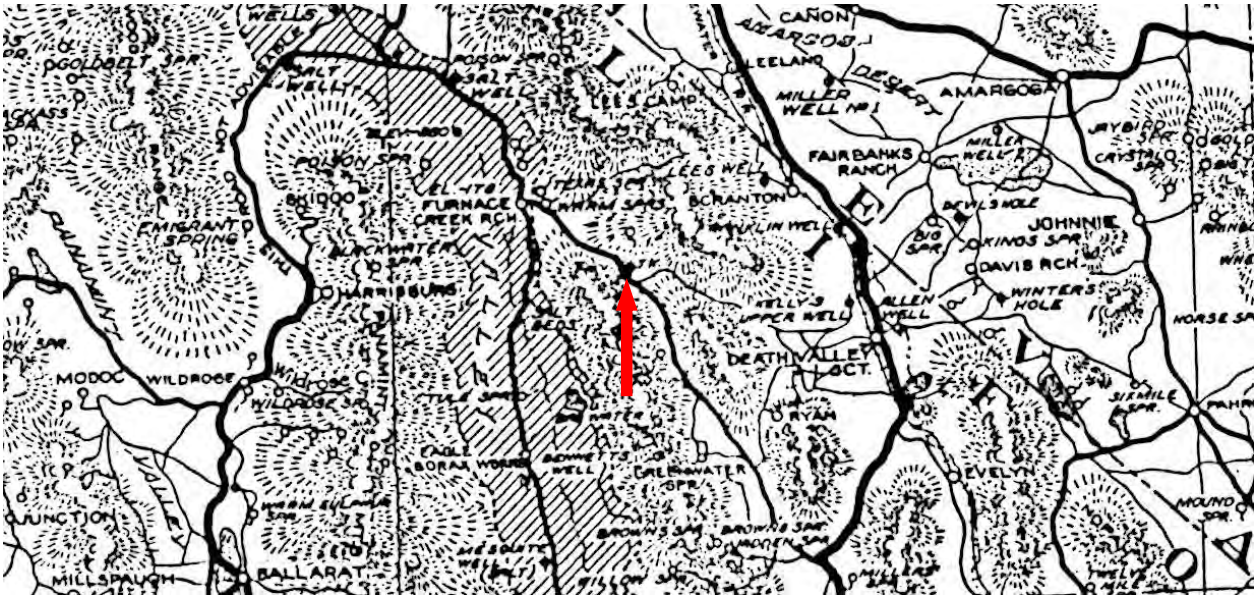


Figure 32. Some Death Valley roads in 1916. The Navel Spring tank is labeled "TK." as a source of water (at red arrow). (Portion of Automobile Club of Southern California 1916)

The Furnace Creek Wash road provided the means for one of the most popular tours in the Monument—from the Furnace Creek Ranger Station to Dante's View (National Park Service 1933:5). The road was subject to frequent flash flooding and its condition occasionally was called into question as discussed in the Death Valley Travel Data section of *Desert Magazine* (*Desert Magazine* 1939:29):

> Furnace Creek road – An unauthorized and misleading bulletin has been circulated representing this road as being in bad condition. On the contrary this road is oiled and in excellent condition for the entire distance between Death Valley Junction and the floor of Death Valley. Within the monument there are several short stretches of gravel on the road, but these patches are well maintained and are in excellent condition.

From the 1930s through the 1950s, travelers traversing the Furnace Creek Wash corridor on CA-127 (and later the paved State Route 190) likely used the Navel Spring tank area for picnicking and overnight camping, especially because of its close proximity to the original Ryan Checking Station. The National Park Service encouraged the use of the tanks: they are found on Death Valley National Monument brochure maps in 1941, 1949, 1950, 1956, and 1957 labeled as "Water" (Figure 33).

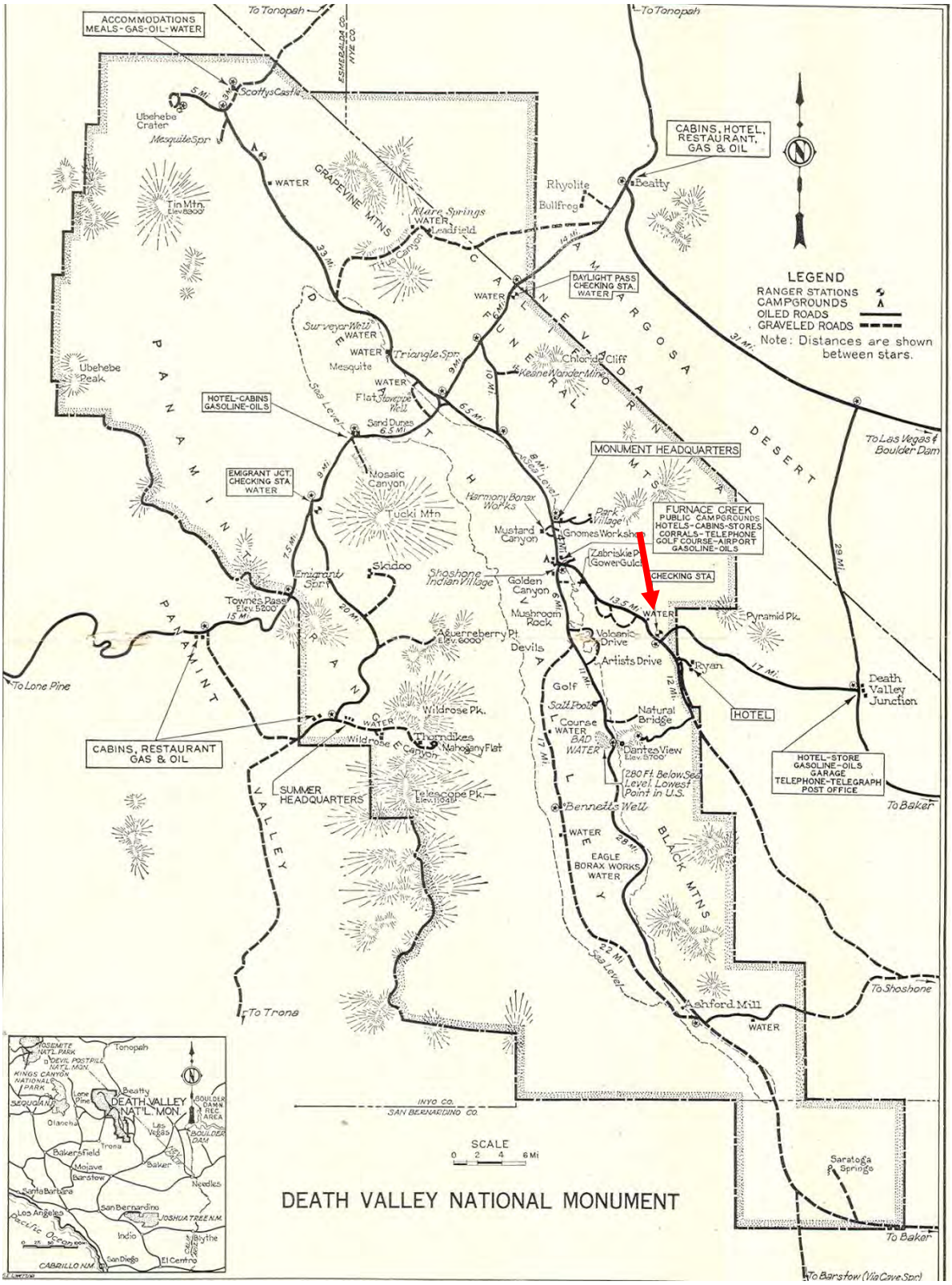


Figure 33. Death Valley National Monument, 1941.
The tanks are labeled as "Water" on this map (at red arrow). (National Park Service 1941)

In 1958, the Death Valley National Monument brochure map shows the tank but does not label it as “water” while on the 1961 map the tank is gone completely. This may have been about the time that U.S. Borax removed the second tank and installed a sign at the tank discouraging the use of the water for safety reasons. Little camping and picnicking occurred after 1960 at the site. Presently, thousands of tourists pass by the storage tank each year as they drive on State Route 190 through the Furnace Creek Wash corridor, unknowingly traversing through the Navel Spring historic landscape.

Cultural Resources

Humans have used water from Navel Spring for thousands of years; this use has left physical imprints on the land in the form of archeological resources, historic districts, and cultural landscapes. Cultural resources inventories identified three archeological sites within the project APE. Research and development of a historic context for Navel Spring identified the presence of a possible ethnographic landscape and an archeological district. Two of the recorded sites are associated with the Ryan Historic District.

Archeological Resources

Death Valley archeological staff initiated cultural resources inventory for the proposed project in May 2011. Park personnel and volunteers conducted additional Class III intensive pedestrian survey of the APE in March and April 2012. A reconnaissance survey was conducted in May 2013 in order to clarify the location of previously recorded resources. These surveys identified several prehistoric and historic features which were grouped into three archeological sites. The Navel Spring water collection and conveyance system was recorded as 10-063-01. The site consists of the collection adits and associated features, historic water pipe, and the access road. The non-historic water tank is included as a feature in an overlapping site which consists primarily of historic campsites: 10-063-03. A third site, 10-063-02, is a historic road which may be the original Furnace Creek Wash wagon road that took travelers entering Death Valley from the east directly to the two water storage tanks installed by U.S. Borax. Prehistoric archeological features occur within these sites and include cleared circles and lithic scatters.

These three archeological sites have not been formally evaluated for listing on the National Register of Historic Places. They will be treated as eligible for listing for the purposes of this undertaking.

Site Number	Site Type	Management Status
10-063-01	Navel Spring Water System; Prehistoric/Historic	Unevaluated, treat as eligible; Possible contributing element to Ryan Historic District
10-063-02	Historic Road	Unevaluated, treat as eligible.
10-063-03	Historic Campsites; Prehistoric/Historic	Unevaluated, treat as eligible; Possible contributing element to Ryan Historic District
Archeological District	Prehistoric	Unevaluated, treat as eligible

Table 3. Archeological resources identified within direct Area of Potential Effect (APE).

The area including and surrounding Navel Spring is being treated as an eligible archeological district based upon the number and diversity of sites which cluster within approximately one mile of the spring itself. Sites in the surrounding area contain rock rings, petroglyphs, hunting blinds, cairns, and trails.

Historic Districts

According to the NPS (1995:5):

> A [historic] district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

One historic district has been delineated in the project area: the Ryan historic district.

Ryan Historic District

Although Ryan is four miles from Navel Spring, the Ryan historic district has been identified as an historic district whose contributing elements lie within the affected environment of the project. The Ryan historic district is eligible for listing on the National Register under criterion A for its association to borax mining in the United States and early tourism in Death Valley, criterion C, for its distinctive Ryan vernacular architecture, and criterion D for the information it can yield regarding borax mining and the beginnings of the Death Valley tourist industry.

Sites 10-063-01 (Navel Spring water system) and 10-063-03 (the historic campsites) may be eligible individually and are being treated as eligible for the purposes of this undertaking. They may additionally be eligible as contributing elements to the Ryan historic district with a period of significance from 1914 to 1960. They work in concert to increase the significance of Ryan and may help to answer major research questions regarding early borax mining operations in the American West and early tourism in Death Valley. Each of these components will be discussed in detail below.

Site 10-063-01 represents the Navel Spring historic water collection and conveyance system. In the early years (post 1906), this system allowed U.S. Borax to procure and use water at its assessment camps in the area. Although Ryan did not fully rely on water from Navel Spring until 1930, U.S. Borax always viewed the spring as an important constituent of successful operations at Ryan. Mining operations evolved into a budding tourist business in 1928 when U.S. Borax shifted its borate extraction to Boron. While the Death Valley View Hotel continued to receive water by rail from 1928 to 1930, it flourished. However when the railroad was dismantled, the Death Valley View Hotel now fully reliant on Navel Spring for water, struggled. The hotel discontinued operations due, in part, to the inadequacies of spring discharge and the labor and fuel expenditures associated with hauling water from the spring. While it may not have been able to support a full-time hotel operation, the spring works were essential to the vitality of Ryan for fire protection, tourist activities, and domestic purposes. It allowed the camp to be lived at, protected, and preserved.

The Navel Spring access road was constructed and maintained by U.S. Borax for access to its water collection and conveyance works at Navel Spring. Correspondence in the early years of Ryan seems to suggest that company employees continuously monitored the water system. After 1930, the road was used primarily to haul water to Ryan via a water truck. The road allowed access to the vital resource of which Ryan was lacking—water.

The components of site 10-063-03 which are associated with the semi-permanent campsites of U.S. Borax employees are being considered significant in that they represent a satellite residential district of Ryan. Historical documentation and oral interviews indicate that three groups of people lived at The Tanks in the 1910s and 1920s while working for U.S. Borax. Ryan's satellite residential district may illuminate the social negotiation of power among U.S. Borax management and employees.

