

SAFE HARBOR AGREEMENT

**FOR THE RE-INTRODUCTION
OF THE AMARGOSA VOLE (*Microtus californicus scirpensis*),
IN SHOSHONE, CALIFORNIA**

Prepared by

**U.S. Fish and Wildlife Service,
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and

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**SAFE HARBOR AGREEMENT BETWEEN SUSAN SORRELLS
AND THE U.S. FISH AND WILDLIFE SERVICE FOR AMARGOSA VOLE
TRANSLOCATION AND RE-INTRODUCTION IN SHOSHONE, CALIFORNIA**

This Safe Harbor Agreement (Agreement), effective and binding on the date of Permit issuance, is between Susan Sorrells (Landowner) and the U.S. Department of the Interior, Fish and Wildlife Service (Service), hereinafter referred to as the “Parties.”

Service: The Service designates the following as the Agreement Contact:
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Summary

This Agreement will outline conservation actions that Landowner will implement and monitor on the enrolled property, described below, for the conservation and recovery of the federally endangered Amargosa vole (*Microtus californicus scirpensis*). The goal of the agreement is to

implement conservation actions for the Amargosa vole to provide a net conservation benefit to recovery.

1.0 INTRODUCTION

Purpose

The purpose of this Agreement is to join with the Landowner to implement the conservation measures for the Amargosa vole through the translocation and re-introduction of the subspecies to suitable habitat on lands owned and managed by the Landowner, and to maintain habitat for the subspecies on Landowner lands. The specific goals of this Agreement are to translocate wild (non-captive) Amargosa voles from a source population, informed by genetic analyses, to re-introduce and establish a self-sustaining population of Amargosa voles within its historical range on Landowner lands.

Enrolled Lands and Core Area

The properties subject to this Agreement (Enrolled Property) consist of two parcels owned by the Landowner: 1) APN 046-120-26 (220 acres) and 2) APN 046-120-25 (247 acres), totaling 467 acres. While this agreement covers the entire 467 acres, Beneficial Management Activities (including translocation and re-introduction) will only occur in approximately 0.5 acres of marsh habitat within the Enrolled Property where restoration activities have previously been implemented to return the habitat to its natural condition. This area (Core Area) consists of 3 connected marsh sites (Marshes 31, 31A, and 31B) on the west side of Highway 127 near the north end of Shoshone, California. A more detailed description and maps of the Enrolled Property are provided in section 3.1 of this Agreement.

Regulatory Framework

Sections 2, 7, and 10 of the Endangered Species Act (Act) of 1973, as amended, allow the U.S. Fish and Wildlife Service to enter into this SHA. Section 2 of the Act states that encouraging interested parties, through Federal financial assistance and a system of incentives, to develop and maintain conservation programs is a key to safeguarding the Nation's heritage in fish, wildlife, and plants. Section 7 of the Act requires the Service to review programs that we administer and to utilize such programs in furtherance of the purposes of the Act. By entering into this SHA, we are utilizing our Recovery Program to further the conservation of the Nation's fish and wildlife. Lastly, section 10(a)(1)(A) of the Act authorizes the issuance of permits to "enhance the survival" of a listed species.

This Agreement follows the Service's Safe Harbor Agreement policy (64 Federal Register [FR] 32717) and regulations (50 CFR 17.22(c) and 50 CFR 17.32(c)) and implements the intent of the Parties to follow the procedural and substantive requirements of section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended (Act).

For the purposes of this Agreement, we define “translocation” according to the International Union for Conservation of Nature and Natural Resources (IUCN) position statement (IUCN 1987) as “the movement of living organisms from one area with free release in another.”

SHA Standard and Background

Before entering into a SHA, the Service must determine that the conservation measures to be implemented will contribute to recovering the species by providing a net conservation benefit.

Safe Harbor Agreements encourage voluntary conservation efforts by non-Federal landowners and provide them assurances that future property-use restrictions will not be imposed if those efforts attract covered species to their Property or result in increased numbers or distributions of covered species already present. In return for voluntary conservation commitments, the Safe Harbor Agreement will extend assurances to the landowner that allow future alteration or modification of the enrolled lands back to pre-agreement conditions (Baseline). This cooperative effort provides landowners with a way to manage enrolled lands to support the conservation of federally listed species while conducting certain other land-use practices.

When signed, this Agreement will serve as the basis for the Service to issue the Landowner an enhancement of survival permit (Permit) under section 10(a)(1)(A) of the Act, for the incidental take of Amargosa voles over a 30-year term while conducting translocation and re-introduction activities, activities associated with the restoration and maintenance of habitat, and other activities including the potential future return of any enrolled lands to their Baseline condition. The Permit will authorize the Landowner to take individual Amargosa voles and their progeny that occur on the enrolled lands above Baseline conditions, as a result of the activities described in this Agreement. The Parties expect that the maximum level of take authorized under this Agreement and subsequent Permit will never be realized. Permit issuance will not preclude the need for the Landowner to abide by all other applicable Federal, State, and local laws and regulations that may apply.

Assurances Provided

The assurances listed below apply to the Landowner where the conservation measures specified in this Agreement are being properly implemented. The assurances apply only with respect to species adequately covered by the Agreement. Through this SHA, the Service provides Landowner with assurances that no additional conservation measures nor additional land, water, or resource use restrictions, beyond those voluntarily agreed to and described in the “Conservation Measures” section of this will be required. These assurances will be authorized with the issuance of an enhancement of survival permit under section 10(a)(1)(A) of the Endangered Species Act. If the Landowner chooses, they may return the enrolled property back to the baseline established in this Agreement.

Relationship to Other Agreements

The Service’s Partners for Fish and Wildlife Program, the California Department of Fish and Wildlife (CDFW), and other Cooperators have collaborated with the Landowner on voluntary

habitat restoration projects on her property in Shoshone, California. Restoration activities in the Core Area began in 2015, with funding provided by the Partners for Fish and Wildlife Program, a Service section 6 grant that was obtained in 2014 by CDFW, and matches from the Landowner and other Cooperators. These restoration activities included installation of irrigation pipes and ditches to distribute water throughout the Core Area, soil recontouring, planting of Olney's three-square bulrush plugs, and removal of invasive plant species such as cattails (*Typha domingensis*) and salt cedar (*Tamarix* spp.). This restoration work was particularly critical to creating suitable habitat to allow for re-introduction of Amargosa voles to historical habitat in Shoshone. These projects have and will also continue to benefit multiple species, including the federally listed Amargosa vole and least Bell's vireo (*Vireo bellii pusillus*), and non-listed species such as Shoshone pupfish (*Cyprinodon nevadensis shoshone*) and other riparian migratory birds.

2.0 STATUS AND BACKGROUND OF AMARGOSA VOLE

This Agreement covers the Amargosa vole (*Microtus californicus scirpensis*), which is also referred to as the "Covered Species."

2.1 Status and Distribution

The Amargosa vole is federally listed as endangered with designated critical habitat (Service 1984) and is also State listed as endangered (CDFW 1980).

The Amargosa vole is one of 17 subspecies of the California vole (*Microtus californicus*). The historical range of the Amargosa vole is confined to an approximately 10-mile stretch of wetland habitat near the communities of Shoshone and Tecopa in southeastern Inyo County, California (see Figure 1). The type specimen was collected from Shoshone in 1891 (Bailey 1900). Subsequent unsuccessful trapping attempts to find additional Amargosa voles led to the incorrect conclusion that the subspecies had gone extinct (Kellogg 1918). Additional trapping efforts in the 1930s were successful near the community of Tecopa Hot Springs (Bleich 1979a). Trapping inventories of extant wetland "pockets" between 1977 and 1988 documented additional Amargosa vole sites along the Amargosa River drainage, extending from a tributary spring 0.5 mile north of Tecopa Hot Springs to the south for approximately 3.5 miles to the northern end of Amargosa Canyon (Gould and Bleich 1977, Bleich 1979b, Rado and Rowlands 1984, Murphy and Freas 1989).

The current range of the Amargosa vole is confined to 36 marshes in the Lower Amargosa River Valley in the vicinity of Tecopa Hot Springs and the northern end of the Amargosa Canyon (Figure 1). The Amargosa vole obligately depends upon, and is closely associated with, wetland vegetation dominated by Olney's three-square bulrush (*Schoenoplectus americanus*), where it generally occurs in isolated and disjunct marshes surrounded by saltgrass-dominated habitats or more xeric desert scrub or barren areas. Although we do not understand all of the mechanisms that drive habitat selection, plausible explanations for habitat preference may include the presence of standing and flowing water, reliance on Olney's three-square bulrush as a vital food

source, and utilization of bulrush litter layers (up to 3.3 feet in depth) for thermoregulation, nesting, and predator avoidance.

