

AFFECTED ENVIRONMENT

INTRODUCTION

The “Affected Environment” chapter describes the resources that could be affected as a result of implementation of any of the alternatives. The descriptions of the resources provided in this chapter serve as an account of the baseline conditions against which the potential effects of the proposed actions considered in this Saline Valley Warm Springs Final Management Plan and Environmental Impact Statement (plan/EIS) are compared. The resource topics presented in this chapter and the organization of the topics correspond to the resource impact discussions contained in the “Environmental Consequences” chapter. The general project setting has been included to provide the background information necessary to understanding the resources and environmental setting of Death Valley National Park (the park). The following resources are included in this chapter: soils; vegetation (native species and nonnative species); wetlands; wildlife (native species and nonnative species); cultural resources (archeological resources, historical resources, and ethnographic resources); wilderness character; visitor use and experience; and human health and safety.

General Project Setting

Death Valley National Park encompasses nearly 3.4 million acres of valley and surrounding canyons and mountains, including all of Death Valley, the Amargosa Range on the east and the Panamint Range on the west, as well as most of the Saline, Eureka, northern Panamint, and Greenwater Valleys (NPS 2002a). Saline Valley is an alluvial valley located in the northwest portion of Death Valley National Park, bordered by the Saline Range to the north, the Last Chance Range to the east, and the Inyo Mountains to the west (see appendix A, figure 1) (CA DWR 2004). The Saline Valley Warm Springs Area is small in comparison to the valley as a whole. The study area encompasses approximately 1,100 acres, including the backcountry area surrounding Lower and Palm Springs and Chicken Strip Airstrip (approximately 1,044 acres), roads in the backcountry that lead to Upper Spring and the bat pole (approximately 43 acres), and the social trail in designated wilderness that leads to the southern peace sign artwork (approximately 11 acres) (see appendix A, figure 2).

The Saline Valley Warm Springs Area is comprised of three distinct areas—the Lower Spring area, the Palm Spring area, and the Upper Spring area—and is considered one of the park’s developed backcountry campgrounds. Four source springs are associated with Lower Spring, two are associated with Palm Spring, and two are associated with Upper Spring (NPS 2012a; Friese 2015). The source springs emerge from the structural basin of Saline Valley between the Last Chance and Saline ranges. Past overflow from the source springs deposited minerals near the orifices, resulting in elevated crater-like spring mounds. The temperatures of the source springs range from 61.2°F to 117.0°F and the flow ranges from less than 1 liter per minute to 30 liters per minute.

A system of pipes and hoses has been created at the Saline Valley Warm Springs Area to divert water from the source springs to the soaking tubs, showers, dishwashing sinks, and other features. Figures 5a, 5b, and 6 in appendix A present the source springs and the piping that leads to the features at Lower Spring and Palm Spring; in most instances, the diversion pipes are buried. At Lower Spring, there are two source springs that supply water to developed features. The cold source spring is immediately diverted by a pipe into the Cool Pool, which is a tub that is no longer used for soaking. Water from the Cool Pool is led by pipe to the sprinkler that is used to water the lawn at Lower Spring. The warm source spring is diverted to seven features at Lower Spring. The Sunrise Pool is fed directly from the warm source spring by a pipe. Other pipes from the warm source spring lead to a pipe distribution box where they then travel

to the Crystal Pool, the bathtub, the shower, the dishwashing sink, the Children's Play Tub, the camp host's trailer, and the camp host's shower. Each feature at Lower Spring is fed by an independent pipe. The water from the Crystal Pool, Sunrise Pool, the bathtub, the shower, the dishwashing sink, and the Children's Play tub drain to the settling pond. Runoff from the lawn also drains to the settling pond. A hose from another source spring, Burro Spring, leads to a large barrel that is used as a wildlife trough. This trough overflows, and the water spills on the ground, watering a line of mesquite and associated ground cover herbaceous plants.

At Palm Spring, two warm source springs supply water to two soaking tubs, a shower, and a dishwashing sink. A pipe runs from the northern warm source spring, under Warm Springs Road, to the Wizard Pool. Another underground pipe leads overflow water from the northern warm source spring to the southern warm source spring. The southern warm source spring then feeds the Volcano Pool by an underground pipe. Another underground pipe leads water from the southern warm source spring to the shower and the dishwashing tub. When the Volcano Pool is emptied, water drains to the small grove of nonnative invasive palm trees next to the tub. Water from the Wizard Pool is drained to the palm grove directly south of it. This area supports a small area of grasses, but water is not diverted from the source springs to maintain the grass. Runoff from the shower and dishwashing sink drain to a wash behind these features.

Upper Spring is undeveloped and enclosed by a metal chain-linked fence, which serves to exclude feral burros. At Upper Spring, the water is not diverted from the natural spring, and there are no soaking tub, shower, dishwashing, or toilet facilities.

SOILS

Death Valley National Park is a part of the larger Basin and Range Province, which is characterized by steep mountains and large flat expanses (USGS 2004). The Saline Valley Warm Springs Area lies within the Mojave Basin and Range, which contains widely spaced mountain ranges, running north to south, separated by broad basins, valleys and old lakebeds covering vast alluvial fans (NRCS 2006). This rugged landscape contributes to the composition of the soils of the Saline Valley Warm Springs Area.

The dominant soils of the Mojave Basin and Range are aridisols and entisols. Aridisols are the most common soils found in deserts; they are dry for most of the year and have little organic material. Entisols are relatively young soils usually with no horizons, or layers of rock with a particular composition. Entisols are generally found in steep rocky settings (University of Idaho n.d.). These soils have a thermic soil temperature regime and an aridic soil moisture regime (NRCS 2006). There are 16 soil types in the Mojave Basin and Range. Soils on the valley floor are characterized as well-drained to excessively drained with average slopes ranging from 0 to 15%, and a maximum slope of 50%. Soils of the higher elevations (mountains and terraces) are well-drained to somewhat excessively drained with slopes of 0 to 75% (NRCS n.d.). Soils with a greater potential for erosion are those with greater slopes, located on hillsides. The low slope of the valley floor makes the soils there less susceptible to erosion.

Although the soils of Saline Valley have little organic content from decaying plant material, biological soil crusts contribute nutrients and organic matter. Biological soil crusts are comprised of complex mosaics of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria (USDI, BLM, and USGS 2001), and are found where vegetation is absent. Biological crusts are fragile and extremely susceptible to compaction and sedimentation (USGS 2001).

VEGETATION

Native Species

The vegetation of Saline Valley is characterized by vegetation assemblages referred to as communities. These vegetation communities are distinctive and described by their dominant vegetation type. National Park Service (NPS) botanists surveyed the vegetation surrounding the three spring areas in 2012. The results of this survey are presented in appendix F. The remaining vegetation communities in the study area are described based on vegetation mapping of the Central Mojave Desert (USGS 2002). Wetlands at the Saline Valley Warm Springs Area and the associated vegetation are described in detail in the “Wetlands” section. Creosote bush shrubland comprises the majority of the Saline Valley Warm Springs Area. This habitat is sparsely vegetated and dominated by creosote bush. Associated species can include burrobush (*Ambrosia dumosa*), Mojave indigo bush (*Psoralea arborescens*), Schott’s dalea (*P. schottii*), Baja desert-thorn (*Lycium brevipes*), water jacket (*L. andersonii*), burrobush (*Hymenoclea salsola*), brittlebush (*Encelia farinosa*), button brittlebush (*E. frutescens*), desert globemallow (*Sphaeralcea ambigua*), beavertail pricklypear (*Opuntia basilaris*), teddybear cholla (*O. bigelovii*), and Wiggins’ cholla (*O. echinocarpa*) (Calflora.net n.d.). Creosote bush shrubland occurs in the large backcountry area surrounding Lower and Palm Springs, as well as along most of the roads and social trail within the study area, covering approximately 860 acres of the study area.

The central portion of the study area surrounding Lower Spring is classified by US Geological Survey as sparsely vegetated (approximately 230 acres). This area has endured the greatest amount of disturbance from human activities (e.g., camping, driving) and contains altered habitat. Water diversion and irrigation have greatly increased the amount of vegetation at Lower Spring; however, much of this vegetation is nonnative and discussed in the “Nonnative Species” section below.