Cultural Landscapes

The National Park Service (1998) defines a cultural landscape as: "a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values

and traditions." Ethnographic landscapes "are associated with contemporary groups and typically are used or valued in traditional ways."

Birnbaum (1994:1) defines a cultural landscape as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity or person or exhibiting other cultural or aesthetic values." Navel Spring would meet the NPS definition of a historic vernacular landscape, or one that evolved through use by the people whose activities or occupancy shaped that landscape (Birnbaum 1994:1). The prehistoric individual hunting bighorn sheep or using a cleared circle, the wagons of early survey parties traversing down the Furnace Creek Wash, the U.S. Borax employees digging a ditch to lay a pipeline, the Basque stonemason and Timbisha woman living near the storage tank, and the Death Valley tourist stopping to have a picnic are some activities which constitute the fabric of the Navel Spring cultural landscape. In addition, these activities leave imprints on the land, which when read can reveal much about the people, activities, and meaning ascribed to Navel Spring.

Landscape characteristics or elements are the tangible evidence of the activities and habits of the people who occupied, developed, used, and shaped the land to serve human needs; they may reflect the beliefs, attitudes, traditions, and values of these people (McClelland 1989). Landscape elements can take the form of vegetation related to land use, building, structures, and objects, feature clusters, archeological sites, and small-scale elements and reflect land uses and activities, patterns of spatial organization, a response to the natural environment, cultural traditions, and boundary demarcations.

Character-defining features of the Navel Spring cultural landscape may include the water storage tank, the Navel Spring access road, the historic Furnace Creek Wash road, several historic campsites in the area, the buried pipeline, prehistoric hunting and settlement features, the gradual topography from the Furnace Creek Wash to the Navel Spring Canyon, the water collection adits, the buried mine car track, the spring's natural steep-walled canyon, its multiple seeps, and the overhanging cliff which comprises the back wall of the canyon. The visual and spatial relationships of these elements as well as their location with regards to topography give the Navel Spring cultural landscape its historic significance. The landscape may reveal much about prehistoric settlement and subsistence, prehistoric technological change, early exploration and survey, water collection and conveyance technology, mining practices and land use, mining social history, transportation routes, protohistoric Native Americans, and tourism in Death Valley.

Ethnographic Resources

Navel Spring may also be significant as an ethnographic landscape. Ethnographic landscapes (NPS, 1998) "are associated with contemporary groups and typically are used or valued in traditional ways."

The Timbisha Shoshone Tribe Historic Preservation Advisory Committee (HPAC) has identified Navel Spring as a place of traditional cultural importance. The Timbisha name for the spring is *Wasipibaa* or *Wasipinbda* – from the term for bighorn sheep (Fowler et al. 1995:70). The Timbisha recognize the spring as a watering area for sheep and hunted in the area into the 1940s (Fowler et al. 1995). Bighorn hunting is deeply rooted in Timbisha culture: the Timbisha have identified themselves as "bighorn sheep eaters" (Fowler et al. 1995:119). Bighorn hunting also had social implications as a means for men to demonstrate that they were good providers and therefore good potential husbands.

Generally ethnographic landscapes are listed on the National Register of Historic Places as either TCPs or as districts. A draft National Register nomination prepared for the Timbisha Shoshone Tribe in 1996 identified Navel Spring, and a surrounding area within a radius of 250 meters, as a Traditional Cultural Property (TCP) for its ceremonial and subsistence significance to the Timbisha Shoshone (Jones and Beck 1996). A traditional cultural property is a property that is associated with cultural practices or beliefs of a living community that (1) are rooted in that community's history, and (2) are important in maintaining the continuing cultural identity of the community (Hardesty and Little 2001:41-42; see also King 2003). Ethnographic and archeological evidence suggest that Navel Spring both has deep roots in the history of the Timbisha Shoshone and has been used to maintain their cultural identity. It is a place that holds special meaning for the Tribe and thus qualifies as an ethnographic resource.

SCENIC RESOURCES

Death Valley National Park is world renowned for its breathtaking vistas and awe-inspiring natural scenery. In fact one of the primary purposes of the Park is to "preserve the unrivaled scenic, geologic, and natural resources of these unique natural landscapes, while perpetuating significant and diverse ecosystems of the California desert in their natural state" (NPS 2002a:3). The Navel Spring water storage tank (and an extremely well-developed mesquite tree) is visible from SR 190, a major thoroughfare for entry into and egress out of Death Valley, thus it potentially has a visual impact on passing motorists (Figure 34). In addition, the black 2-inch HDPE pipeline running along the surface from the spring to the tank, the telephone line, and the Southern California Edison powerline paralleling the roadway are also visibly obtrusive. After the completion of the project, the tank would be larger in size however the black pipeline would be removed.

Figure 34. The water storage tank as it appears from SR 190, looking northward.

The NPS offers some guidance as to the management of Park viewsheds (*Management Policies 2006*: Section 9.1). Whenever possible utilities (water, power, and telecommunication) will share a common corridor and be combined with transportation corridors. The visual disturbance created by the tank is confined to the Furnace Creek Wash corridor and is not visible from either of the two nearby vista points of Dante's View or Zabriskie Point.

In addition to preserving natural features, Death Valley National Park aims to "preserve the cultural resources of the California desert associated with prehistoric, historic and contemporary Native American culture, patterns of western exploration, settlement and mining endeavors" (NPS 2002a:3). Thus, in addition to the perception of the water storage tank as a visual intrusion on the natural landscape, it can also be viewed as a landmark of Death Valley's cultural history and its replacement seen as consistent with the cultural landscape. Historical documentation suggests that the tank (or tanks) served as a landmark for travelers through the Furnace Creek Wash corridor and symbolized a place to hydrate and rest, and for some, a place to dwell. The water storage tank is a character-defining feature of the Navel Spring cultural landscape. The current and replacement tanks are modern; however, they reflect the same form and function as the original water tank, thus providing continuity to the historic landscape.

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section describes the potential environmental consequences associated with the no-action and preferred alternatives. The methodologies and assumptions for assessing environmental consequences are discussed, including consideration of context, intensity, and duration of impacts; cumulative impacts; and measures to mitigate impacts. Subsequent sections under the "Environmental Consequences" section are organized by first impact topic, then by alternative.

METHODOLOGY

Overall, the NPS based impact analyses and conclusions on the review of existing literature and Park studies, information provided by experts at the Park and other agencies, professional judgments, Park staff insights, and comments received during the scoping process.

CONTEXT, INTENSITY, DURATION, AND TYPES OF IMPACT

The following are some of the key considerations in environmental impact analysis. According to CEQ Regulations (40 CFR 1500-1508), impact analysis must evaluate the context, duration, intensity, and quality of impacts as well as describe the direct, indirect, and cumulative impacts of the alternatives on resources of concern.

Context: The significance of an action must be analyzed from several perspectives, such as society as a whole, the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, such as the proposed project represents, significance would depend upon the effects in the locale rather than in the world as a whole. For this EA, impacts will likely occur only on the local and/or regional level. Local impacts would occur within the vicinity of Navel Spring, while regional impacts would occur within the wider Death Valley National Park and slightly beyond its boundaries.

Intensity: Intensity refers to the severity of the effect (40 CFR 1508.27). Factors that have been used to define intensity of effects include magnitude (relative size or amount of an effect), geographic extent (how widespread the effect may be), duration (given its own definition below), and frequency (whether an impact is a

one-time event, intermittent, or chronic). In this EA, intensity is measured qualitatively in degrees - impacts can be negligible, minor, moderate, or major.

Duration: Duration refers to how long the impact will last and can be short or long term. A short-term impact is temporary in duration and is associated with construction activities, as well as the period of site restoration up to five years after construction ceases. A long term impact is generally one that lasts longer than five years. The specific durations are only guidelines as the categorization of short- versus long-term impacts depend on the resource.

Quality: An impact can be either adverse or beneficial. Beneficial impacts would improve resource conditions, while adverse impacts would deplete or negatively alter resources.

Direct impacts: Effects caused by the alternatives at the same time and in the same place as the action.

Indirect impacts: Effects caused by the alternatives that occur later in time of farther from the action, but are still reasonably foreseeable.

Cumulative impacts: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

CUMULATIVE IMPACT SCENARIO

To determine potential cumulative impacts, projects within the Navel Spring area were identified. Potential projects identified as cumulative actions included any planning or development activity that was completed, that is currently being implemented, or that would be implemented in the reasonably foreseeable future.

These cumulative actions are evaluated in the cumulative impact analysis, in conjunction with the impacts of each alternative, to determine if they would have any additive effects on a particular natural resource, cultural resource, or other impact topic. Cumulative impacts are specific to the impact topic and are evaluated for each impact topic and alternative.

ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

Geology, Soils, and Geologic Hazards

Geology, soils, and geologic hazards have been selected as relevant impact topics in need of further analysis. According to the NPS *Management Policies 2006* (Section 4.8), the NPS will preserve and protect geologic resources as integral components of park natural systems. Geologic resources include both geologic features and geologic processes. In addition, management action will be taken by superintendents to prevent or at least minimize adverse, potentially irreversible impacts on soils (Section 4.8.2.4). Lastly, the NPS will work with other agencies and individuals to devise effective geologic hazard identification and management strategies (Section 4.8.1.3).

All available information on geology, soils, and geologic hazards to potentially receive impacts was compiled from agency databases, scholarly literature, previous studies, and current site review. Predictions concerning short- and long-term site impacts were based on previous projects in desert environments with similar geology and soils/fill materials. The thresholds of change for the intensity of an impact to geology, soils, and geologic hazards are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Geologic features, processes, soil development, and geologic hazards would not be affected or the effects would be below or at the lower levels of detection based on standard scientific methodologies for geologic features and processes, soil formation and geologic hazards. Any effects to geologic features, soils, and geologic hazards would be slight.
Minor	The effects to geologic features, processes, soil development, and geologic hazards would be detectable upon monitoring for loss or change of features or shallow developed soils and would be small and localized with minimal loss of contextual information. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and likely be successful.
Moderate	The effect on geologic features, processes, soil development, and geologic hazards would be apparent and result in a change over a relatively wide area. Upon monitoring, some geologic features and contextual information would be lost and disruption to key geologic processes would be short term. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
Major	The effect on geologic features, processes, soil development, and geologic hazards would be readily apparent and substantially change the character of the geology and soils over a large area. Upon monitoring, many geologic features and contextual information would be lost and disruption to key geologic processes would be permanent. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

Impacts to geologic features and processes that are recovered in three years after construction are considered short term. Impacts to geologic features and processes that last longer than three years after construction are considered long term. Soil impacts would be considered short term if the soils recover in less than three years and long term if the

recovery takes longer than three years. Geologic hazard impacts will be considered short term if the hazard is rectified to only within five years and long term if the hazard is rectified beyond five years.

Alternative A – No-Action

Direct and Indirect Impacts
The no-action alternative would have short- and long-term negligible to minor adverse effects to geologic features, processes, and soils. At Navel Spring, the water collection system would continue to require periodic cleaning and inspection. At the lower adit, Ryan personnel would continue to manually excavate and remove newly deposited gravels after flash flood events. In addition, personnel would maintain a trench in front of the lower adit in effort to prevent surface waters from entering and contaminating the underground collection area. The collection sump would be periodically cleaned of mud and debris. A minimal quantity of material would occasionally be excavated from inside of and in front of the lower adit and deposited into the alluvial wash. The ground around the lower portal would continue to erode at a slow rate subsequently increasing the opening and possibly allowing access to the adit. The upper adit would be periodically monitored for on-going ground failures and potentially adverse effects to the lower adit. The palm stumps would remain in place, and the potential for ground and/or slope disturbance from their removal would be negligible and short and long term.

The water storage tank would remain in place and no new concrete foundation would be constructed, having short- and long-term, negligible adverse impacts to geological erosion and deposition of removed materials.

The Navel Spring access road would not have increased traffic or use, which can cause ground disturbance in the road bed and require road maintenance. A trench would not be excavated down the Navel Spring access road and the pipeline buried; hence the adverse impacts to geological features, processes, and soils would be negligible and long term.

In terms of geologic hazards, the impacts of the no-action alternative would be short- and long-term, minor, and adverse. The no-action alternative does not allow for the stabilization of the upper adit, which appears to be caving and has the potential to weaken the steep, overhanging back wall of the canyon.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect geologic features, processes, soils, and geologic hazards include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short-and long-term, negligible adverse impacts on geologic features, processes, and soils. The cumulative impacts of past,

present, and reasonable foreseeable future actions, in combination with the no-action alternative, would have short- and long-term, moderate adverse impacts to geologic hazards.