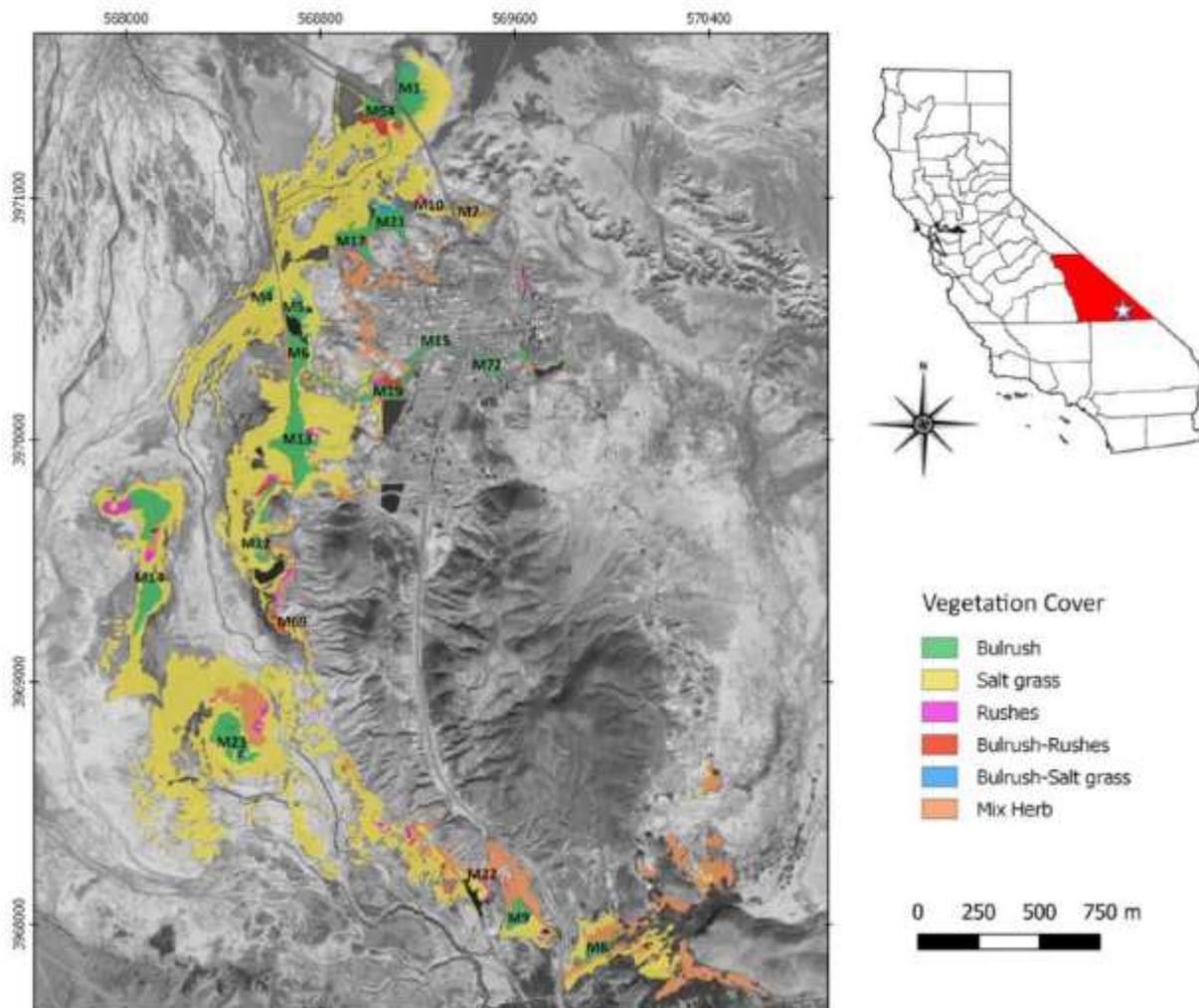


Figure 1. Current range and vegetation cover in Tecopa marshes

2.2 Life History and Habitat Requirements

The Amargosa vole is a stout-bodied, almost cylindrical, compact rodent. The comparatively short tail, small rounded ears, and short legs easily distinguish it from most other small, mouse-like rodents. The Amargosa vole averages 8 inches in length, with an average tail length of 2.5 inches. Pesapane *et al.* (2018) observed sexual dimorphism in Amargosa voles, finding that males had significantly larger body mass, longer total length and longer tail length. Coloration is “bright” brown, ranging from cinnamon buff to “buckthorn” brown (Kellogg 1918). Distinguishing characteristics include the “bright” pelage coloration and a small skull with comparatively large zygomatic width (Kellogg 1918). Amargosa voles may be active throughout

the year, during both day and night, although they seem to be largely crepuscular (Madison 1985).

Microtus subspecies (collectively) generally consume grasses, forbs, and seeds (Heske *et al.* 1984). Grasses in the genera *Hordeum*, *Bromus*, and *Lolium* were identified as food items in a central California vole population (Gill 1977). When seasonally available, green emergent vegetation comprises the bulk of the diet; grass seeds are most common in the diet during the summer and autumn (Batzli and Pitelka 1971). *Microtus* subspecies are primary consumers and are often the principal herbivores within occupied habitats (Rose and Birney 1985). Amargosa voles have been reported to be dietary specialists on Olney's three-square bulrush; however, they have been observed on camera eating other plants within marshes, have been found with components of multiple plant species in their feces, and under various circumstances have been observed feeding on a variety of plant and insect foods while in captivity (Castle *et al.* in press).

Microtus subspecies generally excavate an extensive underground network of runways and tunnels (Wolff 1985), and in dense cover frequently develop extensive surface runways (Taitt and Krebs 1985). Amargosa voles do most of this excavation within the dense litter layer of Olney's three-square bulrush found in marshes. *Microtus* subspecies generally lack physiological or morphological characteristics necessary to tolerate high temperatures (Rose and Birney 1985), and their inability to concentrate urine and conserve water are major reasons for their distributional restriction to mesic and wetland habitats (Getz 1985); for example, California voles (*Microtus californicus*) require regular intake of large amounts of water, meeting or exceeding 10 percent of body weight per day (Batzli and Pitelka 1971). California vole home range size is typically small. In a study conducted near San Francisco Bay, Krebs (1966) noted the tendency of California voles to "remain in a restricted area", with few animals dispersing distances over 400 feet. Amargosa vole dispersal is likely limited by the patchwork nature of its marsh habitat (Neuwald 2002), although inter-marsh dispersal has been observed (Foley *et al.* 2017).

Microtus subspecies have been reported to exhibit monogamy and polygamy with regard to reproduction (Wolff 1985). Amargosa voles do not appear to be monogamous, although captive males have been observed to contribute to the care of offspring (Foley 2019a, pers. comm.). Other *Microtus californicus* subspecies reach reproductive maturity when females attain a weight of 0.9-1.1 ounces and males a weight of 1.2-1.4 ounces (Hoffmann 1958). Amargosa voles have been documented to breed as young as 25 days (Pesapane *et al.* 2018). In a study on California voles in central California, litter size increased from approximately three at the beginning of the breeding season in the fall, to a peak of approximately six in the spring (Hoffmann 1958). Mean litter size for California voles is 4.7 (Nadeau 1985), whereas Amargosa voles tend to have litters of approximately three to four pups with no particular seasonality to litter size. Reproduction may occur at any time of year, but is primarily influenced by factors such as temperature and precipitation that determine availability of food and water (Hoffmann 1958, Seabloom 1985). However, poor survival and body condition in winter likely diminishes reproductive success during this time. Pups are born after a gestation period of approximately 21 days, and weaning occurs after 20 days (Pesapane *et al.* 2018).

McClenaghan and Montgomery (1998) observed that a greater percentage of male and female Amargosa voles were in reproductive condition in June than in November. In central California, California vole populations generally peak during the spring and begin declining in late summer (Hoffmann 1958). By late summer or early fall, most populations consist predominantly of adults. Juveniles are most abundant during the winter and spring (Batzli and Pitelka 1971). Seasonal populations for California voles observed during a 2-year grassland study near San Francisco Bay ranged from 4 to 64 animals per acre (Krebs 1966). Batzli and Pitelka (1971) observed 2- to 4-year cyclic fluctuations in these same populations. From 1959 to 1973, Lidicker (1973) also documented seasonal fluctuations in which California vole populations on Brooks Island in San Francisco Bay ranged from a low of 20 to a high of 632 per acre.

The life expectancy for most *Microtus californicus* subspecies is short. During a 2-year study of California voles in grasslands east of San Francisco Bay, Krebs (1966) estimated the average longevity of adult males and adult females at about 8 weeks and 12.5 weeks, respectively, which is generally consistent with the short survival observed for Amargosa voles (see Klinger *et al.* 2015). McClenaghan and Montgomery (1998) performed mark-recapture studies at three Amargosa vole marshes and estimated a month-to-month survival rate of 83 percent and a 5-month survival rate of 32 percent. However, more recent observations indicate that rare Amargosa voles may live longer than this, and researchers have observed an individual Amargosa vole that lived for at least 1 year in the field and more than 2 years in captivity (Pesapane *et al.* 2018). Overall, Amargosa vole population structure appears dominated by high juvenile mortality, with occasional adults experiencing prolonged survival (Klinger 2014).

Causes of *Microtus* population “crashes” are unclear, but food availability, food quality, and predation may play a role (Batzli and Pitelka 1971). Cyclic population explosions may result in intensive intraspecific competition for available resources as observed in California vole populations in Contra Costa County, California (Heske *et al.* 1984). However, not all *Microtus* subspecies experience population cycles (Tamarin *et al.* 1987). There is evidence for population booms and crashes for the Amargosa vole (Foley and Foley 2016), possibly influenced both by food availability and seasonal increased predation by generalist predators such as coyotes (Roy *et al.* 2019).