Native vegetation communities, creosote bush/burrobush (*Larrea tridentata*/*Ambrosia dumosa*) scrub and mesquite bosque, comprise the vegetation communities within the disturbed area at Lower Spring and Palm Spring (appendix A, figure 7). Creosote bush/burrobush scrub surrounds Upper Spring as well. At the Saline Valley Warm Springs Area, species associated with creosote bush/burrobush scrub include desert centauray (*Centaurea exaltatum*), desert holly (*Atriplex hymenelytra*), Mojave cleomella (*Cleomella obtusifolia*), and mesquite mistletoe (*Phoradendron californicum*) (Calflora.net n.d.). Several patches of mesquite bosque inhabit Lower Spring and there is one small patch at Palm Spring. Mesquite bosques at the Saline Valley Warm Springs Area are dominated by screwbean mesquite (*Prosopis pubescens*). Associate species include creosote bush and desertholly, as well as riparian species such as arrowweed, saltgrass (*Distichlis spicata*), and chairmaker’s bulrush (*Schoenoplectus americanus*) (Meyer 2005). Mesquite bosques occur at Lower Spring in the drainage area associated with Burro Spring, in the drainage area south of wetland 2, and east of the developed area. These areas range from 0.7 to 1.2 acres. The mesquite bosque at Palm Spring is approximately 0.08 acre and is located northeast of the source spring.

Desert holly shrubland, the other naturally occurring vegetation community is present along the social trail to the lower peace sign and along the road just southwest of Upper Spring (appendix A, figure 7). The shrubs in this community are generally small, with small leaves and small flowers, grayish, intricately branched and often spiny. The dominant species in this community is shadscale saltbush (*Atriplex confertifolia*). Other species in this community include spiny hopsage (*Grayia spinosa*), bud sagebrush (*Artemisia spinescens*), winterfat (*Kraschenennikovia lanata*), snakeweeds (*Gutierrezia* spp.), burrobush, blackbrush (*Coleogyne ramosissima*), spiny mendora (*Menodora spinescens*), and various species of jointfir (*Ephedra* spp.) (Calflora.net n.d.). This community accounts for approximately 8 acres of the study area.

Nonnative Species

Based on the May 2012 vegetation survey, the study area contains 12 nonnative vegetation species (table F-1, appendix F). Lower Spring contains eleven of these nonnative species; Palm Spring contains six species; and Upper Spring contains three species.

Two species of palm trees are present in the study area, date palm (*Phoenix dactylifera*) and California fan palm (*Washingtonia filifera*). Users of the Saline Valley Warm Springs Area planted palm trees to create shade for the tubs. These palm tree species are not native to the Death Valley region and are invasive, meaning that their presence at the Saline Valley Warm Springs Area could cause harm to native plant communities. Birds and coyotes can carry the seeds of these nonnative invasive palms long distances to other riparian areas, where the palm trees can disrupt the desert ecology by shading native plants, monopolizing water resources, and increasing fire danger, if they become established (Cornett 1988). Both species of palms are present at Lower and Palm Springs, and California fan palms are present at Upper Spring.

A lawn of turf and nonnative grasses persists at Lower Spring because users planted and continue to hydrate it with water diverted from the source spring. The lawn consists of the following species: creeping bentgrass (*Agrostis stolonifera*), cheatgrass (*Bromus tectorum*), Bermudagrass (*Cynodon dactylon*), annual rabbitsfoot grass (*Polypogon monspeliensis*), cereal rye (*Secale cereale*), and St. Augustine grass (*Stenotaphrum secundatum*). Bermuda grass and annual rabbitsfoot grass also occur at Palm Spring and Upper Spring. These grasses range from heat tolerant (Bermudagrass and St. Augustine grass), to preferring cooler, humid climates (cereal rye and creeping bentgrass) (Texas A&M n.d.a; Texas A&M n.d.b; Texas A&M n.d.c; UCANR n.d.).

Saltcedar (*Tamarix ramosissima*), also known as tamarisk, is an introduced species and opportunistic invader of moist areas throughout Death Valley National Park, including Lower Spring. In Saline Valley, the National Park Service performed removal and treating efforts to control spread of saltcedar in 1984. Follow up surveys in 1987 showed resprouting of some of the cut and treated plants (NPS 1987). Although a single saltcedar can produce up to 600,000 very small seeds that can be widely dispersed by wind currents, saltcedar has not yet spread to Palm Spring and Lower Spring.

Two herbaceous nonnative species are present in the study area. Redstem stork's bill (*Erodium cicutarium*) is found at Lower Spring and Palm Spring. This is a pioneer species that prefers disturbed areas and arid climates and often crowds out or out-competes native species (ISSG 2005). Scarlet pimpernel (*Anagallis arvensis*) is found at Palm Spring. This nonnative herbaceous species crowds out natives by forming dense populations (University of Queensland 2011).

WETLANDS

Section 404 of the Clean Water Act and a number of California state laws and provisions regulate activities in wetlands. Executive Order 11990: *Protection of Wetlands*, directs all federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. In the absence of such alternatives, parks must modify actions to preserve and enhance wetland values and minimize degradation. Director's Order 77-1: *Wetland Protection* states that for new actions where impacts on wetlands cannot be avoided, proposals must include plans for compensatory mitigation that restores wetlands on NPS lands, where possible, at a minimum acreage ratio of 1:1 (NPS 2012b). Consistent with Executive Order 11990 and Director's Order 77-1, the National Park Service adopted a goal of "no net loss of wetlands" (NPS 2002b).

Formal wetland delineations have not been performed in Saline Valley, but wetland areas do exist at the site. To generally describe the existing wetland habitats, National Wetland Inventory (NWI) maps were reviewed and vegetation mapping completed by the park has been examined in conjunction with historic and current aerial photographs. In addition to the wetlands described below, artificial tubs supporting wetland vegetation are present at both Lower and Palm Springs due to spring diversion activities. The National Park Service requires *all natural and artificial wetlands* in the study area to be described (NPS 2012b). The National Park Service describes “artificial” wetlands as those areas that have been created on former uplands or in deepwater habitats as a result of human activities; such wetlands may be *incidental* or may be *intentional* (NPS 2012b). Artificial wetlands can be excluded from wetlands statements of findings and compensation requirements if, after evaluation of impacts on wetland functions and values, the anticipated wetland loss or degradation is determined to be minor (NPS 2012b). The vegetation mapping is presented in appendix A, figure 7.

Lower Spring

At Lower Spring, wetlands exist in their current state partially due to hydrology supplied through diversions of the natural springs. Water from the warm and cold source springs is diverted using pipes to supply the Sunrise Pool, the Crystal Pool, the Children’s Play Tub, the shower, and the sink. Water from Burro Spring is diverted via a hose and creates a riparian corridor. The piping, hosing, and soaking tub overflow that diverts water into areas that would likely be dry under natural conditions, but currently supports wetland vegetation. The NWI maps indicate that two wetland areas exist at Lower Spring: a palustrine, emergent, saturated (PEMB) wetland and a palustrine, unconsolidated bottom, permanently flooded (PUBH) wetland. Comparisons of historic aerials from 1947 (approximately the time when development began at the springs) to present show that the vegetated areas at Lower Spring have increased in size, particularly the lawn area, the drainage area south of the settling pond, and the drainage area west of Burro Spring (appendix A, figure 8). These changes suggest that the unnatural diversion of water has influenced the habitat of the Saline Valley Warm Springs Area.

Park biologists have identified three distinct wetland areas (wetlands 1, 2, and 3) that occur at the Lower Spring area (appendix A, figure 7). Wetland 1 includes three small and isolated palustrine emergent wetland areas (PEM1), totaling approximately 0.35 acre in size supported by a separate warm source spring. The dominant plant species at wetland 1 are identified as whiteflower rabbitbrush (*Chrysothamnus albidus*) and a rush species (*Juncus* sp.). Based on the habitat and vegetative characteristics, the rush species is most likely Cooper’s rush (*Juncus cooperi*); however, at the time of vegetation surveys, the inflorescences of the plants have been grazed by feral burros, making positive identification impossible. Whiteflower rabbitbrush and Cooper’s rush are both on the California Native Plant Society watch list and are identified as vulnerable in California. Whiteflower rabbitbrush is a perennial evergreen shrub that grows in chenopod scrubs, meadows and seeps, and saline or alkaline playas. This species is threatened by hydrological changes, and possibly by vehicles and nonnative plants (CNPS 2013). Cooper’s rush is a perennial herb found in meadows and seeps. Threats to this species include changes in hydrology and grazing (CNPS 2016). Whiteflower rabbitbrush does not have a hydrophytic status (USDA 2014a). In contrast, Cooper’s rush has the hydrophytic status of facultative wetland (FACW), or “usually occurs in wetlands” (USDA 2014b). At Lower Spring, the whiteflower rabbitbrush/Cooper’s rush wetlands are unique in that they are naturally occurring with no water diverted from springs. The whiteflower rabbitbrush / Cooper’s rush marshes have intrinsic value, as noted in table 2. The wetlands act as a wildlife habitat and support the whiteflower rabbitbrush.