Conclusion
The no-action alternative would have short- and long-term, negligible to minor adverse impacts on geologic features, processes, and soils and short- and long-term, minor adverse impacts on geologic hazards. The no-action alternative would have short- and long-term, negligible adverse cumulative impacts to geologic features, processes, and soils and short- and long-term, minor, adverse impacts to the cumulative impacts to geologic hazards.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
The proposed action may potentially impact geologic features, processes and soils in that it involves the relocation of material from within and in front of the lower adit to a naturally occurring alluvial drainage in Navel Spring canyon. Deposited material would be evenly spread in the wash bottom. To complete the work at the lower adit, a small excavator and skid steer would travel through the canyon bottom over loose and compacted alluvium to the lower adit. Some road work (in the form of plucking large boulders out of the road with a small excavator) would need to be completed to create a pathway for the equipment and hence some alluvial gravels would be disturbed. The removal of the palm stumps has the potential to disturb the sediments and soils at the level of the upper adit and may cause some rock fall from the slope adjacent to the palms. In total, impacts to geologic features, processes and soils at Navel Spring would be short-term, minor and adverse.

Along the Navel Spring access road, an 18-inch deep trench would be excavated (ripped with a bulldozer) further affecting soils, erosion, and deposition. Materials excavated from the trench would be spread evenly across the road bed. In addition, traffic from construction vehicles and equipment would increase, and would likely require road maintenance with a front-end loader. All efforts would be made to retain the original grade of the road bed. In an effort to mitigate erosion, erosion control channels would be placed as necessary, under the direction of the NPS hydrologist. Impacts to geologic features, processes, and soils along the Navel Spring access road would be short-term, minor, and adverse.

The current tank would be disassembled on site and removed. For the foundation of the replacement water storage tank, an area 30 feet in diameter would be excavated approximately 18 inches deep in a large, flat area just west of the current tank. A concrete ring would be formed and the center area would be filled with gravel. Material excavated from the foundation ring would be placed in the nearby wash. Impacts to geologic features, processes, and soils at the water storage tank would be short-term, minor, and adverse.

A large overhanging cliff above the upper adit has several tension cracks rendering it a potential geologic hazard. This may be due to the instability and caving of the upper adit. Although the magnitude and timing of future geologic hazards are difficult to forecast, the

collapse of the upper adit and subsequent collapse of the overhang may induce a catastrophic rockfall that would leave an unnatural accumulation of debris and scarring of the cliff face. Such a collapse may pose a health and safety hazard and may destroy the water collection system. The project proposes to fill the upper adit with pervious cellular concrete thus resulting in its long-term stabilization. Thus, the impacts to geologic hazards at Navel Spring canyon would be long-term, minor, and beneficial.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect geologic features, processes, soils, and geologic hazards include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the preferred alternative, would have short-term, minor adverse impacts on geologic features, processes, and soils. The cumulative impacts of past, present, and reasonable foreseeable future actions, in combination with the proposed action alternative, would have long-term, minor beneficial impacts to geologic hazards.

Conclusion
The proposed action alternative would have short-term, minor adverse impacts on geologic features, processes, and soils and long-term, minor beneficial impacts on geologic hazards. The proposed action alternative would have short-term, minor adverse cumulative impacts to geologic features, processes, and soils and long-term, minor, beneficial cumulative impacts to geologic hazards.

Vegetation

Vegetation has been selected as an impact topic in need of further analysis. NPS policy regarding native biotic management is to minimize human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them (Section 4.4.1, NPS *Management Policies 2006*). All available information on vegetation and plant communities potentially impacted in the project area was gleaned from vegetation surveys conducted by NPS personnel and current plant literature. Predictions about short- and long-term site impacts were based on previous projects with similar vegetation and recent studies. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	No native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species population size, integrity, or continuity. The effects would be on a small scale.
Minor	The alternative would affect some individual native plants and would also affect a relatively limited portion of the plant community, but the viability of the plant community would not be affected and would recover naturally. Mitigation to offset adverse effects could be required and would be effective.
Moderate	The alternative would affect some individual native plants and would also cause a localized change in the plant community (e.g., abundance, distribution, quantity, or quality) possibly over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful.
Major	The alternative would have a considerable permanent and noticeable effect on native plant populations, the plant community, and affect a relatively large area of the park. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

Duration of vegetation impacts is considered short term if the vegetation recovers in less than three years and long term if the vegetation takes longer than three years to recover.

Alternative A – No-Action

Direct and Indirect Impacts

Existing vegetation in the project area is subject to the natural processes of erosion, rock slides, and rapid water and alluvium movement during flash flood events. Existing maintenance practices have very little impact on established native vegetation in the project area. Vegetation in travel corridors (roadways and footpaths) would be subject to some trampling in the no-action alternative. In addition, the periodic excavation, removal, and deposition of materials from inside and in front of the lower adit may result in vegetation burial. One existing adverse impact to native plant vegetation is the retention of invasive palm stumps at the level of the upper adit. The palms may re-grow and deprive adjacent hydrophytic native vegetation of soil nutrients and water. Therefore, impacts to native vegetation of the no-action alternative are deemed short- and long-term, negligible to minor and adverse.

Cumulative Impacts

Past, present, and reasonably foreseeable future projects with the potential to affect native vegetation include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action

alternative, would be short- and long-term, negligible to minor and adverse impacts, especially for hydrophytic plants at the level of the upper adit.

Conclusion
Although most of the native vegetation would receive no impact from the no-action alternative, the competition between the invasive palms and the hydrophytic vegetation at the level of the upper adit renders the impacts of this alternative short- and long-term, negligible to minor and adverse. The alternative would have short- and long-term, negligible to minor adverse cumulative impacts.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
Proposed construction activities would cause ground and geologic feature disturbances that may adversely impact vegetation. Native vegetation established in the wash below the lower adit may get buried by the deposition of excavated materials. During construction and occurring throughout the project area, vegetation in the pathway of construction vehicles and equipment could be trampled and crushed. Vegetation along roadways would likely receive construction dust. Any vegetation growing in the centerline of the Navel Spring access road would be uprooted with excavation of the pipeline trench. In addition, a few large mesquites, especially near the current water storage tank, would need slight pruning where they protrude into the construction areas. The rare native plant, *Eriogonum hoffmanii* ssp. *hoffmanii*, present in the area between SR 190 and the water storage tank, could potentially be impacted; however, according to the NPS botanist, this plant does well with ground disturbance and any individual losses are likely to recover quickly. In an effort to mitigate visual disturbances, a few native mesquites (of the local Death Valley genotype) would be planted in front of the replacement water storage tank. In total, impacts to native vegetation would be short-term, minor, and adverse.

The removal of the palm stumps would have short-term, negligible, adverse impacts during construction from the potential disturbance of adjacent native plants, and long-term, moderate, beneficial impacts after construction from habitat restoration. Two specimens of the rare plant *Juncus cooperi* are present in this area. To protect these plants, wooden boxes would be placed over them during the palm stump removal and also during any construction activities occurring in their vicinity. The boxes would be removed during break and quitting times.

For the long-term, the total removal and management of the palms would benefit the Navel Spring plant community. Native hydrophytic plants would no longer have to compete for soil nutrients and water and their populations would flourish. The overall impacts of the palm removal on native vegetation would be long-term, moderate, and beneficial.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect native vegetation include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short-term, minor adverse and long-term, moderate, beneficial impacts on native vegetation, especially for hydrophytic plants at the level of the upper adit.

Conclusion
The proposed action alternative, as a whole, would have short-term negligible to minor adverse and long-term moderate beneficial impacts to native vegetation in the project area. In addition, it would contribute to short- and long-term negligible, adverse cumulative impacts.

Wildlife

Due to the potential impacts to the Navel Spring faunal community, wildlife was selected as an impact topic needing further analysis. The National Park Service Organic Act of 1916 directs parks to conserve wildlife unimpaired for future generations and is interpreted by the NPS to mean that native animal life should be protected and perpetuated as part of the park's natural ecosystem. Natural processes are relied on to control populations of native species to the greatest extent possible as they are protected from harvest, harassment, or harm by human activities. Information on Death Valley National Park wildlife was acquired from park documents, records, site-specific studies, and current site review. Park natural resource management staff also provided wildlife information. The thresholds of change for the intensity of an impact to wildlife are defined as follows:

Impact Intensity	Intensity Definition
Negligible	There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be of short duration and well within natural fluctuations.
Minor	Impacts would be detectable, but they would not be expected to be outside the natural range of variability and would not have any long-term effects on native species, habitats, or natural processes. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Breeding animals are present; animals are present during particularly vulnerable life-stages such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the national park system unit. Impacts on native species, their habitats, or the natural processes sustaining them would be detectable and could be outside the natural range of variability short term. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Impacts on native species, their habitats, or the natural processes sustaining them

Impact Intensity	Intensity Definition
	would be detectable and long term to permanently outside the natural range of variability. Loss of habitat might affect the viability of at least some native species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

The duration of wildlife impacts is considered short term if the recovery is less than one year and long term if the recovery is longer than one year.

Alternative A – No-Action

Direct and Indirect Impacts
The no-action alternative would allow the continuation of existing maintenance practices at Navel Spring. At present, the lower adit is periodically cleaned out, a trench is excavated in front of the adit, and material which has collected from in front of the adit is placed in the adjacent drainage. The water system is periodically inspected. Existing practices may prevent wildlife from approaching the spring canyon because of the human presence; however the impacts to wildlife are short- and long-term, negligible, and adverse.

Along the Navel Spring access road, wildlife might become wary of occasional traffic or very rarely be killed by motor vehicles.

At the water storage tank, wildlife, especially birds, would continue to drink from pools of water created by the overflow spout. There would be no impacts to wildlife at the tank.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect wildlife include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, negligible adverse impacts on wildlife.

Conclusion
The no-action alternative would have short- and long-term, negligible impacts to wildlife. The alternative would have short- and long-term, negligible cumulative impacts on wildlife.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
For the preferred alternative, proposed construction activities could temporarily displace wildlife communities in the project area and has the potential to limit animals' access to water

during working hours. Construction activities at Navel Spring would last approximately four weeks and would involve increased human activity, noise, and ground-disturbance with the potential to displace and disturb wildlife. The proposed construction could also temporarily increase the risk of wildlife mortalities through accidental killing of individuals or by increased susceptibility to predation or competitive stress. The total removal of the palms would lead to increased native spring habitat and is likely to increase the surface water available for wildlife use and wildlife food sources in the form of native vegetation in the spring pool at the level of the upper adit. Construction at the spring would take place during daylight hours from October 1 to March 1 so as to not disturb migrating insects and birds. The impacts to wildlife at the spring would be short-term, minor, and adverse.

Increased traffic along the Navel Spring access road has the potential to increase wildlife mortalities through the accidental killing of individuals by motor vehicles and construction equipment. In addition, trench excavation may expose animal burrows.

The removal of the water storage tank could displace animals (e.g. *Dipodomys, Neotoma* and *Peromyscus*) living under the tank. The construction activities at the tank would have temporary impacts in the form of construction noise and human presence. A few mesquite saplings would be planted in front of the replacement tank to minimize visual disturbances, creating new potential wildlife habitat.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect wildlife include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short-term, minor, adverse impacts on wildlife.

Conclusion
The proposed action alternative would have short-term, minor, adverse impacts to wildlife. The preferred alternative would have short-term, minor, and adverse cumulative impacts to wildlife.

Special Status Species

The proposed action could affect special status species by disturbing habitat, temporarily increasing noise and construction activities near habitat, and temporarily limiting access to water; therefore, special status species are addressed as an impact topic in this EA. The Endangered Species Act (1973), as amended, requires an examination of impacts such as these on all federally listed threatened or endangered species. The U.S. Fish and Wildlife Service (USFWS) was contacted for a list of such species and designated critical habitats that may be within the proposed project area or affected by any of the alternatives. There are no

known federally listed threatened or endangered species in the project area. However, NPS policy also requires examination of the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species. Information on possible species of special concern was gathered from published sources. Information from prior research at Death Valley National Park was incorporated; known impacts caused by development and human use were also considered. One special status species, *Ovis canadensis nelsoni* (Nelson's desert bighorn), is known to frequent Navel Spring and may be impacted by construction activities. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	The action could result in a change to a population or individuals of a species or habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability. This impact intensity equates to a USFWS "may affect, not likely to adversely affect" determination.
Minor	The action could result in a beneficial or adverse change to a population or individuals of a species, habitat, or natural processes, but the impact would not be observable and within the range of natural fluctuations. The change would be measurable, but small and localized and of little consequence. Mitigation measures, if needed to offset the adverse effects, would be simple and successful; equating to a USFWS "may affect, likely to adversely affect" determination.
Moderate	Beneficial or adverse impacts on special status species, habitats, or sustaining natural processes would be detectable and could be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful; equating to a USFWS "may affect, likely to adversely affect" determination.
Major	The action would result in a noticeable beneficial or adverse effect to viability of a population or individuals of a species, habitat, natural processes, or resource or designated critical habitat. Impacts on a special status species, critical habitat, or the natural processes sustaining them would be detectable within the park. Loss of habitat might affect the viability of at least some special status species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed; equating to a USFWS "may affect, likely to jeopardize the continued existence of a species or adversely modify critical habitat for a species" determination.