2.3 Threats

Threats to the Amargosa vole are summarized below as identified in the listing rule (Service 1984), recovery plan (Service 1997), the most recent 5-year review (Service 2009), the recovery plan amendment (Service 2019), and other research and monitoring.

Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

The final listing rule for the Amargosa vole identified habitat loss due to human activities in the Shoshone and Tecopa Hot Springs areas as one of the factors that contributed to its listing. These activities included livestock grazing, burning of marsh habitat for pasture land, diversion and channelization of springs in the Shoshone area, development of mineral baths and mobile home

courts in the Tecopa Hot Springs area, and camping and parking areas adjacent to upland bulrush marshes occupied by voles.

Prior to listing, the Bureau of Land Management (Bureau) had recognized the importance of the Tecopa, Tecopa Hot Springs, and Amargosa Canyon areas by designating the Amargosa River and Grimshaw Areas of Critical Environmental Concern to specifically manage for wildlife habitat, vegetation, outstanding scenery, and riparian resources (Bureau 1980). The boundaries of the two new Areas of Critical Environmental Concern encompassed most known habitat for the Amargosa vole (Bureau 1983a, 1983b). By the time the vole was listed in 1997, land acquisitions by The Nature Conservancy and the Bureau brought most of the vole's preferred habitat under the administration of the Bureau, California State Lands Commission, or The Nature Conservancy (Service 1997).

Since listing, the consolidation of lands within the Areas of Critical Environmental Concern has allowed the Bureau to more effectively manage threats to Amargosa vole habitat. The Bureau established control of vehicular access and began implementation of the remaining aspects of its Area of Critical Environmental Concern management plans, although there is evidence of frequent unauthorized vehicle use adjacent to Amargosa vole habitat (Foley 2019b, pers. comm.). While purposeful burning to clear marsh vegetation appears to no longer be a major threat to habitat (Service 1997), burning of small patches of bulrush vegetation near Tecopa Hot Springs has occurred on private lands as recently as 2008 and continues to be a localized threat (Scofield 2008, pers. comm.). Structure fires and fires ignited by lightning strike are also continuing threats. Although cattle grazing continued to be a threat through the late 1990s, by the end of the 1990s, the Bureau's Barstow Field Office had removed all livestock from the Areas of Critical Environmental Concern and grazing ceased to pose a threat to Amargosa vole habitat (Chavez 2008, pers. comm.).

Since the publication of the 5-year review (Service 2009) there have been multiple legislative and management actions that benefit the Amargosa vole and its habitat. In 2009, the Amargosa Wild and Scenic River was established, consisting of 26 river miles. The passage of the John D. Dingell Jr. Conservation, Management, and Recreation Act in 2019 expanded this area by 6 river miles. The designation provides protections for the vole and directs the Bureau to manage the area for conservation of the subspecies. In 2016, the Bureau's California Desert Conservation Area Plan was amended by the Desert Renewable Energy Conservation Plan, providing further protections and management directives for the subspecies.

New and/or unresolved threats associated with diversions and other artificial barriers to natural spring flow, groundwater pumping, and cattail and salt cedar invasion persist, despite the gains that the Bureau has made in its management of designated areas. Human development, including the diversion of Shoshone Springs to support a high school swimming pool and the development of springs in the Tecopa Hot Springs area for mineral baths were identified as major sources of spring flow modification affecting Amargosa vole habitat (Service 2009). Also, the construction of the Tonopah and Tidewater Railroad line in 1906 has likely altered the historical configuration of marshes in the Tecopa and Tecopa Hot Springs area (Service 1997). Many uncertainties exist with regard to both spring flow diversion and alteration of historical marsh habitat, including 1)

whether the persistence of modifications continues to degrade the overall quality and quantity of vole habitat, and 2) whether outflow from mineral bathhouse diversions in the area continues to support Amargosa vole habitat. It is clear that bulrush marshes that generally support Amargosa voles did not exist in Shoshone prior to restoration activities by the Landowner. While it is not known whether the loss of habitat in this area occurred prior to the diversion of Shoshone Spring, it is likely that diversion of this spring flow had greatly reduced the likelihood of Olney's three-square bulrush marsh regeneration at this site. Restoration activities (*e.g.*, the removal of cattails and salt cedar) and construction of irrigation infrastructure have stabilized water flows and allowed for the establishment of Olney's three-square bulrush marsh.

The recovery plan identified the potential development and exploitation of subterranean water sources for geothermal energy production and domestic consumption as a new threat to Amargosa vole habitat that the final listing rule and the Bureau's previous management plans had not previously recognized (Service 1997). Since this time, however, reduced groundwater supply has been recognized as a threat as even distant groundwater uses for agriculture or other uses could cause spring outputs to decline. Immediate impacts to spring outflows from groundwater pumping are unlikely because there is only one groundwater well within the historical range of the Amargosa vole; this well is near Shoshone, California (Moreo *et al.* 2003). However, the potential effect that intense groundwater development in southern Nevada and potentially other areas (*i.e.*, due to urban development and population increase) may have on future spring discharge cannot be currently dismissed given the regional connectivity of groundwater systems in this area, the source of recharge for the groundwater that enters the Shoshone and Tecopa area, and the predicted paths of regional groundwater flow. Although groundwater pumping directly within the range of the vole is not an issue, pumping elsewhere within the same regional carbonate aquifer is a concern.

Extensive groundwater and spring monitoring has been implemented by the Bureau, University of California-Davis (UC Davis), the U.S. Geological Survey (USGS), and others to capture groundwater and hydrological dynamics both locally and at broader regional scales. For example, Marsh 1 (one of the 36 marshes identified in the Lower Amargosa River Valley) is fed by a large and uncontrolled artesian well that seems to supply enough water to maintain marsh habitat on both sides of Tecopa Hot Springs Road (Marsh 1 to the north and perhaps to a lesser degree may account for some water feeding marshes to the south). The flow rate from this well is high, and it is believed that this may have caused other marshes in the vicinity to dry completely or have significantly less water (Zdon and Parmenter 2014, pers. comm. in Foley *et al.* 2017). In the most recent population viability analysis for the Amargosa vole (Castle *et al.* 2019 in press), reduction in available water supply was influential in reducing persistence for the subspecies.

Another important source of water for Tecopa marshes comes from gray water in the form of runoff from Tecopa Hot Springs sewage treatment and from overflow from local residences downslope into marshes. This source is believed to supply at least nine (25 percent) marshes, with Marshes 17 and 21 seeming to be particularly dependent on residential gray water overflow (Foley *et al.* 2017). Marshes downstream from The Nature Conservancy's local property have previously dried to some degree at times when sewage and residential outflows were reduced (Foley 2019, pers. comm.).

The recovery plan identified the establishment of salt cedar in the Amargosa River drainage, especially the northern portion of the Amargosa Canyon, as a continuing threat that was likely diminishing Amargosa vole habitat quality through replacement of bulrush marshes (Service 1997). The Bureau has continued efforts to remove salt cedar from the broader Amargosa River drainage, some of which has been adjacent to or upstream of vole marshes (Symons 2019, pers. comm.). As salt cedar generally occurs in riparian areas and is unusual in true wetlands, there is some uncertainty about the level of threat it poses in Tecopa wetlands (Klinger 2019, pers. comm.).

The 5-year review noted that the potential for wildfire at that time continued, although it was believed that the likelihood of a wildfire eliminating large amounts of Amargosa vole habitat was low because current habitat tends to be narrow and completely disconnected from other habitat patches (Service 2009). While this may still be the case at a large scale, in September 2017 the Service issued an emergency salvage approval for up to 12 Amargosa voles (4 voles were ultimately captured and removed) following a lightning-caused wildfire in Marshes 17 and 21. Approximately 100 percent of Marsh 17 and approximately 90 percent of Marsh 21 were consumed in this fire (Castle 2017, pers. comm.). In April 2018 another smaller fire was ignited by a suspected transformer malfunction during high winds and burned the portions of Marsh 21 that were unaffected by the 2017 fire, as well as other adjacent marsh habitat. In the most recent population viability analysis for the Amargosa vole (Castle *et al.* 2019 in press), habitat destruction from fire was influential in reducing persistence for the subspecies.

The 5-year review identified climate change as a new threat identified since listing that may affect the Amargosa vole's wetland habitat as a result of increased temperatures and prolonged drought. There is scientific evidence for continued multi-decadal warming across the Earth's surface, with each of the previous three decades experiencing progressively warmer temperatures than any preceding decade since 1850 (IPCC 2014). For the southwest U.S., temperatures have been increasing in past decades and since 1950 the region has experienced hotter temperatures than in any period during the past 600 years (Garfin *et al.* 2014). Overall, 2016 was the hottest year ever recorded globally, and average temperatures have increased by approximately 1.0 to 1.2°C above pre-industrial levels (WMO 2018; Polley *et al.* 2013). The southwest U.S. is projected to be affected particularly severely by prolonged drought, fewer frost days, warmer temperatures, and an increase in extreme weather events (Jepson *et al.* 2016; Cook *et al.* 2015; Archer and Predick 2008). Predictions of climatic conditions for smaller sub-regions such as California remain uncertain. It is unknown at this time if climate change in California will result in a warmer trend with localized drying, higher precipitation events, or other effects. During drought years from 2012 to 2015 the average bulrush cover across the Amargosa vole's range declined by approximately 37 percent (Foley *et al.* 2017), an indicator of potential climate effects on the species' habitat. In the most recent population viability analysis for the Amargosa vole (Castle *et al.* 2019 in press), drought was influential in reducing persistence for the subspecies. When coupled with reduced water availability and habitat destruction from fire, these effects were even more pronounced.