TABLE 2. FUNCTIONS AND VALUES OF WETLANDS FOUND AT LOWER AND UPPER SPRINGS

Wetland	Lower Spring			Upper Spring
	Wetland 1 (PEM1) 0.35 acre	Wetland 2 (PUBr) 0.027 acre	Wetland 3 (PSS1) 0.89 acre	Wetland 4 (PEM1/PSS1) 0.65 acre
Functions				
Groundwater recharge/discharge				
Floodflow alteration		x		x
Fish and shellfish habitat		x		x
Sediment/toxicant retention		x		
Nutrient removal				
Production export				x
Sediment/shoreline stabilization				
Values				
Wildlife habitat	x	x	x	x
Recreation				
Education/scientific				x
Uniqueness/heritage				x
Visual quality/aesthetic				x
Endangered species habitat	x			

PEM1 = palustrine emergent wetland

PUBr = palustrine, unconsolidated bottom, artificial

PSS1 = palustrine scrub-shrub

Wetland 2, the settling pond and associated vegetation, is located at the southern edge of the developed area of Lower Spring and is approximately 0.027 acre in size (appendix A, figure 7). Wetland 2 is characterized as a palustrine, unconsolidated bottom, artificial (PUBr) wetland. Discharge water from the two Lower Spring soaking tubs, the sink, and the shower ultimately drain into this settling pond, as well as runoff from the sprinkler used to water the lawn. The settling pond is located in a developed area and the hydrology from the springs supports date palm and California fan palm, both nonnative invasive species. California fan palm has the hydrophytic status of FACW while date palm has no hydrophytic status (USDA 2014c, d). The settling pond itself is an open water area stocked by users of the Saline Valley Warm Springs Area with nonnative koi (*Cyprinus carpio*) and western mosquito fish (*Gambusia affinis*). Although it is perpetuated by artificial drainage, the settling pond performs several functions and has value. These functions include helping to reduce flood damage by retaining water, providing habitat for fish, retaining runoff, and collecting graywater. Graywater may contain cleaning supplies and water drained from the tubs, sinks, and showers, and rinse water from the sinks. The settling pond intercepts these toxicants and fertilizer from the lawn from entering the surrounding upland habitats. The value of the settling pond comes from its ability to provide wildlife habitat. Wildlife such as great blue herons (*Ardea herodias*), an occasional visitor, and American coots (*Fulica americana*), seasonal residents, use the settling pond. The coots have become habituated to humans, as they are regularly fed illegally by users and graze the lawn adjacent to the settling pond.

Wetland 3 is also located at Lower Spring and is a riparian wetland characterized as a palustrine scrub-shrub (PSS1) wetland dominated by arrowweed (*Pluchea sericea*). Arrowweed is a shrub that often persists in drainages and washes and has a hydrophytic status of FACW (USDA 2014e). Wetland 3 is approximately 0.89 acre in size and occurs southwest of the developed area containing the soaking tubs, water diversion infrastructure, and the settling pond. Cattails (*Typha* sp.), rushes, bulrushes (*Scirpus* sp.), and saltgrass are often associate species of arrowweed (Davis et al. 1998) and likely also occur at this wetland. The arrowweed scrub habitat at Lower Spring provides wildlife habitat (table 2); however, due to the small area of scrub, the quality of the habitat is limited.

Palm Spring

Although the NWI maps indicate that a palustrine, scrub-shrub saturated (PSSB) wetland is present at Palm Spring, park biologists have indicated that no true wetlands are present in the Palm Spring area (appendix A, figure 7). There are two source springs at Palm Spring that flows into the Volcano Pool and the Wizard Pool. The areas beyond these two soaking tubs where the tubs drain into the surrounding vegetation provide some limited hydrology. Plants with a hydrophytic status are present; however, the area is not considered to support a functioning wetland. For example, several native hydrophytic plants were observed at Palm Spring during vegetation surveys, including beaked spikerush (*Eleocharis rostellata*) and desert centaury. Three nonnative hydrophytic plants also occur at Palm Spring, including California fan palm, annual rabbitsfoot grass, and scarlet pimpernel. However, these areas do not provide any functions or values and are therefore not characterized as wetlands.

Upper Spring

The Upper Spring area is the most natural setting at the Saline Valley Warm Springs Area since no bathing tubs or diversions exist at Upper Spring. The NWI maps indicate that one wetland area (PSSB) exists. This wetland is referred to as Wetland 4 and actually exists at the site as a PEM1/PSS1 wetland, totaling approximately 0.65 acre. Two springs provide hydrology to Wetland 4. The first of these is the warm source spring, which is surrounded by a fence to exclude feral burros from the source spring, while the other spring, the cold source springs, is located outside of the burro fence. The vegetation at this wetland is dominated by hydrophytic species including beaked spikerush, chairmaker's bulrush, arrowweed, yerba mensa (*Anemopsis californica*), screwbean mesquite, and California loosestrife (*Lythrum californicum*). Although not native, the California fan palm and annual rabbitsfoot grass are additional hydrophytic species that occur at Upper Spring. The wetland at the Upper Spring (wetland 4) consists of a small area (0.029 acre) comprised of chairmaker's bulrush and beaked spikerush where the pool is located, surrounded by arrowweed scrub (0.62 acre) (appendix A, figure 7). This wetland performs several functions and has several natural values (table 2). This wetland acts to help reduce flood flow by retaining water. Wetland 4 acts as habitat for arthropods and produces food for other wildlife. Wetland 4 has several intrinsic values, such as providing wildlife habitat. As it is the most pristine of the wetlands at the Saline Valley Warm Springs Area, wetland 4 is a source of scientific value. It also provides aesthetic and recreational values, as visitors occasionally use Upper Spring for soaking. Finally, Upper Spring has a link to the heritage of the Saline Valley Warm Springs Area in comparison to the developed nature of Lower and Palm Springs. The Timbisha Shoshone Tribe (the Tribe) has traditionally used the source springs at Saline Valley, and the ethnographic values are part of the heritage of Upper Spring; due to the lack of development, this spring may retain the greater presence of ethnographic resources.

WILDLIFE

Native Species

Native wildlife in Saline Valley is typical of desert habitats, with the majority of wildlife species being small in stature and nocturnal. Death Valley National Park is home to many native species including 51 mammal species, 307 bird species, 36 reptile species, 3 amphibian species, and 5 fish species (NPS 2013b). Common species at the Saline Valley Warm Springs Area include kangaroo rats (*Dipodomys* spp.), common ravens (*Corvus corax*), and coyotes (*Canis latrans*). Appendix F presents wildlife species that have been observed within the study area or are expected to occur there.

Springs occur throughout the Death Valley National Park. Some springs dry periodically while others are reliable water sources. As a consequence of their lengthy isolation and long-term persistence, many Death Valley springs support pupfishes and aquatic macroinvertebrates that are endemic to the park. Typically, the invertebrate community of desert springs and springbrooks are dominated by spring snails and most springs contain amphipods (NPS 2013a).

Nonnative Species

Nonnative wildlife species that occur or are likely to occur in the study area include feral burros, house sparrows (*Passer domesticus*), and European starlings (*Sturnus vulgaris*). Additional species that have been introduced to the aquatic habitats at the Saline Valley Warm Springs Area include western mosquito fish, koi, and Louisiana swamp crayfish (*Procambarus clarkii*). These aquatic species could migrate through natural means such as flooding or through intentional human interaction.

Burros were introduced to the Death Valley region in the 1800s and were used into the early 20th century by prospectors and miners. Most of the free-roaming burros in the region at that time were either escaped from mining operations or were abandoned by the miners (Sanchez 1974). Feral burros are well adapted to the Mojave Desert environment and reproduce at a rate of 20 to 25% annually, potentially doubling the population size every 4-5 years. Feral burros compete with native animals for resources; impact soils, sensitive species, and cultural resources through trampling; and foul water sources (NPS 2013a).