Special status species impacts are considered short term if the species recovers in less than one year and long term if it takes longer than one year for the species to recover.

Alternative A – No-Action

Direct and Indirect Impacts

The no-action alternative would allow the continuation of existing maintenance practices at Navel Spring. At present, the lower adit is periodically cleaned out, a trench is excavated in front of the adit, and material which has collected from in front of the adit is placed in the adjacent drainage. The water system is periodically inspected. Existing practices may prevent

bighorn sheep from approaching the spring canyon because of the human presence. In addition, dogs allowed on-leash at Navel Spring and on the Navel Spring access road may scare bighorn away from the spring. Thus, the impacts to bighorn are short- and long-term, minor, and adverse.

As discussed in an earlier section, it is surmised that Navel Spring is fed through local recharge; thus, deviations in spring flow are dependent on precipitation. Drought negatively impacts the quantity of surface water at the upper spring pool and in the wildlife guzzlers, forcing the bighorn to adapt or migrate to an alternate, more reliable water source during drought periods. The no-action alternative would allow the natural fluctuations of surface water to continue.

Bighorn have not been observed on the Navel Spring access road or at the water storage tank so activities at these locales contribute nothing to potential impacts.

The attention drawn to bighorn sheep at Navel Spring resulting from the public dissemination of this environmental assessment may increase visitorship of the spring and inadvertently disturb the bighorn. This impact is foreseen with both the no-action and the proposed action alternatives.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect special status species include the historic excavation of the water collection adits and the past maintenance practices of Ryan personnel at the spring. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, minor adverse impacts on special status species.

Conclusion
The no-action alternative would have short- and long-term, minor adverse impacts to special status species, namely bighorn sheep. The alternative would contribute short- and long-term, minor cumulative impacts on special status species.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
For the proposed action alternative, proposed construction activities may temporarily displace special status species, namely bighorn sheep, in the project area and has the potential to limit animals' access to water during working hours. Construction activities at Navel Spring would last approximately four weeks and would involve increased human activity, noise, and ground-disturbance with the potential to displace and disturb sheep. For the long term, the palms' total removal and management could increase the surface water available for bighorn use in the spring pool at the level of the upper adit.

Construction at the spring would take place during daylight hours from October 1 to March 1. Bighorn would be able to access water in the evening hours and on the weekends. During research conducted in the 1950s and 1960s, Ralph and Florence Welles observed that even in the driest, hottest weather, the most water-dependent bighorn (lambs and ewes) came to water only every three to five days (Welles and Welles 1961:30). The construction schedule, which is planned for the cooler, wetter months, would allow bighorn to have access to water in the evenings and at least every five days. Bighorn are known to abandon one favorable patch in their range for another (McCullough 1989), thus the bighorn may not use Navel Spring during the construction period. Other water sources in the area include Nevares Spring and other seeps in the Funeral Mountains (NPS 2004). Thus, the impacts to bighorn at the spring would be short-term, minor, and adverse.

Like the no-action alternative, the proposed action alternative would allow the natural fluctuations of surface water at Navel Spring to continue. To reiterate from the previous section, it is surmised that Navel Spring is fed through local recharge; thus, deviations in spring flow are dependent on precipitation. Drought negatively impacts the quantity of surface water at the upper spring pool and in the wildlife guzzlers, forcing the bighorn to adapt or migrate to an alternate, more reliable water source during drought periods. The proposed action alternative would allow the NPS to continue to maintain the wildlife guzzlers present at the spring; at such time the guzzlers are found to not provide adequate water (at thresholds established by the NPS in consultation and agreement with the water rights holder), the NPS would repair or replace these facilities.

The distant noise of construction along the Navel Spring access road has the potential to disturb and frighten bighorn sheep, although bighorn have not been observed on the Navel Spring access road. Bighorn also have not been observed at the water storage tank; hence activities conducted there would likely have no impact.

The proposed action alternative would prohibit dogs from Navel Spring and from being walked on the Navel Spring access road past the gate. This action would protect bighorn from being unnecessarily scared away from the spring and would be a short- and long-term minor beneficial impact to special-status species.

The attention drawn to bighorn sheep at Navel Spring resulting from the public dissemination of this environmental assessment may increase visitorship of the spring and inadvertently disturb the bighorn. This impact is foreseen with both the no-action and the proposed action alternatives.

Cumulative Impacts

Past, present, and reasonably foreseeable future projects with the potential to affect special status species include the historic excavation of the water collection adits and the past maintenance practices of Ryan personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short-term, minor, adverse impacts on special status species.

Conclusion
The proposed action alternative would have short-term, minor, adverse impacts to special status species. The proposed action alternative would contribute to short-term, minor, and adverse cumulative impacts to special status species.

Wetland Habitat

U.S. Fish and Wildlife Service recognizes Navel Spring as a wetland; the total amount of wetland habitat is 0.11 acres. The NPS investigates the potential impacts of proposed projects on wetlands in compliance with NPS mandates and the requirements of Executive Order 11990 (Protection of Wetlands), the Clean Water Act, the Rivers and Harbors Appropriation Act of 1899, and the procedures described in *Director's Order 77-1* (Wetland Protection) and encourages all practicable measures to minimize harm to wetlands. The proposed action has the potential to impact the Navel Spring wetland; therefore, wetland habitat is addressed as an impact topic in this EA. However, since neither alternative would result in a net loss of wetland habitat and there is no additional construction proposed beyond the footprint of the existing water conveyance system for the pre-1914 water rights claim, no wetland statement of findings is required for this environmental assessment.

For this project, expertise from NPS personnel, published sources, and site-specific review was used to determine the intensity of impacts to wetland habitat. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Wetlands would not be affected or the effects to the resource would be below or at the lower levels of detection. Short- and long-term effects to wetlands and floodplains would not occur and any detectable effects would be slight.
Minor	The effects to wetlands would be detectable and relatively small in terms of area and the nature of the change; however, wetland and floodplain processes, functions, and integrity would remain unaffected.
Moderate	Impacts to wetlands would be readily apparent and temporary to the wetlands' defining attributes. In addition, wetland processes, function, and integrity would be temporarily affected, including a long-term effect on wetland vegetation.
Major	Effects to wetlands would be observable over a relatively large area, would be long term. The character of the wetland would be changed and the dynamics upset so that the functions typically provided by the wetland would be permanently altered.

The effects to wetlands are considered short term if the wetland recovers in less than three years. Impacts would be long term if the wetland takes more than three years to recover.

Alternative A – No-Action

Direct and Indirect Impacts
One spring pool at the level of the upper adit meets the criteria for a wetland. This area is subject to the natural processes of erosion, rock slides, and rapid water and alluvium movement during flash flood events. Ryan personnel periodically inspect the upper adit for signs of weakening, but no other maintenance occurs at that level. Therefore, existing maintenance practices have very little impact on the wetland vegetation and organisms. NPS personnel regularly retrieve photographic data from a wildlife camera set on the edge of the spring pool. Foot traffic from this activity minimally impacts the wetland habitat.

One existing adverse impact to a natural wetland was the growth and proliferation of the invasive palms adjacent to the spring pool. While the above ground vegetation was removed in early 2013, the stumps remain. The palm stumps and any re-growth may deprive adjacent hydrophytic native vegetation of soil nutrients and water. Thus, impacts to wetlands of the no-action alternative would be short- and long-term, negligible to minor and adverse.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect the wetland habitat include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, and the maintenance of and data retrieval from the NPS wildlife camera. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, minor adverse impacts on the wetland habitat.

Conclusion
The no-action alternative's impacts are short- and long-term, negligible to minor, and adverse. The alternative would contribute to short- and long-term, minor adverse cumulative impacts.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
The proposed action alternative has the potential to indirectly impact wetland habitat during the pumping of pervious concrete into the upper adit. For this activity, the concrete pump would be placed in the staging area at the mouth of Navel Spring canyon and a 4-inch hose (termed a slick line) would convey concrete to the upper adit. The hose would run to the upper adit along the south access to the level, thus avoiding the spring pool. Impacts to the wetland habitat from this activity would be short-term, negligible, and adverse.

The removal of the palm stumps would have short-term, minor, adverse impacts during construction, and long-term, minor to moderate, beneficial impacts after construction. During the removal of the palms stumps, excavation of the stumps may impact native wetland vegetation at the level of the upper adit. Two specimens of the rare plant *Juncus cooperi* are present in this area. To protect these plants, wooden boxes would be placed over them during

the palm stump removal and also during any construction activities occurring in their vicinity. The boxes would be removed during break and quitting times. The removal of the palm stumps may also increase water turbidity; however, the impact would be short-term.

For the long-term, the total removal and management of the palms would benefit the Navel Spring wetland. With the palms totally removed, surface water at the spring pool is likely to increase. Native hydrophytic plants would no longer have to compete for soil nutrients and water and their populations would benefit. The overall impacts of the total palm removal on the existing wetland habitat would be short- and long-term, minor to moderate, and beneficial.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect the wetland habitat include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the cutting of non-native date palms, and the maintenance of and data retrieval from the NPS wildlife camera. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short-term minor adverse cumulative impacts to wetlands and also long-term, minor beneficial cumulative impacts on the wetland.

Conclusion
The proposed action alternative's impacts would be short- and long-term, minor and beneficial to wetlands. For wetlands, the alternative would contribute to short- and long-term, negligible adverse cumulative impacts.

Cultural Resources / Section 106 of the National Historic Preservation Act

In this environmental assessment, impacts to cultural resources are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality that implement NEPA. These impact analyses are intended, however, to comply with the requirements of both NEPA and reflect the determinations made in compliance with Section 106 of the National Historic Preservation Act. In accordance with the Advisory Council on Historic Preservation regulations implementing Section 106 of the NHPA (36 CFR 800, *Protection of Historic Properties*), impacts to cultural resources were identified and evaluated by: (1) determining the area of potential effect (APE); (2) identifying cultural resources present in the area of potential effects that are either listed on or eligible to be listed on the National Register; (3) applying the criteria of adverse effect to affected NRHP-eligible or NRHP-listed cultural resources; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Formal consultation with the California SHPO and Timbisha tribe was initiated on April 5, 2012. A Section 106 compliance report was submitted to the SHPO and the Timbisha

Shoshone Tribe in July 2013, requesting concurrence with the definition of the APE, adequacy of identification efforts, and assessment of effects to historic properties by the proposed project.

Under Advisory Council on Historic Preservation regulations, a determination of either *adverse effect* or *no adverse effect* must be made for affected NRHP-listed and NRHP-eligible cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion on the National Register, e.g., diminishing the integrity (or the extent to which a resource retains its historic appearance) of its location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects of the alternatives that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, *Assessment of Adverse Effects).* A determination of *no adverse effect* means there is an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion on the National Register.

CEQ regulations and *Director's Order 12* also require a discussion of mitigation, and an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g., from major to moderate. Any resultant reduction in the intensity of an impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect, as defined by Section 106, is similarly reduced. Cultural resources are nonrenewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under Section 106 may be mitigated, the effect remains adverse.

Archeological Resources

The National Historic Preservation Act (16 USC 470 et seq.), NEPA, NPS Organic Act, NPS *Management Policies 2006*, *Director's Order 12*: *Conservation Planning, Environmental Impact Analysis, and Decision-making*, and *Director's Order 28*: *Cultural Resource Management* require the consideration of impacts on cultural resources, including archeological resources, either listed on or eligible for listing on the National Register. Therefore, archeological resources are addressed as an impact topic in this environmental assessment.

In the consideration of the potential impacts to an archeological resource, one must identify the significance of the resource, and its integrity, or what elements remain of the resource which contribute to its significance. Integrity is evaluated along the lines of setting, location, feeling, workmanship, association, design, and materials. Impacts that negatively affect the integrity of an archeological resource are considered adverse. The thresholds for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be *no effect*.
Minor	Alteration of a pattern(s) or feature(s) would not diminish the overall integrity of the resource. The determination of effect for Section 106 would be *no adverse effect*.
Moderate	Alteration of a pattern(s) or feature(s) would diminish the overall integrity of the resource, but does not diminish the integrity of the resource to the point of being ineligible. The determination of effect for Section 106 would be *adverse effect*.
Major	Alteration of a pattern(s) or feature(s) would greatly diminish or destroy the overall integrity of the resource to the extent that it is no longer eligible for listing on the National Register. The determination of effect for Section 106 would be *adverse effect*.