There has been a long-term trend in reduced water availability in the broader Tecopa area as well as increasing temperatures, which has been exacerbated by human water consumption and

prolonged drought (Foley *et al.* 2017). Annual variability in water quality and quantity has increased, with direct effects on the quality of marsh habitat available to the Amargosa vole. Vole populations are highly variable year to year, and long-term persistence depends on populations being able to sustain themselves during the poorest marsh conditions, which typically occurs during the winter season when water levels are at their lowest. High variability in habitat quality and population numbers has the potential to lead to local subpopulation extirpation (Foley *et al.* 2017). Regional management of water withdrawal and use is thus critical to ensuring long-term stability for water availability and habitat quality for the Amargosa vole.

Predation and Disease

Although not identified in the final listing rule, the recovery plan (Service 1997) and the 5-year review (Service 2009) recognized predation by domestic cats (*Felis catus*) in the Tecopa and Tecopa Hot Springs area as a potential source of mortality (see also McClenaghan and Montgomery 1998); however, there is no evidence that predation of Amargosa voles by cats is actually occurring in currently occupied marshes. In the revision of the Amargosa River ACEC Plan, the Bureau identified the control of predation as a management priority (Bureau 2007).

Disease threats have not been addressed or identified in the final listing rule, recovery plan, or 5-year review; however, research since 2009 has demonstrated that disease may be a threat that could diminish the fitness of Amargosa voles. For example, mites that are a larval trombiculid in the genus *Neotrombicula* are prevalent in wild voles, and can cause severe skin lesions and deformities. Although Ott-Conn *et al.* (2015) found no reduction in fitness associated with infection, broader effects on vole populations may be uncertain and additional research is needed to determine whether infection could lead to diminished body condition (Ott-Conn *et al.* 2015). Additionally, infection by *Toxoplasma gondii*, a protozoal parasite that has been shown to alter host behavior and cause mortality, has been documented in Amargosa voles (Ott-Conn *et al.* 2014, Poulsen *et al.* 2017). Other diseases that could cause population-level impacts if introduced include tularemia and plague.

Genetic Effects of Small and Fragmented Populations

The final listing rule identified inbreeding depression as a potential consequence of the small size and disjunct distribution of marsh habitat in the Tecopa Lake Basin. The 5-year review elaborated more on the genetic consequences of small, fragmented populations and low genetic diversity and a limited amount of gene flow among populations as a threat (Service 2009). Loss of genetic diversity in small populations may decrease the potential for persistence in the face of long-term environmental change (Shaffer 1981, Shaffer 1987, Primack 1998). Loss of genetic diversity can also result in declines in fitness from expression of deleterious recessive alleles (Meffe and Carroll 2012). Krohn *et al.* (2018) found that even though Amargosa voles have substantially less genetic diversity than other California vole populations, they still retain moderate population genetic structure. Despite low genetic variation, individual voles still seem to have robust health condition with no evidence of inbreeding depression or reduced fitness observed (Foley *et al.* in press).

Threats Summary

Threats to the Amargosa vole consist of diversion of spring flows, alteration of historical marsh configuration, human activities, wildfire, grazing, groundwater development, salt cedar establishment, predation, genetic consequences due to small and fragmented populations, and climate change. Although some threats have been reduced, it is difficult to accurately assess the current status of the subspecies with the limited information available on its distribution and abundance. Despite many successes by the ad hoc Amargosa Vole Recovery Team, unresolved threats to the Amargosa vole persist.

2.4 Ad Hoc Amargosa Vole Recovery Team Conservation and Recovery Efforts to Date

In November 2013, the Bureau established an informal ad hoc Amargosa Vole Recovery Team that includes the Service, the Landowner, the Cooperators (CDFW, UC Davis, the Bureau's Barstow Field Office, and Shoshone Village), as well as the University of California at Berkeley and USGS. This group has met regularly to identify and characterize threats, and to discuss, advise, strategize, fund, and implement recovery actions for the subspecies.

Partners in the ad hoc Amargosa Vole Recovery Team have made progress toward reducing some threats to the Amargosa vole. The Bureau established the Amargosa River and Grimshaw Areas of Critical Environmental Concern that encompasses most of the current range of the Amargosa vole, and in doing so controlled vehicular access, removed grazing, reduced the incidence of marsh burning, removed some salt cedar seed sources, and worked with The Nature Conservancy to acquire private lands to protect vole habitat. Since the Amargosa Wild and Scenic River was established, complemented by passage of the John D. Dingell Jr. Conservation, Management, and Recreation Act in 2019, and since the signing of the Desert Renewable Energy Conservation Plan, the Bureau has implemented numerous actions that help to reduce threats and protect the Amargosa vole and its habitat.

Many important research and information sharing contributions have been led by CDFW, UC Davis, and USGS, and have included genetics and disease surveys, habitat restoration activities (especially in Shoshone), studies focusing on habitat and Amargosa vole response to drought and fire, population viability and metapopulation modeling, public outreach, compilation of data on the basic biology of the subspecies, establishment and management of a captive breeding colony, studies of captive Amargosa vole releases from the colony and translocation of wild Amargosa voles between marshes, and two range-wide surveys. Much of the data acquired through recent published and unpublished research was instrumental in developing the Service's 2019 recovery plan amendment for the Amargosa vole.

Cooperators that have contributed to recovery efforts for the Amargosa vole have done so under the auspices of multiple section 10(a)(1)(A) recovery permits issued by the Service. Certain Management Activities associated with the translocation of wild Amargosa voles that will be implemented as part of this Agreement will be conducted under the auspices of existing permits, and will adhere to the authorizations, protocols, and terms and conditions provided therein. This includes the following translocation-related activities and forms of take of the Amargosa vole:

survey, capture, handle, collect, photograph, tag, attach radio transmitters and radio track, mark by clipping hair, collect morphological data (weight, sex age, etc.), collect parasites and tissue, conduct veterinary testing (assess reproductive condition, conduct health assessments, quarantine, test for disease and parasites), administer veterinary care, obtain genetic samples (blood, feces, hair, ear snip), euthanize, remove from the wild, emergency salvage, transport, hold in captivity, conduct behavioral studies, release to the wild, translocate, use remote cameras, and monitor populations.

2.5 Survival and Recovery Needs for the Species

The Service issued a recovery plan amendment in 2019 that supersedes the original 1997 recovery plan (Service 2019). This amendment identifies the following as high priority (*i.e.*, priority 1) recovery actions that should be implemented to address threats in order to prevent extinction or to prevent the Amargosa vole from declining irreversibly in the foreseeable future:

1. More effectively use and distribute water from spring and well outflows to increase their utility in supporting marsh habitat quantity and quality;
2. Construct megamarshes within the vole's historical range to provide additional habitat for voles;
3. Develop a regional water use management plan;
4. Conduct rangewide monitoring at least every 5 years for vole density in existing marshes, water availability, and habitat quality;
5. Implement population augmentation in existing and new marsh habitat;
6. Enhance habitat quality in existing marshes;
7. Conduct environmental education and public outreach;
8. Secure local water sources;
9. Proceed in land acquisition and/or development of conservation easements with key, willing landowners that have critical marshes, spring sources, or flow paths; and
10. Maintain a captive breeding colony to assist with vole recovery.

This Agreement will implement activities that will continue to restore critical marsh habitat and will re-introduce voles to historical habitat, both of which are priority 1 recovery actions.

3.0 DESCRIPTION OF ENROLLED PROPERTY AND CORE AREA

3.1 Covered Lands

The properties subject to this Agreement (Enrolled Property) consist of two parcels owned by the Landowner: 1) APN 046-120-26 (220 acres) and 2) APN 046-120-25 (247 acres), totaling 467 acres (Figure 2). While this agreement covers the entire 467 acres, Beneficial Management Activities (including translocation and re-introduction of Amargosa voles) will only occur in approximately 0.5 acres of marsh habitat within the Enrolled Property where restoration activities have previously been implemented by the Landowner to return the habitat to its natural condition. This area (Core Area) consists of 3 connected marsh sites (Marshes 31, 31A, and 31B; see Figure 3) on the west side of Highway 127 near the north end of Shoshone. Marsh 31 comprises 0.26 acres, Marsh 31A comprises 0.12 acres, and Marsh 31B comprises 0.11 acres.

The Core Area is bordered on the east by Old State Highway CA 127, and lies south of the community swimming pool at the Shoshone Trailer RV Park. The purpose of designating a distinct Core Area within the broader Enrolled Property is to: 1) authorize incidental take of Amargosa voles in marsh habitat where Beneficial Management Activities and Other Management Activities, including translocation and re-introduction, will occur (*i.e.*, Core Area); and 2) authorize incidental take in areas adjacent to the Core Area that may contain suitable habitat but may not be consistently supplied with water from Shoshone Spring, where Other Management Activities will occur, and where Amargosa voles could migrate through or into (*i.e.*, broader Enrolled Property). See Sections 5.1 and 5.2 for a description of Beneficial Management Activities and Other Management Activities. Finally, Death Valley Unified School District owns a parcel that is completely surrounded by APN 046-120-26 but is not subject to the terms of this Agreement.