Feral burros at camp host site at Lower Spring

From about 1920 to the 1960s, feral burro populations were kept at low levels by government agencies like the National Park Service and by the public. These efforts to reduce or eliminate feral burros from national park lands were the response of park managers to the burros damaging park resources and changing the ecological composition at the expense of the park's native biotic communities. Major efforts to reduce feral burro numbers were stalled in the 1960s and early 1970s due to public outcry. Since that time, several efforts have been taken to reduce and eventually eliminate feral burros from Death Valley National Park and

surrounding areas, including live trapping and shooting and roundup and removal of live burros by animal protection groups (NPS 2002a). The last burro removal effort was in 2005. The National Park Service reduced feral burro numbers park-wide to an estimated 200–400 animals. Invasive burros increase their population numbers by approximately 20% each year, and park staff now estimate between 2,000 and 4,000 burros may occur within the park.

The park has a “no burro or wild horse” goal and has a three-phase strategy to remove all wild horses and feral burros from the park. In 2018, the National Park Service entered into a 5-year agreement with the Texas-based nonprofit Peaceful Valley Donkey Rescue to capture 2,500 burros from Death Valley National Park and relocate them to offsite adoption facilities and sanctuaries. Relocations will be done through a public-private partnership with minimal cost to the government. Peaceful Valley’s burro project at Death Valley National Park is entirely funded by private donations, foundation grants, and corporate sponsorships. Peaceful Valley will use humane methods to capture burros. One method is to bait burros into a temporary pen with water or food. Wranglers on horseback may also drive the animals into temporary corrals. Peaceful Valley will transport burros to temporary holding facilities before transferring them to a training facility. Trainers will work to prepare the burros for adoption.

CULTURAL RESOURCES

The Saline Valley Warm Springs Area contains a number of cultural resources. These can be divided into two groups – those associated with the prehistoric occupation of Saline Valley and those associated with historic period occupation. Human habitation of Saline Valley extends back thousands of years into the past and according to the traditions of the Tribe, they have inhabited the Death Valley region since time immemorial (Catton 2009). The Tribe’s homelands encompass the entirety of Death Valley National Park (Rucks 2016). Archeological evidence for human occupation extends back to 9,000 B.P. and can be divided into six broad periods based on the type and style of artifacts recovered in archeological studies (table 3) (Giambastiani et al. 2005).

TABLE 3. CULTURAL CHRONOLOGY FOR THE SALINE VALLEY WARM SPRINGS AREA

Period	Alternate Name	Date Range
Death Valley I	Early Holocene	9,000-7,000 B.P.
Early Death Valley II	Middle Holocene	7,000-4,000 B.P.
Late Death Valley II	Late Holocene	4,000-1,500 B.P.
Death Valley III		1,500-650 B.P.
Death Valley IV		650-100 B.P.
Ethnohistoric Period		100 B.P. to Present

Source: Giambastiani et al. 2005

The study area lies approximately between 1,000 and 2,000 feet in elevation. Within the cultural periods described in table 3, archeologists note that the following types of sites are the most frequently encountered: cleared circles, geoglyphs, hunting blinds, hunting camps, lithic quarries, lithic scatters, lithic workshops, rock rings, and trails (Giambastiani et al. 2005). The most prevalent of these are hunting blinds, cleared circles, lithic quarries, or lithic scatters/workshops. Hunting blinds in particular were located between 1,000 and 2,000 feet and placed in proximity to bighorn sheep trails and water sources (Brook 1980 in Giambastiani et al. 2005).

Within the park, in the Death Valley I period, people followed a nomadic hunter-gatherer lifestyle and took advantage of different ecosystems within the park, using upland locations, as well as the edges of Lake Manly (Giambastiani et al. 2005). As the weather warmed during the Death Valley II occupation, sites become less common in the park. This period saw a shift away from tools manufactured with milky quartz and chalcedony to those made with volcanic rocks. Grinders have not been found at either Death Valley I or II sites. By the late Death Valley II occupation, the climate was improving again, which increased game populations, and the growing human population of Death Valley was exploiting different

vegetation. Mortars and pestles, as well as evidence for long distance trade, appear in the archeological record during this period. In the Death Valley III period, the bow and arrow appear, and growing numbers of grinders are found at occupation sites. Death Valley IV continued many of the trends begun in Death Valley III, including the reuse of sites that had been occupied before but also saw the development of pottery making, basketry and the introduction of the glass trade bead (Giambastiani et al. 2005). Based on the archeological record within the Death Valley IV population, it is likely that more than one ethnographic group was present. It is not known whether the Shoshone culture developed in Death Valley and spread out through the Great Basin, or if this culture arrived at a later date in Death Valley from elsewhere in the Great Basin.

According to Giambastiani et al. (2005) the following groups were present in the Death Valley 100 years ago:

The Shoshone occupied the northern part of the valley, including most of the bordering Cottonwood and Grapevine mountains. The southern part of the valley, including the area southeast of modern-day Furnace Creek, was settled by the southern Paiute. Finally, the Kawaiisu occupied the extreme southern end of the Valley and parts of the Panamint range.

Today's Tribe, who are affiliated with Saline Valley in the 19th and 20th centuries, are descended from the Panamint Shoshone (Rucks 2016). Additionally, the Owens Valley Paiute may have lived and hunted within Saline Valley. For both of these groups, the availability of water partially accounts for their prehistoric and historic use of the Saline Valley Warm Springs Area, as well as areas around the canyons of the Last Chance and Nelson mountain ranges. Habitation and more long-term use sites tend to be located near permanent water sources. Temporary occupation sites in Saline Valley are generally smaller and were used more during the winter months (Edwards AFB 2003).

The first Euro-American trappers and entrepreneurs arrived in the Death Valley area in the 1820s (Rothman 2005). While the 49ers, early railroad surveyors, and military expeditions all passed near, or mentioned, Saline Valley, the first group of Euro-Americans to become interested in describing Saline Valley seems to have been biologists from the US Department of Agriculture in 1891 and borax and salt miners at the beginning of the twentieth century (Unrau 1997; Treadwell 1884). Even though industry-mining officials did not become interested until the turn of the century, individual miners had already begun to exploit the mineral riches 20 years earlier. The Saline Valley Warm Springs Area appears for the first time on a map in the 1904 Map of Inyo County, California by A. M. Strong. The only two features noted in Saline Valley are the "Hot Springs" and the "Borax Works." Large-scale salt mining at the Saline Valley salt lake is thought to have begun around this same time. Between 1910 and 1913, the Saline Valley Salt Works constructed the Saline Valley Cable Tramway to move high-quality salt from the salt lake across the Inyo Mountains to Owens Valley where it was milled and packaged (Owens Valley History 2014). The tramway was the steepest in the United States. Although it was an engineering feat, it was costly to run and keep in repair. It was in use sporadically from 1913 to 1936 (Owens Valley History 2014). The tramway was listed on the National Register of Historic Places (NRHP) in 1974. During the later nineteenth century and throughout the twentieth century, some ranchers and miners, both Native American and Euro-American, have made the canyons of the valley their home. Potential historic sites and historic archeological sites for Saline Valley would include historic mining and ranching sites, as well as later period recreational sites.

Recreational use of the Saline Valley Warm Springs Area began likely in the 1940s and was conclusively in use from 1955 to the present. In 1955, the springs were identified as a destination on a tourism map of Inyo and Mono counties. (For a detailed timeline of the physical development of the recreational site at the springs, see the "Visitor Use and Experience" section later in this chapter.)

In a letter to the State Historic Preservation Officer (SHPO) on May 23, 2017, the National Park Service identified the preferred alternative and the proposed area of potential effect. The area of potential effect at the Saline Valley Warm Springs Area is defined as the camping areas, the developed area, the Chicken Strip airstrip, and the boundaries of the proposed historic and ethnographic districts. The SHPO responded on July 20, 2017 and concurred that the proposed area of potential effect was sufficient to determine the direct and indirect effects of the alternatives.