Alternative A – No-Action

Direct and Indirect Impacts

10-063-01 Navel Spring

Navel Spring water system is being treated as eligible for listing on the National Register. It is also considered to be a contributing element to the Ryan historic district. The water system includes the collection adits, historic pipeline, access road, and storage tank location. The no-action alternative would allow natural processes of weathering and erosion/deposition to impact archeological features at Navel Spring. The collection adits would remain essentially in their current state although the upper adit may eventually collapse. One historic element at the spring, the mine car track in front of the lower adit, is buried by alluvium. The burial may speed deterioration of wooden ties. The no-action alternative allows the original sections of the pipeline to be left in place and the natural weathering and erosion processes to deteriorate the pipeline. The Navel Spring access road is found to be a contributing element to the potentially eligible Ryan historic district. With the no-action alternative current maintenance practices would continue. The Navel Spring access road would receive occasional traffic and road work may be necessary after flash flood events. Prehistoric features within the boundary of 10-063-01 would also be subject to natural processes. In general the no-action alternative would have short- and long-term, negligible impacts to Navel Spring, but collapse and loss of the upper adit would result in a long-term minor adverse effect (Section 106: no adverse effect).

10-063-02 Historic Road

The historic road may be a segment of the original Furnace Creek Wash road and is being treated as eligible for listing on the National Register. Under the no-action alternative the

road segment would continue to be subject to natural deterioration. The no-action alternative would have short- and long-term negligible impacts to the site (Section 106: No effect).

10-063-03 Historic Campsites /Prehistoric Features

Components of 10-063-03 represent both historic and prehistoric settlement; the historic features may be associated with the potentially eligible Ryan historic district. The prehistoric features are elements of an archeological district being treated as eligible for this undertaking. The no-action alternative would allow natural weathering and erosion processes to deteriorate the site. The historic timber tank foundation would likely be negatively impacted by the continued leakage and repair of the water storage tank; also, in the event of a catastrophic failure of the water tank, the cultural areas near the tank could be compromised. The no-action alternative would have short- and long-term, negligible impacts to the site (Section 106: No effect).

Archeological District

The area surrounding and including Navel Spring contains a density and diversity of archeological sites which are being treated as an eligible prehistoric archeological district for the purposes of this undertaking. Features recorded within 10-063-01 and 10-063-03 would be contributing elements to the district. Under the no-action alternative natural weathering and erosion processes would continue. The no-action alternative would have short- and long-term negligible impacts to the site (Section 106: No effect).

Cumulative Impacts

Past, present, and reasonably foreseeable future projects with the potential to affect archeological resources include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, negligible, adverse impacts on archeological resources.

Conclusion

The no-action alternative would generally have short- and long-term, negligible impacts to archeological resources (Section 106: No effect). The potential for collapse and loss of the upper adit would result in a long-term minor adverse impact (Section 106: no adverse effect). Cumulative impacts of the alternative are short- and long-term and negligible.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts

10-063-01 Navel Spring Water System

The Navel Spring water system is being treated as eligible for listing on the National Register. It is also considered to be a contributing element to the Ryan historic district. The water system includes the collection adits, historic pipeline, access road, and storage tank location. The water collection system would be affected by the preferred alternative; however effects would not diminish the integrity of the property. In fact, the project may increase the site's integrity of setting and feeling by removing or disguising non-historic features and revealing and stabilizing historic features. Invasive date palms would be entirely removed from the level of the upper adit, helping the spring wetland return to a natural state as it was traditionally and prehistorically. The overburden burying the mine car tracks is to be removed, exposing this historic (1950s-era) element. The upper adit would be filled with pervious cellular concrete; there is evidence that the adit is collapsing and this action would stabilize the historic feature. The design of the water works at the spring would remain; however a concrete frame with a steel door would be placed inside the lower adit portal. While this affects the underground design of the adit, it would also work to hide the steel door, which detracts from the setting.

Although the modern pipeline is to be removed, elements of the historic pipeline would not be altered. One section of pipe above ground in Navel Spring canyon is likely in its original context. To ensure it is not inadvertently affected, it would be flagged during work hours.

Due to a trench being dug down its centerline and increased heavy equipment traffic, the road would receive the most effects from the project. The Navel Spring access road has integrity of association, setting, materials, and feeling. Although the road would be altered, it would retain these four aspects of integrity. Project proponents intend to employ measures to abate erosion along the road.

Protective flagging and monitoring by Park staff will ensure that no impacts occur to prehistoric features within the boundary of 10-063-01.

Impacts from the proposed project are deemed to be short- and long-term, minor, and adverse (Section 106: No adverse effect).

Indirect effects may include increased erosion with the removal of the date palm stumps and also increased deposition with the placement of removed overburden into the canyon bottom. The erosion and deposition would be short-term and negligible and would not affect any other archeological properties.

10-063-02 Historic Road

The historic road may be a segment of the original Furnace Creek Wash road and is being treated as eligible for listing on the National Register. The road bed begins away from the Navel Spring access road and would not be impacted by the project. To ensure that no construction equipment or automobile traffic uses the road, the area where it once met the Navel Spring access road would be flagged for the duration of the project. Due to its high visibility from a major highway, the flagging would only be present during work hours. As with the no-action alternative the road segment would continue to be subject to natural deterioration. Impacts to this site would be short-and long-term and negligible (Section 106: No effect).

10-063-03 Historic Campsites/Prehistoric Settlement

Components of 10-063-03 represent both historic and prehistoric settlement; the historic features may be associated with the potentially eligible Ryan historic district. The prehistoric features are elements of an archeological district being treated as eligible for this undertaking. The large disturbed area in between the modern tank and the Navel Spring access road would be used as a staging area for equipment and vehicles. In addition, the modern tank would be removed and disassembled in this disturbed area and the new larger tank would be placed. A trench would be dug to connect the buried pipeline from the road to the tank in this area. Flagging would be used to restrict vehicles to the access road and disturbed area adjacent to the existing water tank; the flagging would only be present during work hours. While archeological features would be protected from direct construction impacts, they may be impacted by dust from equipment operation. The historic timber tank foundation would be left in place. As with the no-action alternative, natural weathering and erosion processes would continue. Impacts to this site would be short-and long-term, minor, and adverse (Section 106: No adverse effect).

Archeological District

Navel Spring and the surrounding area are being treated as an eligible archeological district based upon the number and diversity of sites which cluster within approximately one mile of the spring itself. Flagging would be used to restrict vehicles to the access road and disturbed area adjacent to the existing water tank. Archeological monitoring will be used to avoid impacts to prehistoric features near the APE. Archeological sites outside of the APE would not be affected. As with the no-action alternative natural weathering and erosion processes would continue. The preferred alternative would have short- and long-term negligible impacts to the archeological district (Section 106: No effect).

Cumulative Impacts

Past, present, and reasonably foreseeable future projects with the potential to affect archeological resources include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the

use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short- term, minor, adverse impacts on archeological resources.

Conclusion
Impacts to archeological resources of the proposed action alternative would be short-term, negligible to minor and adverse (Section 106: No adverse effect). At Navel Spring (site 10-063-01), some impacts would be long-term, minor, and beneficial. Cumulative impacts of the proposed action alternative would be short-term, minor, and adverse.

Historic Districts

One historic district has been identified within and/or have contributing elements which lie within the project area: Ryan. According to the NPS (1995:5):

> A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

The National Historic Preservation Act (16 USC 470 et seq.), NEPA, NPS Organic Act, NPS *Management Policies 2006*, *Director's Order 12*, and *Director's Order 28* require consideration of impacts on cultural resources including historic districts; therefore, historic districts are addressed as an impact topic in this environmental assessment.

Impacts to historic districts are evaluated in much the same way as they are to archeological resources. If historic districts are deemed historically significant and retain enough integrity to convey that significance then they may be eligible for listing on the National Register. Historic districts are composed of elements which contribute to their historic significance (contributing elements) and elements which do not contribute to their historic significance (non-contributing elements). Elements may be objects, features, buildings, structures, or archeological sites, which are not eligible for listing on the National Register by themselves, however in concert, contain adequate historic significance and integrity to be eligible for listing on the National Register as a historic district. Impacts which negatively affect the integrity of one or more contributing elements, and hence negatively impact the district's ability to convey its historic significance, are considered adverse. For the purposes of analyzing potential impacts to historic districts, the thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be *no effect*.
Minor	Impacts would result in little, if any, loss of integrity or character-defining features of a NRHP-eligible district. The determination of effect for Section 106 would be *no adverse effect*.
Moderate	Impacts to an NRHP-eligible district would change the character-defining features of the resource, but would not diminish the integrity of the resource to the point of being ineligible. The determination of effect for Section 106 would be *adverse effect*.
Major	Impacts to an NRHP-eligible district would change character-defining features of the resource, diminishing the integrity of the resource to the extent that it is no longer eligible for listing on the National Register. The determination of effect for Section 106 would be *adverse effect*.

Contributing Elements of Historic Districts in the Navel Spring Area

The Section 106 compliance report identified one National Register eligible historic district that may be impacted by the proposed project: the Ryan historic district. In order to evaluate the impacts to this district, its contributing elements must be delineated.

The contributing elements of the Ryan historic district found in the project area are:
Navel Spring Water System (10-063-01)
Historic Campsites, including the tank area (10-063-03)

Alternative A – No-Action

Direct and Indirect Impacts
The impacts of the no-action alternative on each individual contributing element, or archeological resource, were presented in the section "Archeological Resources" above; however the impacts to the historic districts, of which the elements are only a part, can be quite different. For the Ryan historic district, the no-action alternative would not allow the adequate water storage at Navel Spring needed to protect the district in case of a fire or other emergency. In addition, the failing 10,800 gallon tank limits the availability of water for preservation and restoration activities at the camp. Hence, for the Ryan historic district, impacts of the no-action alternative are short- and long-term, moderate and adverse (Section 106: adverse effect).

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect historic districts include the donation of Ryan to the DVC, the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in

conjunction with the no-action alternative, would have short- and long-term, minor, adverse impacts on the Ryan historic district.

Conclusion
The no-action alternative would have short- and long-term moderate adverse impacts to historic districts. Cumulative impacts would be short- and long-term, negligible to minor and adverse.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
The proposed action alternative would have short- and long-term, minor adverse impacts on contributing elements 10-063-01 and 10-063-03 (as presented in the "Archeological Resources" section); however, the effect of the project to the entire Ryan historic district would be short- and long-term, moderate, and beneficial (Section 106: No adverse effect). The replacement of the failing 10,800 gallon water storage tank with a 33,788 gallon tank would ensure that Ryan would have adequate water for its present and future needs. Fire is the most significant threat to almost all of the contributing elements of the Ryan historic district, namely its buildings, structures, archeological deposits, features, and objects. The larger tank would allow sufficient water to be available for use at Ryan in the event of a structure fire or an on-site water system failure. In addition, the larger tank would meet the water needs required by the DVC's planned preservation and restoration activities.

Repairing the water collection and diversion system at Navel Spring also benefits the Ryan historic district. The upgrades would render the system more stable and ensure its longevity. With the completion of the project, Ryan personnel can devote more time to preservation and restoration activities at Ryan and less to repairing and maintaining a century year old water system. In addition, water from the spring would be less likely to be contaminated, thus promoting the safety of Ryan caretakers and visitors.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect historic districts include the donation of Ryan to the DVC, the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short- and long-term, moderate, beneficial impacts on the Ryan historic district.

Conclusion
The proposed action alternative would have short-term and long-term, minor adverse and moderate beneficial impacts to historic districts. Cumulative impacts would be short- and long-term, minor adverse and moderate beneficial.

Cultural Landscapes

Due to its lengthy and intense period of use by humans, Navel Spring qualifies as a cultural landscape. According to *Director's Order 28*, a cultural landscape is:

> a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials such as roads, buildings, walls and vegetation, and by use reflecting cultural values and traditions.

The National Historic Preservation Act (16 USC 470 et seq.), NEPA, NPS Organic Act, NPS *Management Policies 2006*, *Director's Order 12* and *Director's Order 28* require the consideration of impacts on cultural resources including cultural landscapes.

Cultural landscapes are evaluated in much the same way as archeological resources. The historic significance of the cultural landscape as well as its ability to convey its significance (its integrity) may render it eligible for listing on the National Register. Impacts which have the potential to negatively affect the integrity of a cultural landscape are considered adverse. For the purposes of analyzing potential impacts to cultural landscapes, the thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be *no effect*.
Minor	Alteration of elements of a cultural landscape would diminish the overall integrity or character-defining features of a NRHP-eligible or NRHP-listed historic property but does not diminish the integrity of the resource to the point of being ineligible. The determination of effect for Section 106 would be *no adverse effect*.
Moderate	Impacts to elements of an NRHP-eligible or NRHP-listed cultural landscape would change the character-defining features of the resource, but does not diminish the integrity of the resource to the point of being ineligible. The determination of effect for Section 106 would be *adverse effect*.
Major	Impacts to elements of an NRHP-eligible or NRHP-listed cultural landscape would change character-defining features of a resource, diminishing the integrity of the resource to the extent that it is no longer eligible for listing on the National Register. The determination of effect for Section 106 would be *adverse effect*.