U.S. Fish & Wildlife Service

Amargosa Vole (*Microtus californicus scirpensis*) Safe Harbor Agreement



Cambel Fish and Wildlife Office
2177 Oak Avenue, Suite 201
Carlsbad, CA 92008
(760) 431-9440
Date: USFWS, Inyo County
Source: ESRI World Imagery
Date: 8/12/2020
S:\external\map\AmargosaVole_SafeHarbor.mxd

Parcels
Death Valley Unified School District

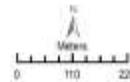


Figure 2. The Enrolled Property



U.S. Fish & Wildlife Service

Amargosa Vole (*Microtus californicus scirpensis*) Safe Harbor Agreement



California Fish and Wildlife Office
2177 Selt Avenue, Suite 201
Colton, CA 92008
(760) 431-6443

Date: USFWS, Inyo County
Base map: ESRI World Imagery
Date: 5/12/2025
S:\water\maps\AmargosaVole_SafeHarbor.mxd

- Parcels
- Death Valley Unified School District
- Marsh 31
- Marsh 31A
- Marsh 31B



Figure 3. The Core Area within the Enrolled Property

3.2 Conditions on Covered Lands

Shoshone Spring consists of multiple individual springs and provides the domestic water supply for the town of Shoshone. Water from these springs is used to irrigate the Core Area, and for both potable (*e.g.*, drinking water after reverse osmosis treatment) and non-potable (*e.g.*, for landscape irrigation and to fill the pool at the Shoshone RV Campground) purposes in the broader Enrolled Property. In addition to domestic use, water outflow from the springs supports a spring brook, riparian vegetation, and six or more stream pools that were constructed to provide habitat for the Shoshone pupfish (*Cyprinodon nevadensis shoshone*) near Old Highway 127.

Core Area

Prior to restoration activities by the Landowner, the Core Area generally comprised interspersed mesquite trees and open meadow, and was also occupied by arrow weed, coyote willow, and Olney's three-square bulrush. Plant species such as cattail and salt cedar had invaded and largely out-competed Olney's three-square bulrush, resulting in the drying out of portions of marsh habitat. This vegetation and other topographic features of the site were thought to not provide the required habitat characteristics to support Amargosa vole occupancy, and specifically lacked the dense bulrush litter used for nesting and predator avoidance as in Tecopa marshes.

Restoration activities by the Landowner have included the following activities: 1) construction of irrigation infrastructure to distribute water throughout the Core Area and improve soil moisture; 2) removal of high water use species such as cattails, salt cedar, mesquites, and willows; 3) planting of living Olney's three-square bulrush where other vegetation was removed, and in areas where bulrush stem density was previously low; 4) development of an Olney's three-square bulrush litter layer; and 5) stabilization of water flow and levels. These activities have resulted in high-quality suitable habitat to support Amargosa vole occupancy. Appendix 1 contains photographs of the irrigation infrastructure that was constructed, and photographs depicting what conditions in the Core Area were like prior to and after restoration activities by the Landowner.

Enrolled Property

As illustrated by Figure 2 and 3, the Enrolled Property surrounds the Core Area. Conditions in the broader Enrolled Property include marsh habitat in areas irrigated by water from Shoshone Spring or other sources, interspersed trees of various species, open meadow, various degrees of undisturbed and disturbed salt scrub desert, and developed areas. Development within the broader Enrolled Property includes the Shoshone Trailer RV Park (camping sites, picnic areas, walking trails, and a swimming pool), various parking areas, and unpaved trails and roads. The broader Enrolled Property is bisected by Old State Highway CA 127 and State Highway CA 127, and lies adjacent to land owned by the Death Valley Unified School District. Existing marsh areas within the broader Enrolled Property may provide some degree of suitable habitat for Amargosa voles, but these generally occur in small patches and lack the Olney's three-square bulrush litter layer that would be needed for nesting and protection from predators.

3.3 Role of the Covered Lands in the Conservation of the Amargosa vole

The Amargosa vole recovery plan amendment (Service 2019) establishes specific recovery criteria for the recovery of the Amargosa vole, and prescribes for the restoration of habitat within

the Amargosa vole's historical range and the establishment of new and self-sustaining populations in order for downlisting and delisting to be considered. Amargosa voles currently do not occur in Shoshone, although Shoshone is the type locality for the subspecies and is within its historical range. Key factors in the Service's determination that the Core Area will serve as high-quality habitat for Amargosa vole reintroductions include: 1) it is within the historical range of the Amargosa vole and constitutes a portion of the subspecies type locality; 2) it will receive consistent, sufficient, and stable water from Shoshone Spring to support marsh vegetation; and 3) it is geographically isolated from disease threats identified in other portions of the subspecies' range.

3.4 Threats

The Landowner will not be considered out of compliance with the Baseline (see definition below) for presence of the Amargosa vole for circumstances or actions outside of the Landowner's control that may reduce the numbers of or extirpate the subspecies in the Core Area. According to this Agreement, actions considered outside of the Landowner's control include:

- Reduction in Core Area habitat quality due to reduced water availability (*e.g.*, drying of springs due to prolonged drought or unsustainable regional groundwater withdrawal);
- Natural disasters including, but not limited to, wildfires, landslides, earthquakes, and/or flood;
- The natural introduction and/or spread of diseases affecting Amargosa voles; and
- Predation by domestic animals not owned by the Landowner.

3.5 Baseline Determination

This Agreement provides a way for the Landowner to enhance and manage native riparian and wetland habitat and to translocate and re-introduce Amargosa voles for the benefit of the subspecies without incurring additional regulatory restrictions on the use of their property. The Agreement, however, does not release the Landowner from the responsibility to avoid take of any endangered or threatened species already occupying portions of their property. To receive the assurances regarding take of Amargosa voles specified in this Agreement, the Landowner must maintain the Baseline conditions in the Enrolled Property.

Baseline conditions are defined in the Service's Safe Harbor Agreement policy (64 FR 32717) as population estimates and distribution and/or habitat characteristics that sustain seasonal or permanent use by the Covered Species, as determined on the area of the Enrolled Property at the time the Safe Harbor Agreement is executed between the Service and the Landowner. The Baseline conditions must reflect the known biological and habitat characteristics of the Enrolled Property. Although Amargosa voles do not currently occur in the Core Area or the broader Enrolled Property, suitable marsh habitat for Amargosa voles now exists in the Core Area and may exist in smaller patches within the broader Enrolled Property. The amount of suitable habitat in the Core Area and the broader Enrolled Property may fluctuate over the Permit term due to the future implementation of Management Activities.

This Agreement has been established to aid in promoting the recovery of the Amargosa vole. The Landowner understands the valuable contribution toward recovery that the translocation and re-introduction of the Amargosa vole on its lands will provide the subspecies. Therefore, the Landowner would like to contribute to the recovery of the Amargosa vole by re-introducing voles to the Core Area and implementing Beneficial Management Activities that would continue to restore and maintain suitable habitat in order to support the establishment of a new population. We anticipate that the implementation of Beneficial Management Activities in the Core Area and will stabilize and may increase the amount of suitable habitat for Amargosa voles during and beyond the 30-year Permit term.

As described earlier in this Agreement, restoration activities by the Landowner and other Cooperators were initiated in 2015 and were supported by federal funding from the Service's Partners for Fish and Wildlife Program and a Service section 6 grant, as well as funding from the Landowner and other Cooperators. Since 2015 the Landowner has implemented significant restoration efforts, funded by multiple sources, which have resulted in high quality suitable habitat to support Amargosa vole occupancy. To ensure that this Agreement does not supersede the terms of the federal funding sources that were used for the construction of permanent infrastructure or interfere with the actions taken as a result of these funds, and to ensure that the significant restoration efforts by the Landowner since this time are recognized, the Parties have agreed to set the following Baseline conditions for the Enrolled Property: 1) the condition of existing irrigation infrastructure at the time this Agreement is executed between the Service and the Landowner; and 2) the condition of the habitat on the Enrolled Property on January 1, 2015, prior to the implementation of habitat restoration activities. Appendix 1 contains photographs from 2015 that illustrate these irrigation infrastructure and habitat Baseline conditions. The habitat Baseline is set to January 1, 2015 in explicit recognition of the Landowner's work and coordination with the Service on this restoration since 2015. Because there are currently no Amargosa voles in the Core Area or the broader Enrolled Property the Parties have agreed to set the population Baseline at zero individuals. Nothing in this Agreement shall affect or supersede any Section 6 grant funding requirements.

4.0 COVERED ACTIVITIES

The Parties have developed this Agreement to identify activities the Landowner can implement to promote the conservation and recovery of the Amargosa vole in collaboration with the Service, and with ad hoc Amargosa Vole Recovery Team partners who will voluntarily perform vole translocation, monitoring, and research.

4.1 Beneficial Management Activities

These activities and methods for the translocation and re-introduction of the Amargosa vole in Shoshone have been designed in a collaborative effort with multiple agencies, organizations, and private entities including: the Landowner, the Service, CDFW, the USGS, UC Davis, and the Bureau. See Section 8.0 for specific responsibilities of the Parties.

