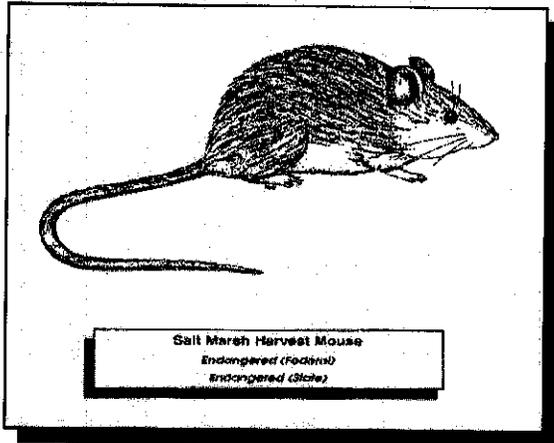


◆ SALT MARSH HARVEST MOUSE



INTRODUCTION

The salt marsh harvest mouse is associated with saline emergent wetlands. The population and distribution of this species have declined substantially, primarily as a result of reclamation of tidal salt marshes for agriculture, salt production, and urban development. The loss of habitat and declining condition of this species' population have warranted its listing as endangered under the State and federal Endangered Species Acts. The major factors that limit this resource's contribution to the health of the Delta are related to the adverse effects of historical and current loss or degradation of saline tidal wetlands that support the dense stands of pickleweed on which the salt marsh harvest mouse is dependent.

RESOURCE DESCRIPTION

The salt marsh harvest mouse occurs only in saline emergent wetlands associated with San Francisco Bay and its tributaries. Historically, these areas supported extensive tidal wetlands, which sustained dense stands of pickleweed.

These plants, in turn, supported the salt marsh harvest mouse.

With the gradual development of the Suisun Marsh and San Francisco Bay areas came the construction of dikes and levees for flood control and protection of lands reclaimed for uses such as for salt ponds and agriculture. These reclaimed areas supported livestock grazing and, in the Suisun Marsh, small grain crops and asparagus. The vegetation growing beyond the limits of high tide supported grazing, and settlers found that if they diked those areas, wetland plants would eventually recede and give way to upland plants favored by livestock. As more and more settlers arrived, development resulted in the loss of large areas of habitat and severe fragmentation of the habitat that remained. Barriers, such as a road or path no more than 10 feet across, isolated the mouse in fragmented habitats because it would not use or travel across areas lacking vegetation. Upland areas consisting of grasslands or salt-tolerant plants that offered refuge during extreme high tides and high outflow periods were adjacent to the saline emergent wetlands. Development altered the landscape and geomorphology in many of these areas, which contributed to the loss of habitat.

Saline emergent wetlands with pickleweed occur only within the Suisun Marsh/North San Francisco Bay Ecological Management Zone of the Ecosystem Restoration Program Plan (ERPP) area. The elimination of much of the salt marsh harvest mouse's habitat is the primary cause of the species' decline. Other factors or "stressors" that have contributed to the decline or potentially could inhibit the recovery of the species include human activities that disturb the species and predation by non-native species. Grazing; water management practices; land use practices; contaminants; and human-made structures, such as dikes and levees, continue to degrade the quality of remaining habitat areas.

VISION

The vision for the salt marsh harvest mouse is to contribute to the recovery of this State- and federally listed endangered species through restoring salt marsh habitat in San Pablo and Suisun bays and adjacent marshes. Existing occupied and unoccupied suitable habitat areas will be protected. Saline emergent wetlands will be restored. Stressors to the population and habitat will be reduced. new populations will be introduced into unoccupied habitat areas.

Protecting existing suitable habitat areas from potential activities that could adversely affect the harvest mouse could be achieved through cooperative agreements with land management agencies, conservation easements, or purchase from willing sellers. Restoration of adjacent upland habitat will help to recover this species by increasing habitat area. Uplands provide the mouse with refuge from flooding.

Reducing factors that contribute to degradation of saline emergent wetland communities would promote natural restoration and maintenance. Increasing the quantity and quality of salt marsh harvest mouse habitat and reducing the adverse effects of stressors would establish conditions necessary to maintain existing populations and allow them to naturally recover. However, introducing the mouse into unoccupied habitat areas within its historic range would speed the recovery of the species by establishing new populations before the species would be expected to naturally expand into these or restored habitat areas.

Many programs are underway to restore the Bay-Delta salt marshes. Successful restoration program implementation will increase the chances of salt marsh harvest mouse recovery. Current land management practices need to be examined and redefined to restore, enhance, and promote salt marsh harvest mouse habitat. Salt

marsh harvest mouse management strategies should focus on:

- managing known critical mouse habitat areas;
- providing additional research to identify other factors limiting the population and determine corrective measures; and
- addressing the needs of waterfowl and other migratory birds that also use saline emergent wetlands.