Archeological Resources

Prehistoric Archeological Surveys and Sites. There have been a number of archeological investigations in Saline Valley; however, only four of these have occurred in the Saline Valley Warm Springs Area (tables 4 and 5). In 1931, archeologist Clifford Park Baldwin, who was studying the Owens Valley Paiute for the Southwest Museum in Los Angeles and the Eastern California Museum in Independence, completed the first archeological investigations in Saline Valley (Unrau 1997). Baldwin and his team drove first to Lower Spring where they noted the presence of a wickiup that had been photographed by Kerr eight years earlier in 1923. They continued to the Upper Spring where they spent three days exploring caves, looking at rock circles, and finding artifacts such as projectile points, pottery sherds, and basketry fragments. On their return trip, they stopped at the “Middle Spring” (Palm Spring) area and noted a group of obsidian knives and chips (Baldwin 1931). Three sites were recorded at or near the springs at this time. The next survey was completed in the 1970s by the Bureau of Land Management (Robarchek 1972). The third study was completed by Brook et al. and documented in 1976 (as cited in Durk 2014), but the sites were not identified in the report. The fourth study was completed in 1997/1998 (Brewer et al. 2000). This study completed an Archeological Inventory and Assessment at numerous locations in the park considered at-risk, including the Saline Valley Warm Springs Area. That survey recorded 80 isolates and relocated one site, INY-163 (CA-INY 0406). In 1999, Canaday completed a study of the vault toilet locations before installation (as cited in Durk 2014). No sites were located in that effort. McCuiston completed condition assessments of 67 sites in Death Valley in 2011. Two previously identified sites could not be relocated, and one (CA-INY-1823) was described as poor/destroyed. The sixth study was completed by Death Valley National Park in 2011 and described archeological findings for the Saline Valley Warm Springs Area (Bonstead 2011 and 2013). Bonstead (2011) noted that evidence for the two previously recorded archeological sites (INY-1569 and INY-163) was scarce and the sites’ conditions were poor (table 4). Finally, the most recent study (Durk 2014) was conducted by Death Valley archeologists in 2014 and resulted in the identification of three new sites in the study area.

TABLE 4. ARCHEOLOGICAL SURVEYS CONDUCTED IN THE SALINE VALLEY WARM SPRINGS AREA

DEVA Project No./Year	Author(s)	Sites
1931	Baldwin, Clifford Park	CA-INY-0405 (INY-1569) and CA-INY-0406 (INY-163)
1976H	Brook, Richard and Eric Ritter	Sites not listed, but one was likely CA-INY-1823
1997C	Brewer, Harold et al.	80 Isolated Artifact Finds and relocated CA-INY-0406
1999T	Canaday, Tim	No Findings
2011	McCuiston, Emily	Relocated CA-INY-1823, could not relocate CA-INY-0405 and CA-INY-0406
2011 (11-036)	Bonstead, Leah	Could not relocate CA-INY-0405, CA-INY-0406, and CA-INY-1823
2014 (15-006)	Durk, Jennifer	Located three new sites, SV-01, SV-02, and SV-03

TABLE 5. PREHISTORIC ARCHEOLOGICAL SITES RECORDED IN THE SALINE VALLEY WARM SPRINGS AREA

Site Number	Recorded by	Description
CA-INY-0405 (INY-1569)	Baldwin 1931	Long-term camp / “village” – Lower Spring vicinity, Brush Shelter (observed in 1923 and 1931, not relocated 2011).
INY-1571	Baldwin 1931 (site number referenced in Robarchek 1972, relocated 1972)	Upper Spring Vicinity.
CA-INY 0406 (INY-163)	Baldwin 1931; Brewer et al. 2000; Bonstead 2011	Campsite/artifact scatter – Palm Spring. Not relocated 2011.
INY-1576	Noted in Robarchek 1972	Glass beads, pottery fragments, flakes, condition good 2011.
CA-INY-1823 (INY-124)	Recorded in 1976, (likely by Brook et al., as cited in Durk 2014)	Lithic scatter, Upper Warm Spring, condition poor/destroyed 2011.
80 Prehistoric Isolates	Brewer et al. 2000	Predominantly lithics throughout study area
SV-01	Durk 2014	Artifact scatter with metate and two flakes, Palm Spring vicinity.
SV-02	Durk 2014	Lithic concentration, Palm Spring vicinity.
SV-03	Durk 2014	Multiple rock cairns, Warm Springs Road south of Lower Springs.

Historic Archeological Sites. At present, no historic archeological sites have been recorded in the Saline Valley Warm Springs Area, with possible exception that the stone dwelling near the Upper Spring, INY-124 may be a mining cabin, not a prehistoric dwelling.

Historical Resources

In 2014, the National Park Service completed a Determination of Eligibility (DOE) to identify and evaluate historic resources in the Saline Valley Warm Springs Area and determine if the site is eligible for nomination to the NRHP (New South 2015). The “historic” DOE considered the potential significance of the site from the perspective of the Euro-American use and development from the 1930s to the present. The National Park Service completed consultation with the SHPO under section 106 of the National Historic Preservation Act of 1966 (NHPA). The National Park Service sent a consultation package with the identification of historic properties (including archeological surveys and DOE documents for the historic and ethnographic sites) and the Assessment of Effect to the SHPO on February 15, 2018. Per 36 Code of Federal Regulations (CFR) 800, “Protection of Historic Properties,” the SHPO had 60 days from the time the package arrived to respond formally. The National Park Service did not receive a formal response but sent another letter in July 2018, requesting SHPO comments or concurrence by the end of August 2018. The National Park Service did not receive a formal response at the time of completing this report; therefore, in accordance with 36 CFR 800.5(c)(1), the National Park Service would proceed with the undertaking once a decision is made. The National Park Service would continue to treat the Saline Valley Warm Springs Historic District as eligible for listing on the NRHP for this project and future projects. The historic DOE also recommended that a Cultural Landscape Inventory and possibly a Cultural Landscape Report be prepared for the Saline Valley Warm Springs Historic Site (New South 2015). A Cultural Landscape Inventory and a Cultural Landscape Report would be appropriate to complete in the future to provide guidance on how to maintain the cultural landscape at the Saline Valley Warm Springs Area.

The DOE recommends that the area of historic significance for the recreational users is significant at the local level under Criterion A for recreation as a campground established around a hot springs site in use by Euro-Americans since 1955. Additionally, the DOE recommends that the area of historic significance is significant for social history. The site typifies the ideals and principles of a continuum of counterculture movements, in particular the Beat and Hippie movements and the social trends that influenced them, such as nudism or naturism. The contributing resources at the site reflect these social movements in the California Deserts. The site's earliest use for tourism and visitation was tied to primitive recreationism and the rise in the automobile tourism that occurred during the post-World War II economic boom. The site is not easily accessed on foot or by horseback, and even motorized vehicles need to be prepared for rough roads and a lack of services. The appropriate type of off-road vehicle became more widely available after World War II.

The springs saw frequent but light use through the 1940s and 1950s with visitation increasing, as well as the length of time individuals were staying at the site, through the early 1960s. Evidence that the site was seeing heavier recreational usage leading up to 1965 was implied by the perceived need to clean up the site and encourage a different type of self-motivated and community-motivated upkeep of the campsites and springs. In 1965, the site cleanup was organized and later that year the Sunrise Pool was built, marking the start of increasing development at the springs and the evolution of the unique community at the site.

From 1965 to 1978, there were many additions to the landscape at the springs: five pools were constructed at the site; the source springs became off-limits to soakers; the users began to increasingly build campfire rings and other small additions to frequently used camping areas; and the communal areas of the sites were established. This movement of visiting the desert for recreation was very popular from the 1930s through the 1970s in California, throughout the West, and Saline Valley. Deserts became a unique destination due to their lack of oversight, private ownership, and commercialization for these years. Most of the hot and warm spring sites in the West are heavily used, commercialized, privately owned, or overdeveloped. According to the longtime visitors to the springs, many of whom have visited numerous springs throughout the western United States, the Saline Valley Warm Springs Area is unique as a recreational resource with a combination of beauty, remoteness, facilities, and community.

In the 1950s, members of the Beat Generation, who opposed society's status quo, celebrated a return to nature and the basics, as well as a non-materialistic lifestyle. Bored of the sameness of the expanding American suburbs, many sought escape from their daily lives in wild, remote, outdoor destinations, such as Saline Valley. People came to Saline Valley for recreation to "get away from it all." Noted sculptor Gordon Newell, who was a member of the Beat Movement in California, left his life in the commercial culture of Hollywood for a simpler existence in nearby Darwin, California, and likely found visiting the Saline Valley Warm Springs Area as an even greater escape.

Sometime during the 1950s or 1960s, a culture that either accepted or embraced nudity began at the springs. Naturists sought out remote locations where they could recreate and vacation in the nude. During the period of significance for the springs, nudity gradually went from being occasional, or at least accepted at the springs, to being the norm, particularly where soaking in the tubs was concerned. This was reflective of a larger counterculture movement in California. Where once only more fringe elements of society like the Nature Boys frequented the California Deserts in the nude, soon nudity was embraced by many in the Hippie Movement as well. The springs became a recreational haven where naturists and nudists could feel safe and accepted.