The Landowner agrees to carry out the following Beneficial Management Activities at the Core Area:

Translocation and Re-introduction of Amargosa Voles

The general methods for translocating Amargosa voles to the Core Area are described in Appendix 2. This protocol is based on release and translocation plans that have been previously developed, approved, and implemented in coordination with the Service and other partners for captive and wild Amargosa voles. Because these methods have and will continue to evolve over time, modifications may be proposed to the Service to ensure that the most effective methods are being implemented. Additionally, all activities associated with the translocation and re-introduction of Amargosa voles to the Core Area will follow the measures identified in the Services' Environmental Assessment (Service 2015), and in the relevant biological opinions and section 10(a)(1)(A) permits that the Service has previously issued to ad hoc Amargosa Vole Recovery Team partners to cover these activities, as applicable.

The Landowner is committed to the re-introduction of Amargosa voles to the Core Area. Re-introduction activities are expected to continue for 10 years or longer until a sustainable population of Amargosa voles is established. Defining a sustainable population may include evaluating influential parameters from population viability analyses, and may also include additional parameters such as assessing the need to continually augment new populations (Service 2019).

Restoration Activities

Restoration activities will continue to be implemented to conserve intact native habitats, to allow for the establishment of native plant species, and to potentially expand the amount of available habitat for the Amargosa vole. Active restoration efforts within the Core Area and near or within the proposed re-introduction sites will include control and eradication of cattail growth, outplanting of Olney's three-square bulrush, and monitoring of spring dynamics considered influential to maintaining viable Amargosa vole habitat (*e.g.*, water availability, soil moisture, vegetation cover, bulrush density, bulrush litter cover).

Biological Monitoring and Research Activities

Biological monitoring for habitat suitability and for the presence of Amargosa voles will be conducted annually for 5 years from the initiation of re-introduction activities and at a minimum of every 5 years thereafter, as determined necessary and feasible by the Landowner and the Service (see Part 8 of this Agreement for details of the monitoring protocol). Further, the Landowner will coordinate with the Service and with ad hoc Amargosa vole Recovery Team partners to evaluate translocated populations for density and time to extinction, at a target timeframe of every 5 years post-translocation, as described in the downlisting and delisting criteria defined in the Service's recovery plan amendment (Service 2019). This is to ensure that new populations become sustainable and can persist without continual augmentation (*i.e.*, translocation). Funding mechanisms for density and time to extinction analyses will be explored in a collaborative manner between the Landowner, the Service, and ad hoc Amargosa vole Recovery Team partners,

and analyses will be completed as determined necessary and feasible by the Landowner and the Service.

Compliance Monitoring Activities

The Service will be allowed reasonable access to the Core Area and broader Enrolled Property in order to monitor compliance with the implementation of Management Activities and avoidance and minimization measures contained in this Agreement.

Incidental Take Monitoring and Reporting Activities

The Service and ad hoc Amargosa vole Recovery Team partners will be allowed reasonable access to the Core Area and broader Enrolled Property in order to monitor for incidental take of Amargosa voles, and for reporting of incidental take if and when it occurs.

Adaptive Management Activities

The Service and ad hoc Amargosa vole Recovery Team partners will be allowed reasonable access to the Core Area and broader Enrolled Property in order to develop and implement adaptive management protocols and processes.

4.2 Other Management Activities

Additional Management Activities include activities that could occur in the Core Area and activities that could occur outside of the Core Area within the Enrolled Property.

Activities within Core Area

Other activities that could occur in the Core Area include, but are not limited to:

- Other habitat restoration activities (*e.g.*, trash removal)
- Retiring, maintaining, improving, and creating walking trails for recreational and educational use
- Remedial erosion and flooding management
- Installation of interpretive/educational signage
- Interpretive/educational events
- Maintenance activities for pupfish habitat
- Activities considered to be force majeure (*e.g.*, law enforcement and emergency response including patrols, incident response, human or fish/wildlife injury, or search and rescue of lost visitors)

Activities Outside of Core Area

Other activities that could occur outside of the Core Area but within the Enrolled Property include those described for the Core Area and also include, but are not limited to:

- Retiring, maintaining, improving, and creating trails and roads
- Maintaining and improving existing facilities, or creating new facilities such as campgrounds and/or parking lots in previously developed areas
- Law enforcement and emergency response including patrols, incident response, human or fish/wildlife injury, search and rescue of lost visitors, removal and restoration of marijuana grow sites, and removal of vehicular wreckage
- Remedial erosion and flooding management
- Limited sampling for research activities, including archaeological investigations and cultural site protection projects
- Recreational activities on approved trails or areas that could include hiking, horseback riding, bicycling, camping, and picnicking activities
- Wildfire fuel modification activities around existing buildings
- Interpretive/educational events
- Maintenance activities for pupfish habitat
- Special events
- Continued public use

4.3 Avoidance and Minimization Measures

All Management Activities that have been described for the Enrolled Property will be implemented according to the following avoidance and minimization measures. These general measures are subject to modification over time as necessary. If modification to Management Activities may result in incidental take of Amargosa voles in a manner that is inconsistent with activities described in this Agreement, the Landowner will contact the Service to determine whether an amendment to the Agreement is required.

1. Clearly marked work areas will be established prior to project activities within Amargosa vole habitat;
2. Human access to the Core Area will be allowed only when necessary to carry out Management Activities or for recreational use of existing walking trails;
3. Existing trails will be used as much as possible to enter the Core Area;
4. When existing trails are not available, the Landowner will designate clearly marked footpaths to be used to access the Core Area; and
5. Dogs will be kept on leashes at all times, and signs indicating this will be clearly posted in campgrounds and other public use areas in the Core Area and Enrolled Property.

As described earlier in this Agreement, Management Activities associated with the translocation of wild Amargosa voles will be conducted under the auspices of existing section 10(a)(1)(A) recovery permits previously issued by the Service to ad hoc Amargosa vole Recovery Team partners. As such, the appropriate terms and conditions and avoidance and minimization measures contained in these regulatory documents will be implemented as applicable.

5.0 INCIDENTAL TAKE OF COVERED SPECIES

As used in this Agreement, incidental take refers to the unintentional or unavoidable killing or injuring of individuals of the Covered Species in the course of carrying out otherwise lawful activities. Section 3(18) of the Act defines take to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Service regulations (50 CFR 17.3) define harm to include significant habitat modification or degradation that actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Nothing in this Agreement authorizes the Landowner or persons associated with the Landowner to deliberately kill or injure any listed species.

Safe Harbor Agreements are written in anticipation of take of the Covered Species and their progeny at some point in the future. Any take that occurs as a result of a reduction in the amount of habitat in the established Baseline is not authorized over the term of the 10(a)(1)(A) Permit that the Service proposes to issue in conjunction with this Agreement. Under this Agreement, incidental take of Amargosa voles could occur: 1) as a result of translocation and re-introduction activities; 2) as a result of the Management Activities described in Section 5 of this Agreement; 3) as a result of the monitoring described in Section 4 and 7 of this Agreement; and 4) as a result of the potential return to Baseline at the end of the term of this Agreement and its associated Permit. The Landowner may conduct these activities even if such use results in the incidental take of individual Amargosa voles covered under this Agreement and as authorized in the Permit.

The Permit will authorize persons or entities associated with the Landowner or individuals that are under the direct supervision of a Service-approved individual to incidentally take individual Amargosa voles while conducting activities associated with the translocation and re-introduction of the subspecies in the Core Area. While past translocations of Amargosa voles have been conducted with minimal mortality and high survivorship (see López-Pérez *et al.* 2019), incidental take of Amargosa voles could occur as a result of activities associated with the capture and translocation of individuals from the source population. As a result of translocation activities, incidental take could occur in the form of direct mortality or injury to Amargosa voles, through trapping, suffocation, exposure, stranding, entrapment, or trampling by persons assisting the Landowner. The number of Amargosa voles re-introduced to the Core Area during any single translocation event will be determined by the Service, Landowner, and ad hoc Amargosa Vole Recovery Team partners. Considerations in determining this may include but are not limited to the following parameters: 1) estimated minimum density of translocated Amargosa voles in the Core Area, below which reproduction may not occur; 2) the amount of available unoccupied habitat in the Core Area as it relates to the territorial behavior of Amargosa voles; and 3) estimated density of Amargosa voles in source populations in Tecopa marshes. Density estimates in the Core Area will be made visually through two individual trapping estimates conducted 1 month apart prior to any translocation activities. The time of year for any translocation activities will be determined by the Service and authorized persons or entities in coordination with the Landowner.

Beneficial Management Activities have been developed with the intent to re-introduce and establish a self-sustaining population of Amargosa voles in the Core Area. As the number of Amargosa voles increase, individuals may migrate and disperse outside the Core Area. The

Permit will authorize the Landowner, and authorized persons or entities associated with the Landowner, to incidentally take individual Amargosa voles and their progeny at the Enrolled Property within and outside the Core Area as a result of the Beneficial Management Activities and other Management Activities described in Section 4 of this Agreement.

The Permit will provide the Landowner incidental take coverage for a specified number of Amargosa voles that could be taken as a result of the implementation of Management Activities on a per year basis over the 30-year permit term. Within the Core Area, the Permit will authorize the incidental take of 5 Amargosa voles per year. We anticipate that incidental take of Amargosa voles in the Core Area could occur in the form of injury, or mortality through trapping, suffocation, exposure, stranding, digging, or trampling during implementation of Management Activities at restored marsh sites.

