

# 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 centaurium (*Centaurium 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.





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 centauray. 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.





