As the Hippie Movement flowered, their ideals found a strong expression in the recreational landscape that continued to evolve at the springs. Soaking pools and rugged campsites accompanied a communal fire ring for socializing, singing, and celebrating. The landscape that developed, particularly at the Lower

Spring, exhibited the communal lifestyle favored by the Hippies with shared cooking, bathing, and social areas in the site. The fact that Charles Manson and members of his family came to the springs circa 1968, presumably for recreation, is notable; not in the context of their later terrible crimes, but in the context of their participation in the Summer of Love and embrace of a semi-nomadic Hippie lifestyle. During this period people spent months or years at the springs, often leaving during the hottest months of summer and returning in the winter. Spending time at the springs has for many become a multigenerational, recreational, and experiential tradition.

The area of historic significance for the recreational users is also recommended significant under Criterion A for social history. The period of development for the site coincides with a strong counterculture social movement in American history. Populated by a segment of American society that had become disillusioned with the political and social establishment, the Counterculture Movement emerged in the 1930s with a back-to-nature approach and continued through the post-war era of the mid-1940s. The Beat Movement of the 1950s and the Hippie Movement of the 1960s and 1970s grew from the earlier counterculture movements of the early and mid-twentieth century, such as the Nudist Movement and the German Wandervogel Movement. The Hippie Movement would then coincide, and in many cases comingle with, the Anti-War Movement, the Feminist Movement, the Civil Rights Movement, and the Environmental Movement. The 1960s and early 1970s were a time of significant upheaval in American society, and the Beat and Hippie Countercultures that developed at the time clearly flourished at the Saline Valley Warm Springs Area and continue to thrive there to this day. At present, the site seems to be overlaid with the many layers of countercultural beliefs of its users.

For members of the Beat Generation, places like Saline Valley were distant places where one could get away from the greater materialistic American society of the 1950s. Like the primitive recreationists, the Beats sought out wild destinations and lauded literary works such as Henry David Thoreau's *Walden*. They felt that real creative moments flowed from experiencing all aspects of the world, beautiful and ugly. A desert landscape that is both challenging and beautiful like Saline Valley would certainly have fit this description.

The utopian view of a community where everyone is accepted for who they are, as well as the idea of searching for a simpler existence that is closer to nature, the ethic of shared responsibility and communalism, and the idea that responsibility can be shared, and people can gently be taught to do something is at the heart of Hippie ideology. In a famous *Time Magazine* article from July of 1967, during the Summer of Love, the writer describes the Hippie ethos, which also very accurately reflects the ongoing culture of the springs, "Hippies preach altruism and mysticism, honesty, joy, and nonviolence. They find almost a childish fascination in beads, blossoms and bells, blinding strobe lights and ear-shattering music, exotic clothing and erotic slogans. Their professed aim is nothing less than the subversion of Western society by 'flower power' and force of example." This is the social structure that has allowed the springs to work as a recreational site and one rooted in Hippie ideology. Veteran visitors to the springs would prefer to use politeness and lead by example than employ rigid rules.

The Hippie ideology is manifested in the physical landscape of the springs as well. The Lower (East) Peace Sign was created during this period and in addition to serving as the most famous emblem of the Hippie Movement at the springs, its size and location allowed it to be a very clear protest statement to the military pilots flying over the site from nearby Naval Air Weapons Station China Lake. Other art that has developed over time at the site is inspired by nature, mysticism, and whimsy, all of which are favored themes of the period.

Hippie values have also significantly influenced the Nudist culture that has developed at the springs. While the roots of the Naturist Movement stretch all the way back to the early 1900s, the Hippies' more relaxed attitudes toward nudity brought the culture out of private camps and into public spaces and public

lands. The physical layout of the pools and showers of Lower Spring and Palm Spring do not allow for privacy in their design. If one wishes for privacy, they wear a bathing suit.

During this period as well, scientists in the emerging new field of environmental studies, visited the springs for study and recreation. As one noted environmental scientist stated, “[At the springs] you can see the effect of thoughtful, green, and sustainable before those were buzz words” (Sage in New South 2015). It is significant that Stewart Brand, publisher of the iconic *Whole Earth Catalog* and member of the Merry Pranksters, chose Saline Valley as a test location to prove that enterprise could coexist with the wilderness. As a prominent member of the Hippie and Environmental movements, the fact that Brand knew of the springs speaks to its notoriety amongst the movers and shakers of the movement.

The area of historic significance for the recreational users consists of a campground and recreational site focused around soaking pools (tubs) that have been constructed at the Lower Spring and Palm Spring by visitors between 1965 and the early 1990s. The site has a discontinuous boundary and includes the Lower (East) Peace sign to the east of Lower Spring. In addition to the tubs, the site contains camping areas, communal use areas, artwork, supporting infrastructure, roads and paths, and airstrips. Contributing and non-contributing features of this site are detailed in table 6 and appendix C.

TABLE 6. FEATURES OF THE AREA OF HISTORIC SIGNIFICANCE FOR THE RECREATIONAL USERS

Name of Feature	Contributing	Non-Contributing	Undetermined
Bat Pole (Painted Pole)	X		
Road from Bat Pole to North End of Palm Spring Central Area (Warm Springs Road)	X		
Lower (East) Peace Sign	X		
Lower Spring Warm Source Spring Piping/Utilities	X		
Lower Spring Cold Source Spring/Cool Pool	X		
Burro Spring Piping/Utilities		X	
Bathtub	X		
Sunrise Pool	X		
Crystal Pool	X		
Children's Play Tub ^a		X	
Shower, Lower Spring ^a		X	
Library Recycling Area	X		
Communal Campfire Circle	X		
Wood Storage Area ^b			X
Dishwashing Area, Lower Spring	X		
Settling Pond	X		
Lawn	X		
Lower Spring Palms ^c			X
Campground Host Compound, Lower Spring ^a		X	
Boneyard		X	
Weather Station		X	
Decommissioned Airstrip (Tail Dragger Strip)	X		

Name of Feature	Contributing	Non-Contributing	Undetermined
Art Board/Rock Alignment Area		X	
Active Airstrip (Chicken Strip)	X		
Ball Field/Balcony	X		
Lower Warm Spring Signage		X	
Central Camping Area, Lower Spring	X		
Cool Pool Camping Area	X		
Burro Spring Camping Area	X		
Lower Dispersed Camping Area	X		
Fencing ^a		X	
Vault Toilet #1, Lower Spring		X	
Vault Toilet #2, Lower Spring		X	
Middle Dispersed Camping Area		X	
Palm Spring Northern Warm Source Spring, Piping/Utilities	X		
Palm Spring Southern Warm Source Spring, Piping/Utilities	X		
Volcano Pool	X		
Wizard Pool	X		
Palm Spring Palm Trees	X		
Shower, Palm Spring		X	
Dishwashing Area, Palm Spring		X	
Central Camping Area, Palm Spring	X		
Vault Toilet, Palm Spring		X	

a Feature should be re-evaluated for contributing status once the resource reaches 50 years of age.

b Undetermined.

c Undetermined due to conflicting accounts on when the palms were planted.

Ethnographic Resources

The 2000 *Legislative Environmental Impact Statement: Timbisha Shoshone Homeland* identified the Saline Valley Warm Springs Area as part of a special use area for the Tribe. The Timbisha Shoshone Natural and Cultural Preservation Area, which includes the Saline Valley Warm Springs Area, can be used by members of the Tribe for low impact, ecologically sustainable, traditional practices (e.g., camping, ceremonies, and other traditional practices) pursuant to a jointly established management plan (NPS 2000).

The warm springs at Saline Valley (the warm springs) were highly valued and widely utilized by the older generation of contemporary Tribal members for healing and medicinal purposes (Fowler et al. 1995). As development of the Saline Valley Warm Springs Area increased, the Tribe's use of and visitation diminished. Despite the avoidance of the Saline Valley Warm Springs Area, the Tribe has expressed interest in the management of the Saline Valley Warm Springs Area.