It is possible that individual Amargosa voles may migrate from the Core Area into the broader Enrolled Property, where they may be vulnerable to being taken by activities not associated with Management Activities being implemented in the Core Area. In these areas the Permit will authorize the incidental take of 5 Amargosa voles per year over the 30-year Permit term. Outside the Core Area, we anticipate that injury or mortality to Amargosa voles could most likely occur as a result of exposure or trampling during operations and maintenance activities, being struck by vehicles, or through predation by wild and domestic (*e.g.*, cats and dogs) predators.

Certain activities by the Landowner outside the Core Area and the broader Enrolled Property that may result in incidental take of the Amargosa vole include: 1) emergency actions; 2) remedial actions to protect property from erosion and/or flooding; and 3) activities associated with fire prevention, suppression, and response. Incidental take resulting from these activities will be covered under the authorization in the Permit. The Service recognizes that this level of take is consistent with the overall goal of providing a net conservation benefit to recovery of the species on the Enrolled Property.

The Permit will also authorize the Landowner and persons conducting activities on behalf of the Landowner to incidentally take individual Amargosa voles and their progeny as a result of activities associated with the return to Baseline conditions. Baseline conditions are described in Section 4 of this Agreement. Incidental take of Amargosa voles (including adults and juveniles) that results from the return to Baseline conditions in the Core Area could occur in the form of direct mortality or injury to Amargosa voles through trapping, suffocation, exposure, stranding, digging, or trampling by the Landowner or authorized persons or entities associated with the Landowner. The Permit will also authorize the incidental take of Amargosa voles outside the Core Area that could result from activities associated with a return to Baseline conditions.

The Parties expect that the maximum level of take authorized under this Agreement and Permit will never be realized because the Landowner will implement the Avoidance and Minimization Measures in Section 4 of this Agreement to reduce the likelihood that take will occur. Additionally, the maximum level of take is not expected to be realized because, as identified in Section 7 of this Agreement, the Landowner is required to: 1) notify the Service of any planned activity that the Landowner reasonably anticipates will result in take of Amargosa voles in the

Enrolled Property, including a return of any portion of the Core Area and the broader Enrolled Property to Baseline conditions; and 2) provide the opportunity to capture and relocate any individuals back to Tecopa source marshes, if determined by the Service to be appropriate, that could potentially be affected by a return to Baseline conditions. Incidental take of Amargosa voles could occur in the form of capture as a result of these activities.

6.0 NET CONSERVATION BENEFIT

In accordance with the Service’s Safe Harbor Agreement Policy (64 FR 32717), “net conservation benefit” means that the Management Activities that are a part of the Agreement are expected to provide an increase in the Covered Species’ population or distribution, and/or the enhancement, restoration, or maintenance of the Covered Species’ habitat. The net conservation benefit will be sufficient to directly or indirectly contribute to recovery of the Covered Species.

The re-establishment of Amargosa vole populations within their historical range is identified in the downlisting and delisting criteria in the recovery plan amendment for the Amargosa vole (Service 2019). Additional activities in the Agreement have been developed to support recovery actions for the Amargosa vole by restoring and protecting suitable habitat and by implementing habitat management plans. The Service anticipates that implementation of these activities will produce the following net conservation benefits to the Amargosa vole:

- Re-establish Amargosa vole populations at the northern extent of the subspecies’ range, in its historical type locality;
- Provide areas where suitable habitat for the Amargosa vole will be maintained, protected, and remain relatively undisturbed;
- Increase population redundancy within the subspecies’ range; and
- Reduce the potential for local extirpation and extinction due to stochastic events (*e.g.*, wildfire, disease) within the subspecies’ limited existing occupied habitat.

Therefore, Management Activities associated with this Agreement would benefit the Amargosa vole by contributing to the conservation and recovery of the subspecies. Restoration activities by the Landowner have and will continue to stabilize spring flows, water availability, and bulrush cover in the Core Area. Re-introduction of Amargosa voles to the Core Area will contribute toward recovery of the species by establishing a population in critical historical habitat. The net conservation benefit to the Amargosa vole from this Agreement, and thus contribution to recovery, will continue for at least 30 years, as identified here and in Section 9 of this Agreement. As described earlier, we anticipate that the Core Area will provide high quality habitat for the establishment and persistence of a self-sustaining population of Amargosa voles throughout the duration of this Agreement and possibly longer.

7.0 RESPONSIBILITIES OF THE PARTIES

In addition to carrying out the Management Activities described in Section 5, the Landowner agrees to the following responsibilities:

1. The Landowner will provide the Service with 60 days' notice of any planned activity that the Landowner reasonably anticipates could result in the take of Amargosa voles in the Core Area. This includes the return of the Core Area and broader Enrolled Property to the Baseline conditions described in Section 3 of this Agreement, in order to provide the Service the opportunity to capture and translocate any individuals that could be affected.
2. The Landowner will coordinate with the Service and other ad hoc Amargosa Vole Recovery Team partners to conduct annual habitat assessment surveys in the Core Area for a 5-year period following the initial translocation and re-introduction of Amargosa voles. After this annual 5-year survey period has been fulfilled, surveys will be conducted at a minimum of once every 5-years for the remainder of the Permit term, or as deemed necessary by the Landowner, the Service, and ad hoc Amargosa vole Recovery Team partners. Surveys will follow the most recent Service and ad hoc Amargosa Vole Recovery Team protocols and guidance.
3. The Landowner will coordinate with the Service and other ad hoc Amargosa Vole Recovery Team partners to conduct annual visual surveys for Amargosa voles in the Core Area for a 5-year period following the initial translocation and re-introduction of Amargosa voles. After this annual 5-year survey period has been fulfilled, surveys will be conducted at a minimum of once every 5-years for the remainder of the Permit term, or as deemed necessary by the Landowner, the Service, and ad hoc Amargosa vole Recovery Team partners. Surveys will follow the most recent Service and ad hoc Amargosa Vole Recovery Team protocols and guidance.
4. The Landowner will coordinate with the Service and other ad hoc Amargosa Vole Recovery Team partners to conduct trapping surveys for population monitoring of Amargosa voles in the Core Area as it is determined to be beneficial for evaluating and managing the establishment of a new population, and as funding appropriation allows. Surveys will follow the most recent Service and ad hoc Amargosa Vole Recovery Team trapping, biosecurity, and handling protocols and guidance. Trapping surveys will be conducted under the auspices of section 10(a)(1)(A) recovery permits that have been previously issued by the Service to ad hoc Amargosa vole Recovery Team partners, and will implement all avoidance and minimization measures contained in the permits.
5. The Landowner will allow reasonable access by the Service or other agreed-upon parties into the Core Area for purposes related to this Agreement, including confirmation of Amargosa voles occupying Core Area marsh habitat and the capture and translocation of Amargosa voles for purposes described in this Agreement.
6. The Landowner will document the implementation of Management Activities described in Section 4 of this Agreement, and other activities as they are implemented.
7. The Landowner will notify the Service at least 60 days prior to the transfer of ownership of any portion of the Enrolled Property so the Service can attempt to contact the new owner, explain the Baseline responsibilities applicable to the Core Area, and seek to

interest the new owner in signing the existing Agreement or develop a new one to benefit the Amargosa vole on the Enrolled Property.

8. The Landowner will report to the Service any dead, injured, or ill specimens of the Amargosa vole observed on the Enrolled Property. Upon the location of a dead or injured Amargosa vole, the Landowner will notify the appropriate Service contact at the Palm Springs Fish and Wildlife Office by electronic mail or telephone (760-322-2070) within 3 working days of its finding. This notification must include the date, time, location, cause of injury or death if known, photographs if possible, and any other pertinent information.
9. The Landowner will provide the Service with an annual report, due every January 31 for the prior calendar year, for the duration of the Permit. The annual report should include a summary of all Management Activities and Avoidance and Minimization Measures described in Section 5 that were implemented during the period covered by the report, as well as a summary of all results from habitat, visual, and trapping surveys that were conducted. Persons representing the Landowner may submit this report to the Service on behalf of the Landowner.

In consideration of the foregoing, the Service agrees to:

1. Upon execution of the Agreement and satisfaction of all other applicable legal requirements, issue a 10(a)(1)(A) enhancement of survival permit to the Landowner authorizing incidental take of Amargosa voles as a result of lawful activities on the Enrolled Property in accordance with the terms of such Permit. The duration of the Agreement and the Permit will be 30 years.
2. As appropriate, provide the Landowner with a determination that they have satisfied the conservation measures within 1 year of the expiration of the Agreement.
3. Provide the Landowner with technical assistance when requested, and provide information on Federal funding programs for habitat improvement including those for threatened and endangered species.
4. To the extent possible, assist the Landowner and ad hoc Amargosa Vole Recovery Team partners with translocation and re-introduction planning and implementation, implementation of Management Activities and Avoidance and Minimization Measures, and habitat, visual, and trapping surveys and other monitoring activities in the Core Area. The Service's agreement to assist may be limited by its authorities, workload priorities and appropriated funds.

