

Appendix H

H.0 Recommended Special Management Actions for the Recovery of the Amargosa Vole

H.1 Introduction

The Amargosa vole is desert subspecies of the widely distributed California vole. The Amargosa vole historically inhabited a highly localized and isolated wetland of the central Mojave Desert in extreme southeastern Inyo County, California, near the Inyo – San Bernardino County line. It depends upon, and is closely associated with, wetland vegetation dominated by bulrush. The Amargosa vole was listed as a California State endangered species on September 2, 1980. (Title 14 California Administrative Code, Section 670.5) and as a federal endangered species with critical habitat on November 15, 1984 (49 Federal Register (FR): 45160). Reasons for listing include loss of historical habitat, rechannelization of water sources needed to perpetuate habitats, and pumping of groundwater. Based on the high degree of threat and low full recovery potential, the Amargosa vole has been given a recovery priority of six (6), meaning that it is a subspecies under high threat with a low recovery potential.

H.2 Objective of the Management Actions

The objective of the management actions is to minimize the threats that imperil the Amargosa vole so that the species can be downlisted to “Threatened” status. The Amargosa vole may be proposed for downlisting when populations of the vole and the wetland ecosystem on which they are dependent within the ancient Tecopa Lake Basin and within Amargosa Canyon are secure and self-perpetuating.

Recovery efforts should occur on the following five sites:

1. Public lands administered by the BLM in the Grimshaw Lake and Amargosa Canyon Areas of Critical Environmental Concern
2. State lands in the northern portion of the Amargosa Canyon
3. The BLM lands south of Tecopa Hot Springs
4. Private lands containing vole habitat
5. Water sources required to perpetuate these areas, and corridors necessary for maintaining genetic exchange between otherwise isolated vole populations

The interim goal is to secure vole populations in wetlands above 1,370 feet (410 meters) elevation. Tasks to achieve the interim goal include securing habitat and the water sources for maintaining these wetlands, and minimizing threats from introduced species.

Specific recommendations, requirements and tasks include:

1. Implement short-term actions critical for the near-term survival of the Amargosa vole.
 - a. Identify Amargosa vole habitat and source water on private, The Nature Conservancy, state, and federal lands.
 - i. Identify Amargosa vole habitat
 - ii. Identify groundwater sources and springs

- b. Implement measures to secure extant populations and non-occupied habitat; foremost, those above 1,370 feet (410 meters) in elevation and habitats protected against flooding by the historic railbed grading for the Tonopah and Tidewater railroad lines.
 - i. Secure water sources and water rights for groundwater and springs critical to maintaining and enhancing upland habitats and lowland habitats.
 - ii. Protect wetland habitats from geothermal exploration and development.
 - ◆ Identify geothermal ownership (mineral estate) that can affect upland and protected lowland habitats.
 - ◆ Remove geothermal development that has adverse effects on wetlands or critical habitat from current and future leases. This would probably include a mineral withdrawal corresponding with public lands within critical habitat. Invoke a “no surface occupancy” stipulation in the affected area if the impact analysis supports that surface disturbance will adversely affect the vole or wetlands habitat, and USF&WS supports that jeopardy opinion would occur if surface activity were allowed.
 - iii. Remove tamarisk from upland and protected lowland habitats
 - iv. Maintain integrity of the Tonopah and Tidewater railbed to prevent flooding of existing lowland habitats.
 - v. Prevent further loss of habitat or water quality by road construction, maintenance, or other construction activities.
 - vi. Replace existing OHV exclusion barrier with a more substantial post and cable barrier.
 - vii. Immediately remove all feral cattle from the Amargosa Canyon
 - viii. Prohibit all camping and campfires on public lands.
 - c. Identify threats to the Amargosa vole and/or habitat.
 - d. Develop interim management plan to protect habitats.
 - e. Implement management plan.
2. Population surveys and assessments.
- a. Estimate population size of all habitat patches using capture/mark/recapture.
 - b. Obtain demographic data on the Amargosa vole to determine abundance, distribution, natality, mortality, recruitment, dispersal distance, and rate of population change.
 - c. Collect tissue samples from all new captured animals.
 - d. Collate and analyze data annually.
3. Habitat surveys and assessment.
- a. Quantify habitat characteristics around animal capture sites.
 - b. Determine temporal and spacial patterns of habitat use.

- c. Evaluate habitat condition annually:
 - i. Tecopa Lake Basin and Amargosa Canyon.
 - ii. Shoshone area.
- d. Develop management protocols for enhancing extant habitat and rehabilitating historical habitat sites:
 - i. Analyze habitat data.
 - ii. Develop management protocols for enhancing extant habitat and rehabilitating historical habitat sites.
- 4. Genetic Analysis
 - a. Analyze genetic data.
 - b. Evaluate progress toward recovery objective.
- 5. Enhance Amargosa vole populations and habitat.
 - a. Determine affects of natural and anthropogenic threats including flooding, spring water flow and flux, vegetation changes, fire, exotic intrusion (plant and animal), pesticides/ rodenticides, and groundwater/ watershed alterations.
 - b. Implement effective habitat/vegetation manipulation that enhances vole habitat and minimizes adverse effects on other sensitive native species.
 - c. Reduce or eliminate competitive faunal species.
 - d. Establish additional Amargosa vole populations.
 - i. Determine if establishment or rehabilitation of habitat is necessary.
 - ii. Complete habitat rehabilitation or protective measures, if necessary, prior to reintroducing voles.
 - iii. Introduce voles into the site.
 - iv. Monitor success of the vole population at each transplant site.
 - v. Continue with transplant program if necessary of feasible.
 - e. Develop map of habitat and population trends.
- 6. Monitor habitat trends.
 - a. Develop monitoring protocol and conduct yearly small mammal and vegetation surveys.
 - b. Update map of habitat and population trends.
 - c. As necessary, modify management plans.
- 7. Establish a public outreach program.¹

¹ U.S. Fish and Wildlife Service, 1997. Amargosa vole (*Microtus californicus scirpensis*) Recovery Plan. Portland, Oregon.

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