In January 2018, the National Park Service completed a DOE report to identify ethnographic resources in the Saline Valley Warm Springs Area and to evaluate the site's NRHP eligibility. The "ethnographic" DOE considered the potential significance of the site from the perspective of the Tribe and documented that the warm springs are eligible for listing on the NRHP under Criterion A as an area of significance to the Tribe. The waters of the warm springs are a source of *puha*, or sacred knowledge, and the warm springs were sought by Tribal spiritual leaders for *puha* and by Tribal elders for healing (Rucks 2016). *Puha* is defined as a life force energy that is at once everywhere yet concentrated in particular geographic features, such as the warm springs (Rucks 2016). Despite the development of the Saline Valley Warm Springs Area, the warm springs have retained their cultural significance to the Tribe. As previously stated, the National Park Service has completed consultation with the SHPO under section 106 of the NHPA. Without official response from the SHPO and in accordance with 36 CFR 800.5(c)(1), the National Park Service would proceed with the undertaking. The National Park Service is treating the ethnographic resources at the Saline Valley Warm Springs Area as eligible for listing in the NRHP.

A separate ethnographic evaluation of the individuals who currently use area of historic significance was not a component of the historic DOE, which focused on the Euro-American use of Saline Valley Warm Springs Area since 1930. However, the historic DOE noted that the community that has developed and maintained the area of historic significance may be a continuing distinct culture based on the ideals of the counterculture movements from the 1930s to today (New South 2015). From the ideals of primitive recreationists to the Beat and the Hippie movements that followed, and through the Environmental Movement, a distinct culture may have developed among the community that uses the springs. Additional ethnographic research and documentation would be necessary to determine if the area of historic significance is eligible for listing in the NRHP as a Traditional Cultural Property (TCP) for its association with the community that uses it today. For a site to be a TCP, it must have "... association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (NPS 1998).

WILDERNESS CHARACTER

Wilderness is described by the Wilderness Act of 1964 [section 2(c)] as land that is

protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Approximately 91% of Death Valley National Park is designated as wilderness (NPS 2012c). Only 1% (11 acres) of the study area is wilderness (appendix A, figure 2); however, the Saline Valley Warm Springs Area is often used as a staging area for people who enjoy exploring wilderness. Users will often camp in the Saline Valley Warm Springs Area or drive the roads leading to the Saline Valley Warm Springs Area to access the surrounding wilderness areas.

The road from Palm Spring to Upper Spring is an unmaintained path that is subject to changes from rain events and washouts. As a result, the road does not remain within the designated wilderness boundary. The designated wilderness boundary in the study area is described as being 50 feet from the centerline on either side of the Steel Pass Road from the boundary where it leaves the backcountry area at Palm Spring to Upper Spring. At the time of publication for this plan/EIS flooding and washouts had moved the road from the north side of Upper Spring to the south side. Due to the legal description of the wilderness

boundary and the wilderness exclusion for Upper Spring, the road cannot be switched to this location and needs to be re-established on the north side of the Upper Springs. This adjustment will be managed as described in the Wilderness Stewardship Plan (NPS 2013a) and will not be a part of this plan/EIS.

Creating art in the desert at the Saline Valley Warm Springs Area is recognized as an integral part of the experience for some visitors (see full discussion in the “Visitor Use and Experience” section). The lower peace sign and upper peace sign are two large pieces of artwork that were created in the designated wilderness area. Most artwork occurs in the backcountry close to the developed areas of the site, but some visitors occasionally create art from rocks within designated wilderness.

VISITOR USE AND EXPERIENCE

Saline Valley Warm Springs Area

The Saline Valley Warm Springs Area is remote and limited in size relative to the 3.4 million acres of the park. It takes a substantial effort for a visitor to make it to the area to use the springs. Over the years, an established community of users has formed. Users of the Saline Valley Warm Springs Area started to enhance the area by constructing soaking tubs of concrete by the 1940s when the land was under the management of the Bureau of Land Management.

Currently, the Saline Valley Warm Springs Area, a developed backcountry campground, is informally managed by a combination of the established community of users who frequent the area, a year-round volunteer camp host, seasonal camp hosts, and Death Valley National Park rangers. The camp host has an NPS-issued radio and other means of communicating with park personnel if necessary. However, the remoteness of the area and the time it takes for park personnel to travel to the Saline Valley Warm Springs Area make the response times approximately 2 to 6 hours depending on the availability of personnel. Park rangers visit the area regularly and make a point to be visibly present and available to address enforcement or safety issues on busy periods, such as holidays (e.g., Presidents Day). The current camp host also provides vehicle support to assist visitors with minor auto repairs. The vehicle support facility is supplied and maintained by the camp host. This service is not offered elsewhere in the park and is not sanctioned by the National Park Service.

Many of the people who visit Saline Valley Warm Springs Area are a part of Saline Preservation Association (SPA), a non-profit organization established in 1986. SPA’s mission is to provide the following:

an informational conduit both between and among governing agencies and a widely dispersed community who visit the Saline Valley and its Warm Springs. SPA’s goal is protection, preservation and conservation of the valley to include geology, wildlife habitat, archeology, and a traditional human presence that emphasizes responsible individual freedom of choice (SPA n.d.).

In February 2001, a former Death Valley National Park Superintendent and a former SPA President signed a memorandum of understanding (MOU). This MOU defined certain volunteer efforts that were provided by members of SPA including reasonable care, sanitation, public safety, public information, mutual communications, resource conservation, and visitor use (SPA 2001). This MOU expired in 2006 and has not been renewed.

Park personnel have described the community as effective in handling instances of unruly or loud visitors and visitors who do not follow the general camp cleanliness guidelines. The established community has maintained a self-managing policy and contacts park law enforcement only when an issue cannot be resolved within the community. Recently, there has been a noticeable shift in the community as new visitors vacation in the Saline Valley Warm Springs Area. These visitors are often unfamiliar with the traditional recreational community and its norms. As the community expands with these new visitors, the cohesiveness of the community also seems to be changing.

When large gatherings occur at the springs, group activities and cooperation are standard. At Thanksgiving, there is a softball game between the Palm Spring and the Lower Spring teams, as well as a traditional communal dinner. During Presidents Day, a par-three golf course is constructed and played. Both the ballfield and golf course have been created by the visitors without authorization from the National Park Service. Group campfires and singing are common.



The Bat Pole marks the entrance to Saline Valley Warm Springs Area

Art is a large part of the culture of Saline Valley Warm Springs Area. Two peace symbols have been created by moving dark desert pavement rocks to expose the lighter soil along hillsides near Saline Valley Warm Springs Area but within designated wilderness. The oldest peace symbol created on a hillside to the east of Lower Spring is within the viewshed of the area. The peace symbol was created during the Vietnam War era to be visible to the military pilots training in the airspace. A second peace symbol is on a hillside to the west of Upper Spring. This peace symbol was created later than the Vietnam War era symbol (perhaps 1990s). The Bat Pole, which marks the entrance to the Saline Valley Warm Springs Area on South Pass, is an evolving piece of artwork. Smaller pieces of artwork, much of it metal work, can be found throughout Lower and Palm Springs.



Unauthorized artwork created by a Saline Valley Warm Springs Area visitor

Lower Spring is the most developed area with many amenities for visitors, including the Crystal Pool, the Sunrise Pool, the Cool Pool, the Children's Play Tub, a shower, a bathtub, a sink for washing dishes, a library, shade canopies, a pond with koi, and vault toilets. Palm Spring has two soaking tubs, the Volcano Pool and the Wizard Pool. Palm Spring also has a vault toilet, a shower, and a dishwashing sink. Dispersed camping (no designated campsites) occurs between Lower and Palm Springs, and anecdotal accounts of camping between Palm and Upper Springs have been reported.

Camp hosts at Lower Spring recorded the number of visitors between September 2012 and April 2013; Palm Spring visitors were logged

from November 2012 through March 2013. These logs are not considered to be entirely accurate for several reasons: data are missing for some days (data are missing for Lower Spring for December 2012, as well as several weeks in October and November 2012); only vehicle counts were recorded during

certain periods and visitor counts had to be estimated based on the remaining data; and length of stay information was not recorded for many visitors or groups of visitors. The number of visitors at Lower Spring and Palm Spring cannot be compared because the recording was not synchronized; however, visitation at the two areas was generalized from the available data and summarized in the following two paragraphs and table 7.

Based on visitor logs, approximately 3,800 people visited Lower Spring between September through November 2012 and January through April of 2013. Monthly visitor counts ranged from 44 people (September 2012) to 950 people (April 2013). Holiday weekends often bring the largest numbers of visitors to the springs, including Presidents Day and Thanksgiving. The length of stay at Lower Spring ranged from 1 day to 30 days, with an average of 3 days.