Alternative A – No-Action

Direct and Indirect Impacts
As mentioned earlier, some of the character-defining features of the Navel Spring cultural landscape are the water storage tank, the Navel Spring access road, the historic Furnace Creek Wash road, several historic campsites in the area, the buried pipeline, prehistoric hunting and settlement features, the gradual topography from the Furnace Creek Wash to the Navel Spring Canyon, the water collection adits, the buried mine car track, the major spring pool, the spring's natural steep-walled canyon, its multiple seeps, and the overhanging cliff that comprises the back wall of the canyon. The no-action alternative's impacts on individual archeological features were discussed above the in the "Archeological Resources" section and were determined to be short- and long-term, negligible, and adverse. The water storage tank, because it is modern, was left out of archeological resources evaluation; due to its historical inaccuracy in terms of size and shape, its non-removal is a short- and long-term, minor adverse impact.

Most of the character-defining natural features of the Navel Spring cultural landscape would be negligibly impacted by the no-action alternative in the short- and long-term.

In total, the no-action alternative would have short- and long-term, negligible impacts to the Navel Spring cultural landscape (Section 106: No adverse effect).

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect cultural landscapes include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, negligible, adverse impacts on cultural landscapes.

Conclusion
The no-action alternative would have short- and long-term, negligible impacts to the Navel Spring cultural landscape. Its contribution to cumulative effects would result in short- and long-term, negligible, adverse impacts to cultural landscapes.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
The proposed action alternative's impacts on individual cultural features were discussed above in the "Archeological Resources" section and were determined to be short-term, minor, and adverse. The water storage tank, because it is modern, was left out of archeological resources evaluation; due to its historical inaccuracy in terms of size and shape a replacement

tank with a historically-consistent size and shape would improve the integrity of the cultural landscape as it pertains to setting and feeling. The NPS, in an effort to minimize the visual impacts of a tall profile tank, prefers a squat profile and historically inaccurate tank. Thus, the tank replacement would have a short- and long-term minor adverse impact.

Most of the character-defining natural features of the Navel Spring cultural landscape would be negligibly impacted by the proposed action alternative in the short- and long-term. The spring pool would likely benefit from the entire removal and long-term management of the date palms, therefore the proposed action alternative would have short- and long-term, minor, and beneficial impacts to this feature.

Overall, the proposed action alternative would have short- and long-term, negligible impacts to the Navel Spring cultural landscape (Section 106: No adverse effect).

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect cultural landscapes include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short- and long-term, negligible, adverse impacts on cultural landscapes.

Conclusion
The proposed action alternative would have short- and long-term, negligible impacts to the Navel Spring cultural landscape. Its contribution to cumulative effects would result in short- and long-term, negligible, adverse impacts to cultural landscapes.

Ethnographic Resources

Navel Spring is considered an ethnographic resource by the local Timbisha Shoshone Tribe and is eligible for listing on the National Register as a traditional cultural property. According to NPS *Management Policies 2006* (Section 5.3.5.3), park ethnographic resources are the cultural and natural features of a park that are of traditional significance to traditionally associated peoples. These peoples are the contemporary park neighbors and ethnic or occupational communities that have been associated with a park for two or more generations (40 years), and whose interests in the park's resources began before the park's establishment. The NPS's primary interest in ethnographic resources stems from its responsibilities under the NPS Organic Act, the National Historic Preservation Act (NHPA), the American Indian Religious Freedom Act (AIRFA), the Archeological Resources Protection Act (ARPA), NEPA, and Executive Order 13007 (Indian Sacred Sites). The Navel Spring project may affect ethnographic resources; therefore, it is included as an impact topic.

Potential impacts to traditional cultural properties and other ethnographic resources are more difficult to assess than archeological resources, cultural landscapes, and historic districts because these properties do not necessarily contain tangible elements. National Register Bulletin 38 is explicit about the integrity requirements of traditional cultural properties:

> [T]he integrity of a traditional cultural property must be considered with reference to the views of traditional practitioners; if its integrity has not been lost in their eyes, it probably has sufficient integrity to justify further evaluation (National Register of Historic Places 1990:10).

There is ample evidence to suggest that the Timbisha feel that Navel Spring retains integrity. While two adits, a buried track, a pipeline, and two guzzlers are present at Navel Spring, the spring retains most of the elements which may hold significance for the Timbisha: the steep walled canyon, the multiple seeps of water, wetland vegetation, the steep overhanging cliff at the back of the canyon, and bighorn sheep. While the Timbisha are the ultimate judge of impact severity, for the purposes of this EA the thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for Section 106 would be *no effect*.
Minor	Impacts would result in little, if any, loss of integrity or character-defining features of a traditional cultural property or other ethnographic resource. The determination of effect for Section 106 would be *no adverse effect*.
Moderate	Impacts to a traditional cultural property or other ethnographic resource would change the character-defining features of the resource, but does not diminish the integrity of the resource to the point of being ineligible. The determination of effect for Section 106 would be *adverse effect*.
Major	Impacts to a traditional cultural property or other ethnographic resource would change character-defining features of a resource, diminishing the integrity of the resource to the extent that it is no longer eligible for listing on the National Register. The determination of effect for Section 106 would be *adverse effect*.

Alternative A – No-Action

Direct and Indirect Impacts

Navel Spring is being treated as eligible for listing on the National Register as a traditional cultural property (TCP) for the Timbisha Shoshone; thus it is an ethnographic resource. The no-action alternative would not alter physical elements of Navel Spring which may be of significance for the Timbisha Tribe. However, the regrowth of invasive palm trees could compromise the amount of water available for bighorn sheep—an issue of concern for members of the Timbisha tribe. Therefore, the no-action alternative would have short- and long-term negligible impacts on ethnographic resources (Section 106: No effect).

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect ethnographic resources at Navel Spring include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the prohibition of hunting at Navel Spring with the establishment of Death Valley National Monument, the placement of a wildlife camera at the level of the upper pool, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, minor, adverse impacts on ethnographic resources.

Conclusion
The no-action alternative would have short- and long-term, negligible, adverse impacts on ethnographic resources, however combined with past, present, and future projects the impacts are deemed short- and long-term, minor, and adverse.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
The proposed action alternative, like the no-action alternative, would not alter elements of Navel Spring which may be of significance for the Timbisha Tribe. The bighorn sheep, prized by the Tribe, would be impacted during the duration of construction activities, but this would only be temporary. Some of the project components may benefit the integrity of the TCP. For example, the total removal of the date palms would allow native plants, which may have traditional ethnographic uses for the Tribe, to flourish. Complete removal of invasive palm trees could increase the amount of water available for bighorn sheep. In addition, the stabilization of the upper adit may help deter the deterioration of the steep back wall of the canyon. Thus, impacts of the preferred alternative on ethnographic resources are considered to be of short- and long-term duration and negligible impact (Section 106: No effect).

As previously mentioned, Timbisha Shoshone elders visited the site on February 10, 2012 and the Tribal Historic Preservation Officer visited on March 7, 2013. They expressed no concerns with the proposed project.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect ethnographic resources at Navel Spring include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the prohibition of hunting at Navel Spring with the establishment of Death Valley National Monument, the placement of a wildlife camera at the level of the upper pool, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short- and long-term, minor, adverse impacts on ethnographic resources.

Conclusion
The proposed action alternative would have short- and long-term, negligible, beneficial impacts on ethnographic resources, however combined with past, present, and future projects the impacts are deemed short- and long-term, minor, and adverse.

Health and Safety

The proposed project contains components with beneficial impacts to the health and safety of Ryan personnel, NPS employees, and the general public; therefore, health and safety is included as an impact topic. According to NPS *Management Policies 2006* (Section 8.2.5), while recognizing that there are limitations on its capability to totally eliminate all hazards, the NPS and its concessioners, contractors, and cooperators will seek to provide a safe and healthful environment for visitors and employees. The NPS will work cooperatively with other federal, tribal, state, and local agencies; organizations; and individuals to carry out this responsibility. In addition, the NPS will strive to identify and prevent injuries from recognizable threats to the safety and health of persons and to the protection of property. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Health and safety would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on individual health and safety.
Minor	The effect would be detectable, but would not have an appreciable effect on health and safety. If mitigation were needed, it would be relatively simple and would likely be successful.
Moderate	The effect would be readily apparent and would result in substantial, noticeable impacts to health and safety on a local scale. Mitigation measures would probably be necessary and would likely be successful.
Major	The effect would be readily apparent and would result in substantial, noticeable impacts to health and safety on a regional scale. Extensive mitigation measures would be needed, and their success would not be guaranteed.

The effects to health and safety are considered short term if the effects last for the period of construction and long term if the effects last beyond the period of construction.

Alternative A – No-Action

Direct and Indirect Impacts
There are three major health and safety concerns with regard to Navel Spring: the potentially hazardous adits, the contamination of the lower water collection area, and the inadequate

reserve of water in the event of a fire at Ryan. The no-action alternative would not address these issues. At present, the adits at the spring are secured with a steel door at the lower adit and a cable net at the upper. A slight deformity of the lower adit steel door structure suggests that it has been repeatedly pulled on in an effort to dislodge it and allow access to the lower adit. While the effort proved futile, it did add to the gap around the door created by erosion. The no-action alternative does not address the weakening of the steel door and its frame. As public visitation to Navel Spring is likely to increase after the dissemination of this EA, not addressing issue presents an adverse impact to maintaining public safety.

To combat contamination of the water collection area, current maintenance practices involve hand-excavating a trench that allows water dripping down from the upper spring pool and rain water to drain away from the collection area. The trench is not entirely effective and not a long-term solution (as it has to be re-excavated after every rain).

Finally, the 10,800 gallon tank present at the site does not permit sufficient replenishment of the water storage at Ryan in the case of a fire or Ryan water system failure. As previously mentioned, Navel Spring is low discharge and once the 10,800 gallon tank is emptied, it takes approximately one week to refill.

Thus, the no-action alternative would have short- and long-term, minor and adverse impacts on health and safety.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect health and safety include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, minor, adverse impacts on health and safety.

Conclusion
The no-action alternative would have short- and long-term, minor and adverse impacts on health and safety issues. Cumulative impacts would also be short- and long-term minor and adverse.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
The proposed action alternative addresses the major health and safety concerns of the Navel Spring water system. To appropriately secure the lower underground opening, the existing steel door would be removed and replaced with a steel door containing a shielded lock and continuous hinge mounted to a steel door jamb that would be scribed tightly to the surrounding rock. In addition, a concrete and steel portal structure recessed approximately 2

ft in from the current brow would prevent edge erosion as is occurring at present. The upper opening would be backfilled by pervious cellular concrete, thus securing it in perpetuity.

The securing of the lower and upper adits would also help solve contamination issues. Coliform bacteria has been detected in the Navel Spring water. The major source of harmful coliform bacteria is human and animal waste. At present, the water collection area may be contaminated by wildlife entering the adits and/or water from the upper spring pool containing animal waste dripping down in front of the lower adit, collecting, and then entering the water collection area. The backfilling of the upper adit and the replacement of the lower adit portal structure would prevent wildlife and contaminated water from entering the water collection area.

Ryan contains over fourteen historic wood framed structures as well as multiple outbuildings, historic features, objects, and archeological deposits. The water system at Ryan is a gravity system; if part of the system fails or in the event of a structure fire, the reservoir may be completely depleted. A 33,788 gallon tank at Navel Spring would allow for quick replacement of a minimum on-site water supply.

In total, the proposed action alternative would have long-term, moderate, and beneficial impacts to health and safety.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect health and safety include the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short- and long-term, minor, beneficial impacts on health and safety.

Conclusion
The proposed action alternative would have long-term, moderate and beneficial impacts on health and safety issues. Cumulative impacts would be short- and long-term minor and beneficial.

Scenic Resources

The Navel Spring water storage tank is visible from SR 190 along the Furnace Creek Wash corridor. One component of the proposed project is to replace the existing 10,800 gallon tank with one equivalent to the approximate volume that was used historically at the site-- 33,788 gallons. The mission of Death Valley National Park as presented in the park's *General Management Plan*, 2001, is that "Death Valley National Park dedicates itself to protecting significant desert features that provide world class scenic, scientific, and educational opportunities for visitors and academics to explore and study." In addition, the purpose of the

park is to "preserve the unrivaled scenic, geologic, and natural resources of [the park's] unique natural landscapes, while perpetuating significant and diverse ecosystems of the California desert in their natural state." A larger tank, although more historically accurate and consistent with the cultural landscape, may adversely impact the scenic resources of the park; therefore scenic resources are included as an impact topic.