8.0 AGREEMENT AND PERMIT DURATION

This Agreement will be in effect for 30 years from the effective date following its approval and signing by the Parties. The 10(a)(1)(A) enhancement of survival permit authorizing take of the species will have a term of 30 years from the issuance date of the permit. If the Service determines that the conservation actions identified in the Agreement have been implemented and

completed, then the Landowner need not perform additional conservation activities on the property and the Permit may continue in effect following termination of the Agreement for an additional 2 years. The additional duration of the Permit following termination of the Agreement will continue Permit coverage for the Landowner for 2 years to allow a return of the Core Area and the broader Enrolled Property to Baseline conditions. Both the duration of the Agreement and the Permit may be extended beyond the specified terms through renewal or amendment upon mutual agreement of the Parties. For renewal of the Permit, the Landowner must submit a written application to the Service at least 30 days prior to the expiration date of the Permit.

9.0 ASSURANCES TO LANDOWNER IN CASE OF CHANGED OR UNFORESEEN CIRCUMSTANCES

(1) Changed circumstances not provided for in the SHA. If additional conservation measures not provided for in the Agreement are necessary to respond to changed circumstances, the Service will not require any conservation measures in addition to those provided for in the Agreement without the consent of the Landowner, provided the SHA is being properly implemented.

(2) Unforeseen circumstances.

(A) If additional conservation measures are necessary to respond to unforeseen circumstances, the Service may require additional measures of the Landowner where the Agreement is being properly implemented, only if those measures maintain the original terms of the Agreement to the maximum extent possible. Additional conservation measures will not involve the commitment of additional land, water, or financial compensation, or additional restrictions on the use of land, water, or other natural resources available for development or use under the original terms of the Agreement without the consent of the Landowner.

(B) The Service will have the burden of demonstrating that unforeseen circumstances exist, using the best scientific and commercial data available. These findings must be clearly documented and based upon reliable technical information regarding the status and habitat requirements of the affected species. The Service will consider, but not be limited to, the following factors:

- (1) Size of the current range of the affected species;
- (2) Percentage of range adversely affected by the Agreement;
- (3) Percentage of range conserved by the Agreement;
- (4) Ecological significance of that portion of the range affected by the Agreement;
- (5) Level of knowledge about the affected species and the degree of specificity of the species' conservation program under the Agreement; and

(6) Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

After approval of the Agreement, the Service may not impose any new requirements or conditions on, or modify any existing requirements or conditions applicable to the Landowner or successor in interest to the owner, to compensate for changes in the conditions or circumstances of any species or ecosystem, natural community, or habitat covered by the Agreement except as stipulated in 50 CFR 17.22(c)(5) and 17.32(c)(5).

10.0 MODIFICATIONS

A. Modification of the Agreement. Either Party may propose amendments to this Agreement, as provided in 50 CFR 13.23, by providing written notice to, and obtaining the written concurrence of, the other Party. Such notice shall include a statement of the proposed modification, the reason for it, and its expected results. The Parties will use their best efforts to respond to proposed modifications within 60 days of receipt of such notice. Proposed modifications will become effective upon the other Parties' written concurrence.

B. Termination of the Agreement.

As provided for in Part 8 of the Service's SHA Policy (64 FR 32726, June 17, 1999), the Landowner may terminate implementation of the Agreement prior to the Agreement's expiration date, even if the expected benefits have not been realized. In the event the Landowner desires to withdraw from the Agreement, they should coordinate with the Service at the earliest possible time. The Landowner is required to give 30-days written notice of its intent to terminate the Agreement. If the Agreement is terminated, the Landowner is required to surrender the enhancement of survival permit at termination, thus relinquishing his or her take authority and the assurances granted by the permit.

C. Permit Suspension or Revocation. The Service may suspend or revoke the Permit referred to in Section 7 of this Agreement in accordance with the laws and regulations in force at the time of such suspension or revocation. The Service also, as a last resort, may revoke the Permit if continuation of permitted activities would likely result in jeopardy to the Covered Species (50 CFR 13.28(a)). The Service will revoke because of jeopardy concerns only after first implementing all practicable measures to remedy the situation.

D. Baseline Adjustment. The Baseline condition set forth in Part 4 of this Agreement may, by mutual agreement of the Parties, be adjusted if, during the term of the Agreement and for reasons beyond the control of the Landowner, the utilization of the Enrolled Property by the Covered Species or the quantity or quality of habitat suitable for or occupied by the Covered Species is reduced from what was at the time the Agreement was negotiated.

11.0 OTHER MEASURES

A. Remedies. Each Party will have all remedies otherwise available to enforce the terms of the Agreement and the Permit, except that no Party will be liable in damages for any breach of this

Agreement, any performance or failure to perform an obligation under this Agreement or any other cause of action arising from this Agreement.

B. Dispute Resolution. The Parties agree to work together in good faith to resolve any disputes, using dispute resolution procedures agreed upon by all Parties.

C. Succession and Transfer. As provided in Part 11 of the Service's Safe Harbor Agreement Policy (64 FR 32717), if the Landowner transfers their interest in an Enrolled Property to another non-Federal entity, the Service will regard the new owner or manager as having the same rights and responsibilities with respect to the Enrolled Property as the Landowner, if the new owner or manager agrees to become a party to the Agreement in place of the Landowner.

D. Availability of Funds. Implementation of this Agreement by the Service is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any funds from the U.S. Treasury. The Parties acknowledge that the Service will not be required under this Agreement to expend any Federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

E. Applicable Laws. All activities undertaken pursuant to this Agreement and its associated Permit must be in compliance with all applicable State, Federal, tribal, and local laws and regulations.

F. Relationship to the Act and other Authorities. The terms and conditions of this Agreement will be governed by and construed in accordance with the Act and applicable Federal law. In particular, nothing in this Agreement is intended to limit the authority of the Service to seek penalties or otherwise fulfill its responsibilities under the Act. Moreover, nothing in this Agreement is intended to limit or diminish the legal obligations and responsibilities of the Service as an agency of the Federal government.

G. No Monetary Damages. No Party will be liable in damages to any other Party or other person for any breach of this Agreement, any performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement, or any other cause of action arising from this Agreement.

H. No Third-Party Beneficiaries. This Agreement does not create any new right or interest in any member of the public as a third-party beneficiary, nor does it authorize anyone not a party to this Agreement to maintain a suit for personal injuries or damages pursuant to the provisions of this Agreement. The duties, obligations, and responsibilities of the Parties to this Agreement with respect to third parties will remain as imposed under existing law.

I. Other Listed Species, Candidate Species, and Species of Concern. There is the possibility that other listed, proposed, candidate species, or species of concern may occur in the future on the Enrolled Property as a direct result of the management actions specified herein. In the event that a non-covered species that may be affected by covered activities becomes listed under the Act,

the Landowner and the Service will work together either to amend this Agreement, and the Permit described in Section 7 of this Agreement, to cover such other species or otherwise to confer upon the Landowner similar assurances with respect to such other species as are described above for Covered Species.

J. Notices and Reports. Any notices and reports, including monitoring and annual reports, required by this Agreement will be delivered by electronic mail to the appropriate Service contact or by mail to the person at the address listed below:

U.S. Fish and Wildlife Service
777 East Tahquitz Canyon Way, Suite 208
Palm Springs, California 92262
Attn: Assistant Field Supervisor

Annual reports for the previous calendar year shall be due January 31 of each year and copies will be made available to the Cooperators/ad hoc Amargosa Vole Recovery Team members.

K. Pursuant to Section 22, Title 41, United States Code, it is further mutually agreed that no member of or delegate to Congress or resident commissioner, after their election or appointment, and either before or after they have qualified and during their continuance in office, will be admitted to any share or part of the Agreement, or to any benefit to arise thereupon; but this provision will not be construed to extend to this Agreement if made with a corporation for its general benefit.

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APPENDIX 1: Photographs of Core Area for Baseline Determination

MARSH 31













MARSH 31A















MARSH 31B











APPENDIX 2: TRANSLOCATION PROTOCOL FOR AMARGOSA VOLES

1. Ensure that habitat is optimal, with live actively flowering bulrush, a litter layer over 80% of bulrush covered area of at least 20 cm, and available water in springs, streams, or ponds.
2. Collect voles from donor site in Tecopa marshes, in consultation with landowner and the Service. Any Amargosa voles for translocation to the Core Area must be young adults or subadults based on coat color and teeth wear; have no apparent medical defects on physical examination by a veterinarian; and be shown to be free of chigger mites and infection with *Francisella tularensis* and *Yersinia pestis* as detected via polymerase chain reaction analysis of blood samples. Waiting for these pathogen test results may necessitate animals being held temporarily in captivity. During this period they will also be monitored for general health and will not be released into the Core Area unless they demonstrate normal appetite, normal feces, and normal behavior.
3. Prepare voles for release. If a genetic sample has not already been acquired, a small piece of marginal ear tissue will be collected with sterile scissors. Each vole will receive a uniquely numbered metal ear tag, a VHF radio-collar, and a subcutaneous PIT tag. Prior to placement in the soft-release cage, the placement and signal of the PIT tag and collar will be verified.
4. Prepare site with soft release cages, and remotely triggered cameras positioned on the soft release cages.
5. Transport Amargosa voles from the donor site to the Core Area following existing transportation protocol.
6. Perform soft-release to Core Area marshes.
7. Monitor at 2 day intervals for 1 week, after 1 month, after 6 months, and at 1 and 2 year time points by obtaining radio-collar signals and using baited camera traps. Live trapping to assess Amargosa vole body condition may be performed in consultation with the Landowner and the Service. Monitoring using dataloggers to detect PIT tags may be performed if personnel and supplies are available.