TABLE 7. MONTHLY VISITATION AT LOWER SPRING AND PALM SPRING BASED ON VISITOR AND VEHICLE COUNTS TAKEN BY CAMP HOSTS IN 2012 AND 2013

Location	September 2012	October 2012	November 2012	December 2012	January 2013	February 2013	March 2013	April 2013
Lower Spring	45	453	686*	ND	174	442	942*	950*
Palm Spring	ND	ND	417	187	125	250	742*	ND

* These numbers are estimates. In some instances, only the vehicle counts were recorded, and the number of visitors had to be extrapolated based on visitor to vehicle ratios derived from available data. Lower Spring has a visitor to vehicle ratio of 1.60 and there is an average of 1.78 people per vehicle at Palm Spring.

ND = no data

Visitor logs from Palm Spring only include November 2012 through March 2013. Approximately 1,700 people visited Palm Spring during this time. Monthly visitor counts ranged from 125 people (January 2013) to 742 people (March 2013). The length of stay at Palm Spring ranged from 1 day to 21 days, with an average length of stay of 4 days.

It is important to note that these data were collected by the camp hosts at Lower Spring and Palm Spring. It is possible that visitors could have been counted more than once, although this is unlikely due to the nature of camping at the springs. Visitors tend to set up camp close to their vehicles.

Chicken Strip

The Chicken Strip is a backcountry dirt airstrip located in the backcountry area of Saline Valley, approximately 0.5 mile from Lower Spring. The airstrip is approximately 1,400 feet long and 35 feet wide. Features of the airstrip include a windsock, painted rocks lining the strip, and two airplane tiedowns. Those visitors who fly into the Saline Valley Warm Springs Area via the Chicken Strip often camp next to their airplanes. As stated in the “Purpose of and Need for Action” chapter, the National Park Service is proposing a special regulation to designate the Chicken Strip airstrip as a location available for the operation of aircraft.

Recreational Aviation Foundation (RAF) is a 501(c)(3) public charity dedicated to “keeping the legacy of recreational aviation strong by preserving, maintaining and creating public use recreational and backcountry airstrips nationwide” (RAF 2011).

RAF has a current MOU with Death Valley National Park that allows members of RAF to volunteer their time to make necessary repairs to the Chicken Strip airstrip in Saline Valley (RAF n.d.). RAF arranges work days, often with the help of park personnel, to make repairs to the Chicken Strip to keep it in safe working order. Repairs include leveling the dirt strip after rain events, replacing the wind sock, and painting the rocks that line the strip.

Based on visitor registration logs at the Chicken Strip, approximately 440 people visited Saline Valley via airplane from 2008 to 2012, averaging 88 visitors per year. Of the aircraft reported, approximately two-thirds were various models of Cessna airplanes. Other types of planes included various models of Pipers, Maules, and Beechcraft. The largest number of people recorded in one aircraft was six.



The Chicken Strip Airstrip is the only active airstrip in Saline Valley

HUMAN HEALTH AND SAFETY

The health and safety of visitors, park staff, and volunteers are of paramount concern to the National Park Service. NPS *Management Policies 2006* summarizes the commitment of the National Park Service to providing appropriate, high-quality opportunities for visitors while striving to protect human life and providing for injury-free visits (NPS 2006). Director's Order 83: *Public Health*, outlines what the National Park Service will do to ensure compliance with prescribed public health policies, practices, and procedures. This order establishes NPS policy with respect to all public health activities within areas of NPS jurisdiction, regardless of whether those activities are carried out by the National Park Service or other federal employees, or by other organizations, including the NPS Public Health Program. Public health includes illnesses associated with drinking water, wastewater, food safety, animal vectors, animal reservoirs, hazardous wastes, indoor air pollution, institutional sanitation, radiation safety, medical wastes, solid wastes, air pollution, and other related areas of environmental health.

The Superintendent's Compendium includes rules specific to the Saline Valley Warm Springs Area, created to protect public health and safety. These restrictions include closing source springs to bathing, keeping domestic pets at least 50 feet away from the tubs and springs, prohibiting people who are sick from soaking in the tubs, excluding the introduction of human bodily waste, prohibiting birthing in the waters, and requiring young children to wear waterproof swimming diapers (NPS 2016a).

Risks from Flood Events

Under the present hydrologic and sediment regime, drainage patterns around the developed areas of the Saline Valley Warm Springs Area indicate that flood runoff is derived from watersheds in the Saline Range to the north and northeast. In the study area, the National Park Service has identified three watersheds (appendix A, figure 9), which are discussed in detail in the Floodplains Statement of Findings (appendix G).

The east watershed flows south out of the Saline Range and then southwest down the valley to Upper Spring. There is no indication that the elevated spring mound area has been subject to recent flooding.

The runoff to the north of Palm Spring and Lower Spring is derived from the west watershed, which flows to the southwest out of the Saline Range into the valley. The drainage patterns indicate that the developed areas of Palm Spring and Lower Spring have not been affected by recent flooding from the west watershed; however, the Chicken Strip airstrip is within the west watershed, and there is some evidence of flooding across the mid-southern portion of the airstrip.

The middle watershed flows to the southwest out of the Saline Range then into the valley. The watershed drains around the southeast of Palm Spring, and the drainage patterns indicate that the developed areas at Palm Spring have not been subjected to recent flooding; however, the expansion of the camping area has probably resulted in impromptu campsites being located within flood zones. The dominant drainage of the middle watershed continues along the southeast side of the spring deposits before it turns to the west towards Lower Spring. Drainage patterns and anecdotal evidence indicate that a significant amount of the developed area in Lower Spring is subject to flooding. As runoff enters Lower Spring, the focused channel flow spreads out around the highest parts of the spring mound. A small levee has been built to protect the camp host site, and this feature diverts some of the southwesterly flow to the southeast. The energy of the runoff is further dissipated by the concentration of manmade features and vegetation surrounding Lower Spring, but below the developed area the flow becomes refocused in the drainage. There are numerous campsites that are subject to flooding below the developed area of Lower Spring. These campsites are rarely occupied during the summer when flooding is most likely. Higher ground can be found immediately to the southeast and northwest of the drainage.

Risks of Recreational Water Use

There are risks associated with recreational water use, although attributing an infection to the water is difficult (Pond 2005). Two diseases associated with recreational use of hot or warm springs are primary amoebic meningoencephalitis and Legionnaires' disease. Primary amoebic meningoencephalitis is caused by the amoeba *Naegleria fowleri* and eventually results in the destruction of brain tissue (Pond 2005). Legionnaires' disease is a type of pneumonia caused by the bacteria *Legionella* (Pond 2005). Both *Naegleria fowleri* and *Legionella* are found in freshwater worldwide (Pond 2005).

Risks from Habituated Wildlife

Habituated and nuisance wildlife species can pose threats to human health and safety. At the Saline Valley Warm Springs Area, these species include common ravens, American coots, Eurasian collared doves (*Streptopelia decaocto*), feral burros, coyotes, and various rodents. Food is the contributing factor to the presence of these species in the Saline Valley Warm Springs Area. Park personnel have developed

flyers for the camp host to post to encourage visitors to practice proper food storage. However, anecdotal reports from users of the Saline Valley Warm Springs Area indicate that alfalfa and dog food, as well as food scraps, are provided at unofficial feeding stations. Visitors regularly and illegally feed wildlife at the Saline Valley Warm Springs Area. Features such as the settling pond and lawn can be an attractive nuisance, as they bring wildlife to an area where they are exposed to human activity, creating a greater potential for becoming habituated to humans. Users report large amounts of burro and bird feces, which lead to an increase in insects and rodents. The National Park Service has not tested rodents from the Saline Valley Warm Springs Area for hantavirus; however, it has been detected in other areas of the park. Hantavirus is transmitted to humans through contact with infected rodents or their excrement (CDC 2012).



Feral burro drinking from a source spring at Palm Spring

Hazardous Material Handling

The National Park Service issued Director's Order 50B: *Occupational Safety and Health Program* and the associated Reference Manual 50B to protect the health and safety of the visiting public, employees, contractors, and volunteers. The storage and use of hazardous materials for the operations of the Saline Valley Warm Spring area should be regulated under these guidance documents. Hazardous materials at the Saline Valley Warm Spring area include cleaning products, such as bleach for the soaking tubs and toilet facilities, and items for vehicle repair, such as batteries, gasoline, and motor oil.



Collection of batteries at the camp host site