The impact assessment for scenic resources focused on the context of the impact (the SR 190 transportation corridor), the number of potential individuals impacted, and the severity of the impact. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Scenic resources would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on scenery.
Minor	The effect would be detectable, but would not have an appreciable effect on scenic resources. If mitigation were needed, it would be relatively simple and would likely be successful.
Moderate	The effect would be readily apparent and would result in substantial, noticeable impacts to scenic resources. Mitigation measures would probably be necessary and would likely be successful.
Major	The effect would be readily apparent and would result in substantial, noticeable impacts to scenic resources. Extensive mitigation measures would be needed, and their success would not be guaranteed.

The effects to scenic resources are considered short term if the effects last for the period of construction and long term if the effects last beyond the period of construction.

Alternative A – No-Action

Direct and Indirect Impacts
With the no-action alternative, the current water storage tank would continue to be repaired on site and the HDPE pipeline would remain on the surface from Navel Spring to the water storage tank. Scenic resources would continue to be impacted by the tank and pipeline. Therefore, impacts of the no-action alternative would be short- and long-term negligible and adverse.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect scenic resources include the construction of electrical transmission and telephone lines in the Furnace Creek Wash, the replacement of the water tank in 1996, and the installation of the HDPE pipeline on the surface from Navel Spring to the water storage tank. Cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the

preferred alternative, would have short- and long-term, minor, adverse impacts on scenic resources.

Conclusion
The impacts of the no-action alternative on scenic resources would be short- and long-term negligible and adverse. The alternative would have short- and long-term, minor adverse cumulative impacts on scenic resources.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
The proposed action alternative requires a larger water storage tank. The capacity of the replacement water storage tank would be three times the existing tank. Although the replacement tank differs from that found at the site currently, it comports to the historic tank in capacity and can be considered a restoration of a historic cultural landscape (per *NPS Management Policies 2006* Section 5.3.5.2). To mitigate natural visual impacts from SR 190, project plans include employing a low profile tank to replace the existing tank. To further mitigate visual impacts, the tank would be a color chosen by the NPS that would better blend into the natural and cultural landscape. In addition, the project proponent would plant two or three native mesquite trees (with a Death Valley genotype) in front of the tank and direct the tank overflow for their watering needs.

The HDPE pipeline running along the surface from Navel Spring to the water storage tank would be replaced with a pipeline buried along the centerline of the Navel Spring access road. The abandoned pipeline would be removed, resulting in a negligible to minor beneficial impact to scenic resources.

Overall, however, because of the larger tank size proposed, this alternative would have long-term, minor, and adverse impacts to scenic resources.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect scenic resources include the construction of electrical transmission and telephone lines in the Furnace Creek Wash, the replacement of the water tank in 1996, and the installation of the HDPE pipeline on the surface from Navel Spring to the water storage tank. Cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have long-term, moderate, adverse impacts on scenic resources.

Conclusion
The proposed action alternative would have long-term, minor, and adverse impacts to scenic resources. Cumulative effects of past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have long-term, moderate, adverse impacts on scenic resources.

Visitor Use and Experience

Enjoyment of park resources and values by the people of the United States is part of the fundamental purpose of all parks (NPS *Management Policies 2006*, Section 8.2).Visitor use and experience may be affected by traffic volumes, time of travel (delays), turnouts to view natural resources and vistas, and safe access/egress to important sites. The proposed project would occur on an infrequently traveled dirt road behind a locked gate and is not likely to impact traffic in Death Valley National Park. However, the proposed action alternative would prohibit the walking of dogs past the Navel Spring access road gate and could impact visitor use and experience. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Visitor use and experience would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on visitor use or experience.
Minor	The effect would be detectable, but would not have an appreciable effect on visitor use and experience. If mitigation were needed, it would be relatively simple and would likely be successful.
Moderate	The effect would be readily apparent and would result in substantial, noticeable impacts to visitor use and experience on a local scale. Mitigation measures would probably be necessary and would likely be successful.
Major	The effect would be readily apparent and would result in substantial, noticeable impacts to visitor use and experience on a regional scale. Extensive mitigation measures would be needed, and their success would not be guaranteed.

The effects to visitor use and experience are considered short term if the effects last for the period of construction and long term if the effects last beyond the period of construction.

Alternative A – No-Action

Direct and Indirect Impacts

With the no-action alternative, dogs would continue to be allowed past the Navel Spring access road gate as long as they are leashed and remain on the road as consistent with parkwide regulations. Therefore, impacts of the no-action alternative would be short- and long-term and negligible.

Cumulative Impacts

Past, present, and reasonably foreseeable future project with the potential to affect visitor use and experience include the prohibition of unauthorized vehicles on the Navel Spring

access road past the gate. Cumulative effects of this past action, in conjunction with the no-action alternative, would have short- and long-term, minor, adverse impacts on visitor use and experience.

Conclusion
The impacts of the no-action alternative on visitor use and experience would be short- and long-term negligible. The alternative would have short- and long-term, minor adverse cumulative impacts on visitor use and experience.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
The proposed action alternative would prohibit dogs from being walked on the Navel Spring access road past the gate and bans them from Navel Spring for the protection of wildlife. While the Navel Spring access road would not be open to dog-walking, all other established unpaved roads within the park (unless stated otherwise) would remain available to dog walkers with leashed dogs. The total length of backcountry roads available to dog walkers in Death Valley National Park under this alternative would be approximately 1000 miles. Twenty-Mule Team Canyon road, located 5 miles from Navel Spring, is a prime location to hike with leashed dogs. In this context, the proposed action alternative would have long-term, negligible to minor, adverse impacts to visitor use and experience.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect visitor use and experience include the prohibition of unauthorized vehicle traffic on the Navel Spring access road beyond the gate and the park's recently completed and approved Wilderness and Backcountry Stewardship Plan, which imposes some additional visitor use restrictions in order to protect park resources. Cumulative effects of this past action, in conjunction with the proposed action alternative, would have long-term, minor, adverse impacts on visitor use and experience.

Conclusion
The proposed action alternative will have long-term, minor, and adverse impacts to visitor use and experience. Cumulative effects of past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have long-term, minor, adverse impacts on visitor use and experience.

Adjacent Landowners and Land Uses

Navel Spring provides the only source of water for Ryan, a historic district in the process of being donated to a non-profit group, the DVC. The NPS must evaluate a project's potential impacts on adjacent landowners and how the project may affect local land uses. According to Death Valley National Park's *General Management Plan*, *2001*, the NPS would work with

neighboring landowners on topics of mutual interest being sensitive to the influences and effects that Park management might have on adjacent landowners. In addition, the NPS would seek to enhance beneficial effects and to mitigate adverse effects in ways consistent with its policies and management objectives. The NPS encourages compatible adjacent land uses and seeks to mitigate potential adverse effects on Death Valley National Park values by actively participating in planning and regulatory processes of neighboring jurisdictions, other federal, state, and local agencies, and Native Americans.

For the purposes of the EA, the thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Adjacent landowners and land uses would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect.
Minor	The effect would be detectable, but would not have an appreciable effect on adjacent landowners and land uses. If mitigation were needed, it would be relatively simple and would likely be successful.
Moderate	The effect would be readily apparent and would result in substantial, noticeable impacts to adjacent landowners and land uses at a local level. Mitigation measures would probably be necessary and would likely be successful.
Major	The effect would be readily apparent and would result in substantial, noticeable impacts to adjacent landowners and land uses on a regional scale. Extensive mitigation measures would be needed, and their success would not be guaranteed.

The effects to adjacent landowners and land uses are considered short term if the effects last for up to five years after construction and long term if the effects last beyond five years after construction.

Alternative A – No-Action

Direct and Indirect Impacts

The no-action alternative would limit the DVC's plan for land use at Ryan. Ryan is a significant historic and cultural resource. Although it is not located within park boundaries, it contributes to the historical importance of Death Valley National Park. As discussed earlier, the DVC has stated plans to preserve and restore (where practical) Ryan as well as nominate it to the National Register of Historic Places. Eventually, Ryan would be a venue for educational outreach and scientific research. The no-action alternative involves no repairs, no deferred maintenance activities and no updates to the aging water system at Navel Spring. The retention of the existing water storage tank does not permit Ryan to be sufficiently protected in case of a fire or on-site water system failure or to meet its future water needs, the retention of the surface pipeline would not allow the system to run more smoothly and efficiently, and the continuation of maintenance practices at Navel Spring would not address

issues of deferred maintenance, contamination, and safety hazards. Thus, the no-action alternative would have short- and long-term moderate adverse impacts on adjacent land owners and uses.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect adjacent land owners and uses include the donation of Ryan to the DVC, the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the no-action alternative, would have short- and long-term, moderate, adverse impacts on adjacent landowners and land uses.

Conclusion
The no-action alternative would have short- and long-term, moderate, adverse impacts and cumulative impacts on adjacent landowners and land uses.

Alternative B – Proposed Action Alternative

Direct and Indirect Impacts
As discussed earlier, the DVC's ultimate stated goal for the Ryan historic district is for it to function as a living laboratory, supporting scientific research and education in historic preservation, archeology, history, and the biological and physical sciences. All stabilization, restoration, and construction activities would occur under the auspices of the Secretary of the Interior's *Standards for the Treatment of Historic Properties*, *Standards and Guidelines for Archaeology and Historic Preservation,* and *Guidelines for the Treatment of Cultural Landscapes*; each construction project would occur with care and consideration for the integrity of historic buildings, structures, and features.

In interacting with adjacent landowners, the NPS encourages compatible adjacent land uses. The preservation and restoration of a historic district as well as the furthering of education and knowledge about the history, archeology, geology, biology and other factors of Death Valley National Park's unique landscape qualifies as a compatible land use. The NPS stresses the importance of the conduct of original scientific research within its national parks; the DVC, by providing support for scientists working in Death Valley in the form of housing and other research support, can assist the NPS to this end.

A functioning, efficient, and sufficient water system and supply is necessary to the preservation and restoration of Ryan. A 33,788 gallon water tank would provide adequate water for fire protection, preservation and restoration activities, and ultimately educational outreach programs. The buried pipeline would allow the system to operate more smoothly and efficiently. The repairs, deferred maintenance and stabilization of Navel Spring would update the system, reducing contamination and safety hazards. Thus, the proposed action

alternative would have short- and long-term, moderate, beneficial impacts to adjacent landowners and land uses.

Cumulative Impacts
Past, present, and reasonably foreseeable future projects with the potential to affect adjacent land owners and uses include the donation of Ryan to the DVC, the historic excavation of the water collection adits, the past maintenance practices of Ryan personnel, the replacement of the water tank in 1996, and the use of the Navel Spring access road by Ryan and NPS personnel. The cumulative effects of these past, present, and reasonably foreseeable future actions, in conjunction with the proposed action alternative, would have short- and long-term, moderate, beneficial impacts on adjacent landowners and land uses.

Conclusion
The proposed action alternative would have short- and long-term, moderate, beneficial impacts to adjacent landowners and land uses. The cumulative effects of past, present, and reasonably foreseeable future actions, in conjunction with the preferred alternative, would have short- and long-term, moderate, beneficial impacts on adjacent landowners and land uses.

CONSULTATION AND COORDINATION

SCOPING

Scoping is the effort to involve agencies and citizens in determining the scope of issues to be addressed in an environmental document. Among other tasks, scoping determines important issues and eliminates issues not important; allocates assignments among the interdisciplinary team members and/or other participating agencies; identifies related projects and associated documents; identifies permits, surveys, and consultations required by other agencies; and creates a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made. Scoping includes any interested agency, or any agency with jurisdiction by law or expertise (such as the State Historic Preservation Office and U.S. Fish and Wildlife Service) to obtain early input (see appendix A). The National Park Service also consulted with the Timbisha Shoshone Tribe.

The U.S. Fish and Wildlife Service responded with a memorandum stating that no federally listed, or candidate species nor their habitats are known to occur in the project area. As described throughout this document, consultation has been ongoing with the SHPO and the Timbisha Shoshone Tribe. The separate National Historic Preservation Act, Section 106 process will result in an agreement of the area of potential impact, concurrence with the findings of eligibility for historic properties, and concurrence with the impacts of the project on said historic properties.

A press release initiating scoping and describing the proposed action was issued on April 18, 2012. Comments were solicited during a public scoping period that ended May 18, 2012. Several comments were received from the public and are summarized in the "Scoping" section of the EA.

LIST OF PREPARERS

This environmental assessment was prepared by Jessica Smith, Ph.D., under the direction of the National Park Service.

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DISTRIBUTION LIST

Agencies

Bureau of Land Management
California Department of Fish and Game
California Dept. of Transportation
California State Clearing House
California State Parks
Inyo County Board of Supervisors
Inyo County Planning Department
National Park Service
State Water Resources Control Board
U.S. Fish and Wildlife Service

Tribes

Timbisha Shoshone Tribe

Organizations/Businesses

Amargosa Conservancy
Amargosa Opera House
Beatty Chamber of Commerce
Beatty Town Advisory Board
California Desert Protection League
California Native Plant Society
Center for Biological Diversity
Death Valley 49ers, Inc.
Death Valley Chamber of Commerce
Death Valley Conservancy
Death Valley Natural History Association
Desert Protective Council
Desert Research Institute
Furnace Creek Inn & Ranch Resort
High Desert Multiple Use Coalition
Lone Pine Chamber of Commerce
National Parks Conservation Association
Native American Rights Fund
Panamint Springs Resort
Sierra Club

Libraries

Amargosa Valley Library
Bishop Branch Library
Independence Central Library
Lone Pine Branch Library
Pahrump Community Library
Ridgecrest Branch Library

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APPENDIX A: AGENCY CORRESPONDENCE

United States Department of the Interior
NATIONAL PARK SERVICE
Death Valley National Park
PO Box 579
Death Valley, California 92328

IN REPLY REFER TO:
RM. A.2

April 5, 2012

George Gholson
Chairman
Timbisha Shoshone Tribe
621 W. Line St.
Suite 190
Bishop, CA 93514

Subject: Naval Springs Water Diversion System Maintenance Project PEPC Project No. 41379; CRP Project No. 10-063

Dear Chairman Gholson:

The Death Valley Conservancy (DVC) and Rio Tinto (RT) propose to perform maintenance and improvements to their water collection system at Navel Spring (AKA Naval Springs) in Death Valley National Park, California. U.S. Borax (a subsidiary of Rio Tinto) holds a pre-1914 claim to the spring and is in the process of conveying this claim, along with the longstanding borax mining camp of Ryan, CA, to the DVC. The purpose of this letter is: 1) to solicit comments on the proposed action, and 2) to inform you that the National Park Service (NPS) intends to work with the DVC and RT to meet all obligations under Section 106 of the National Historic Preservation Act.

Initial water diversion and collection works at Navel Spring likely date to the early 1900s and supported local borax mining operations and the watering needs of travelers. By the mid-1910s, the spring experienced increased development and usage concurrent with the growth of Ryan, which was later converted to the Death Valley View Hotel. Starting in 1928 and continuing to present day, Navel Spring has served as the sole source of water for all of Ryan's residential, mining, tourist, and educational activities. The spring and water works now require significant repairs and improvements aimed at increasing public safety; better securing the underground workings (water collection adits) from contamination; facilitating cleaning and maintenance; increasing water storage capabilities for fire suppression and contemporary and future resident and visitor usage at Ryan; and enhancing the long-term stability of the spring and water works. To meet these needs, the proposed project has three components: the repair and maintenance of the underground water diversion tunnels; the replacement of the pipeline which conveys water from the diversion tunnels to the water tank; and the replacement of the water tank.

Archaeological survey of the project area has begun. Once the survey is complete we will forward copies of the report, Assessment of Effect Form, and detailed project plans. The Park will work closely with DVC and RT to develop plans to minimize impacts to cultural resources to the greatest extent possible.

A map of the project area showing the approximate locations of Navel Spring, the storage tank, and access roads is enclosed for your review. The proposed new pipeline would be buried in the existing access road between the spring and storage tank. Timbisha elders visited the project location on February 10, 2012. They did not express any concerns related to the project.

We look forward to your input on the proposed project. If you have questions please contact Wanda Raschkow, park Archeologist, at 760-786-3232 or Blair Davenport, Cultural Resources Manager at 760-786-3287.

Sincerely,

Sarah Craighead
Superintendent

Enclosure: Project area map

cc: Mike Cipra, Environmental Protection Specialist
Blair Davenport, Cultural Resources Manager
Wanda Raschkow, Archeologist

United States Department of the Interior

NATIONAL PARK SERVICE
Death Valley National Park
PO Box 579
Death Valley, California 92328

IN REPLY REFER TO:
RM.A.2

April 5, 2012

Milford Wayne Donaldson
State Historic Preservation Officer
California Office of Historic Preservation
PO Box 942896
Sacramento, CA 94296

Attn: Mark Beason, State Historian II

Subject: Naval Springs Water Diversion System Maintenance Project PEPC Project No. 41379; CRP Project No. 10-063

Dear Mr. Donaldson:

The Death Valley Conservancy (DVC) and Rio Tinto (RT) propose to perform maintenance and improvements to their water collection system at Navel Spring (AKA Naval Springs) in Death Valley National Park, California. U.S. Borax (a subsidiary of Rio Tinto) holds a pre-1914 claim to the spring and is in the process of conveying this claim, along with the longstanding borax mining camp of Ryan, CA, to the DVC. The purpose of this letter is: 1) to solicit comments on the proposed action, and 2) to inform you that the National Park Service (NPS) intends to work with the DVC and RT to meet all obligations under Section 106 of the National Historic Preservation Act.

Initial water diversion and collection works at Navel Spring likely date to the early 1900s and supported local borax mining operations and the watering needs of travelers. By the mid-1910s, the spring experienced increased development and usage concurrent with the growth of Ryan, which was later converted to the Death Valley View Hotel. Starting in 1928 and continuing to present day, Navel Spring has served as the sole source of water for all of Ryan's residential, mining, tourist, and educational activities. The spring and water works now require significant repairs and improvements aimed at increasing public safety; better securing the underground workings (water collection adits) from contamination; facilitating cleaning and maintenance; increasing water storage capabilities for fire suppression and contemporary and future resident and visitor usage at Ryan; and enhancing the long-term stability of the spring and water works. To meet these needs, the proposed project has three components: the repair and maintenance of the underground water diversion tunnels; the replacement of the pipeline which conveys water from the diversion tunnels to the water tank; and the replacement of the water tank.

Consultation with the Timbisha Tribe has been initiated. Timbisha elders visited the project location on February 10, 2012. They did not express any concerns related to the project.

Archaeological survey of the project area has begun. Once the survey is complete we will forward copies of the report, associated site forms, Assessment of Effect Form, and detailed project plans. The Park will work closely with DVC and RT to develop plans to minimize impacts to cultural resources to the greatest extent possible.

A map of the project area showing the approximate locations of Navel Spring, the storage tank, and access roads is enclosed for your review. The proposed new pipeline would be buried in the existing access road between the spring and storage tank.

We look forward to your input on the proposed project. If you have questions please contact Wanda Raschkow, park Archeologist, at 760-786-3232 or Blair Davenport, Cultural Resources Manager at 760-786-3287.

Sincerely,

Sarah Craighead
Superintendent

Enclosure: Project area map

cc: Mike Cipra, Environmental Protection Specialist
Blair Davenport, Cultural Resource Manager
Wanda Raschkow, Archeologist

United States Department of the Interior

NATIONAL PARK SERVICE
Death Valley National Park
PO Box 579
Death Valley, California 92328

IN REPLY REFER TO:
RM A.2.

April 5, 2012

Carl Benz
Section 7 Program Coordinator
US Fish and Wildlife Service
2493 Portola Road, Suite B
Ventura, CA 93003

Re: Navel Spring Water Collection System Maintenance and Improvements

Dear Mr. Benz:

The Death Valley Conservancy (DVC) and Rio Tinto (RT) propose to perform maintenance and improvements to their water collection system at Navel Spring (AKA Naval Springs) in Death Valley National Park, California. U.S. Borax (a subsidiary of Rio Tinto) holds a pre-1914 claim to the spring and is in the process of conveying this claim, along with the longstanding borax mining camp of Ryan, CA, to the DVC. The purpose of this letter is: 1) to solicit comments on the proposed action, 2) to inform you that pursuant to the National Environmental Policy Act (NEPA) process, the National Park Service (NPS) intends to work with the DVC and RT to meet all obligations under Section 7 of the Endangered Species Act, and 3) to request information on whether any species, or their critical habitats, which are listed, proposed to be listed, candidates to be listed, or otherwise listed may be present in the project area. The NPS, along with the DVC and RT, will use this information to determine potential effects of the proposed action on those identified species and habitats.

Initial water diversion and collection works at Navel Spring likely date to the early 1900s and supported local borax mining operations and the watering needs of travelers. By the mid-1910s, the spring experienced increased development and usage concurrent with the growth of Ryan, which was later converted to the Death Valley View Hotel. Starting in 1928 and continuing to present day, Navel Spring has served as the sole source of water for all of Ryan's residential, mining, tourist, and educational activities. The spring and water works now require significant repairs and improvements aimed at increasing public safety; better securing the underground workings (water collection adits) from contamination; facilitating cleaning and maintenance; increasing water storage capabilities for fire suppression and contemporary and future resident and visitor usage at Ryan; and enhancing the long-term stability of the spring and water works. To meet these needs, the proposed project has three components: the repair and maintenance of the underground water diversion tunnels; the replacement of the pipeline which conveys water from the diversion tunnels to the water tank; and the replacement of the water tank.

Your agency recognizes Navel Spring as a "wetland" and the NPS, DVC, and RT are in cooperation to develop project designs and construction methods to minimize or avoid disturbance to vegetation and wildlife in the project area. One such proposal includes the removal of a series of invasive date palms (*Phoenix dactylifera*) from the spring, hence encouraging the return of native wetland vegetation. Floral and faunal surveys are currently underway and will help guide the project's design and methods as well as aid in the determination of the

appropriate level of NEPA documentation. Hopefully, the species list provided by USFWS will assist in the development of mitigation measures aimed at lessening the potential impact on wildlife and vegetation.

A map of the project area showing the approximate locations of Navel Spring, the existing pipeline, and the storage tank is enclosed for your review. We look forward to your input on this project.

Sincerely,

Sarah Craighead
Superintendent

Enclosure: Project area map

cc: Mike Cipra, Environmental Protection Specialist
Richard Friese, Hydrologist
Jane Cipra, Botanist
Linda Manning, Wildlife Biologist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN00-2012-SL-0309

April 30, 2012

Memorandum

To: Superintendent, Death Valley National Park, National Park Service, Death Valley, California

From: Assistant Field Supervisor, Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service, Ventura, California

Subject: Navel Spring Water Collection System Maintenance and Improvements, Death Valley, Inyo County, California

This letter is in response to your request dated April 5, 2012, and received by our office on April 9, 2012, for information on federally listed, proposed, and candidate species, and designated critical habitat that may occur in the vicinity of the water collection system at Navel Spring. The National Park Service is proposing to repair and maintain the existing underground water diversion tunnels, replace the pipeline that conveys water from the diversion tunnels to the water tank, and replace the water tank for the water collection system. The Navel Spring water collection system serves as the sole source of water for all of the Town of Ryan's residential, mining, tourist, and educational activities. Your request and our response are made pursuant under section 7 of the Endangered Species Act of 1973, as amended (Act).

Based upon review of our records, no federally listed, proposed, or candidate species nor their critical habitats are known to occur in the proposed project area. Newer information based on updated surveys, changes in the abundance and distribution of listed species, altered habitat conditions, or other factors could change this list.

This letter fulfills the requirements of the U.S. Fish and Wildlife Service under section 7(c) of the Act. The National Park Service, as the lead federal agency for this project, has the responsibility to review its proposed activities and determine whether any listed species may be affected. If the project is a construction project which may require an environmental impact statement[1], the National Park Service has the responsibility to prepare a biological assessment to

[1] "Construction project" means "any major federal action which significantly affects the quality of the human environment designated primarily to result in the building of structures such as dams, buildings, roads, pipelines, and channels. This includes federal actions such as permits, grants, licenses, or other forms of federal authorizations or approvals which may result in construction."

make a determination of the effects of the action on listed species and critical habitat. If the National Park Service determines that a listed species or critical habitat is likely to be adversely affected, it should request, in writing through our office, formal consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to threatened or endangered species and their critical habitat prior to a written request for formal consultation. During this review process, the National Park Service may engage in planning efforts but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act.

Only federally listed species receive protection under the Act; however, species listed by the State of California or otherwise considered to be sensitive should be considered in the planning process in the event that they become listed or proposed for listing prior to project completion. We do not generally supply information on other sensitive species and recommend that you review information in the California Department of Fish and Game's Natural Diversity Database. You can contact the California Department of Fish and Game at (916) 324-3812 for information on other sensitive species that may occur in this area.

If you have any questions regarding this letter, please contact Amy Torres of the Ventura Fish and Wildlife Office at (909) 382-2654.

As the nation's principal conservation agency, the Department of the Interior has the 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.

NPS 143/106325 November 2013 / Printed on recycled paper

Death Valley National Park
California and Nevada