INTEGRATION WITH OTHER RESTORATION PROGRAMS

Existing restoration programs that would benefit the salt marsh harvest mouse include:

- Suisun Marsh Recovery Plan,
- San Francisco Bay Joint Venture,
- San Francisco Bay Area Wetlands Ecosystem Goals Project,
- California Coastal Conservancy,
- Delta Native Fishes Recovery Plan,
- California Department of Fish and Game Delta/Bay Enhanced Enforcement Program,
- Grizzly Island Wildlife Area,
- National Estuarine Reserve Research System,
- North Bay Wetlands Protection Program,
- San Francisco Bay National Wildlife Refuge, and
- Tidal Wetlands Species Recovery Plan.

Targets and actions will be coordinated through these programs.

LINKAGE WITH OTHER ECOSYSTEM ELEMENTS

Restoration of salt marsh harvest mouse is integrally linked with restoration of saline emergent wetlands and adjacent grasslands adjacent to San Pablo and Suisun Bays.

STRATEGIC OBJECTIVE, TARGETS, AND PROGRAMMATIC ACTIONS



The Strategic Objective is to restore salt marsh harvest mouse to tidal marsh within their historical range.

LONG-TERM OBJECTIVE: Restore salt marsh harvest mouse to tidal marsh throughout their historical range.

SHORT-TERM OBJECTIVES: Reestablish populations in newly created or restored marshland and protect existing populations as outlined in the salt marsh harvest mouse recovery plan.

RATIONALE: This species is listed as endangered by both state and federal governments and exists in small isolated populations in Bay salt marshes. Historically, about 107,000 acres of habitat suitable for the salt marsh harvest mouse existed. Degradation of habitat due to agricultural practices, diking, and human disturbance has limited greatly what is available today. It is important that this degradation and loss of any more habitat be stopped. Existing habitat is susceptible to flooding and silting in, as well as new building projects. New wetlands have to be

created to outweigh disappearing marsh in other areas if the small isolated populations are to be enhanced. Created habitat would also benefit other species that use tidal marsh environments.

STAGE 1 EXPECTATIONS: Key items in the salt marsh harvest mouse recovery plan will have been identified, followed by implementation of those that would have immediate benefits to the species, including stopping population decline and increasing genetic flow between isolated populations. The existing populations will have been studied to determine their size and their habitat requirements. Limit the activities that would further increase erosion of Bay marshes and therefore reduce existing population sizes.

The following general targets will assist in meeting the implementation objective:

- Increase the number of salt marsh harvest mice in San Pablo and Suisun Bay marshes.
- Reduce the extent of isolation among the mouse populations.

The following general programmatic actions will assist in meeting the targets:

- Increase the area of salt marsh adjacent to San Pablo and Suisun Bays.
- Decrease the extent of isolation among remaining salt marshes.
- Increase the amount of adjacent grasslands to the marshes.
- Reduce the degree of stressors including water management and land use practices on existing and restored marshes and adjoining upland habitats.

REFERENCE

Strategic Plan for Ecosystem Restoration. 1999. Appendix to the CALFED Bay-Delta Program Environmental Impact Statement /Environmental Impact Report. June 1999.

◆ SUISUN ORNATE SHREW

INTRODUCTION

The Suisun shrew, a subspecies of the ornate shrew, is a federal species of concern and is also listed as a California Department of Fish and Game Species of Concern. Historically, this species inhabited tidal marshes ranging from San Pablo and Suisun Bays to Grizzly Island and as far west as the mouth of Sonoma Creek, Petaluma River, and Tubbs Island. Most of the shrew's range today exists in the tidal marshes of Suisun Bay.

The primary factor affecting the Suisun shrew is habitat degradation. The shrew prefers tidal wetland to diked or managed wetlands and therefore is limited in its range.

RESOURCE DESCRIPTION

The Suisun shrew typically inhabits tidal salt marsh with adjoining upland areas where they can seek shelter during high tides and flooding. They only occur where dense foliage and driftwood can be used for nesting material and foraging. In addition, the shrew prefers areas where the soil moisture is constant. An upland component to their habitat requirements is necessary to avoid inundation during rising tides. The structure of the vegetation that occurs in their habitat may be more important than species composition. When tides are high and the ground is wet the shrew travels above ground, in the vegetation. Therefore, vegetation needs to be thick enough to provide cover for an escape corridor. The Suisun ornate shrew is an insectivore and additional diet items include crustaceans.

With the development of the Suisun Marsh came the construction of dikes and levees for flood control and protection of lands reclaimed for uses such as agriculture. These reclaimed areas supported livestock grazing, and crops such as

asparagus and grain. As more and more lands were converted to agriculture, more and more habitat loss occurred which allowed for severe fragmentation of the habitat that remained. Barriers, such as roads also added to fragmentation of the remaining habitat. Development altered the landscape and geomorphology in many of these areas, which contributed to the loss of habitat.

Tidal marshes occur within the Suisun Marsh/North San Francisco Bay Ecological Management Zone of the ERP area. The elimination of much of Suisun shrew's habitat is the primary cause of the species' decline. Other factors that have contributed to the decline or potentially could inhibit the recovery of the species include human activities that disturb the species and predation by non-native species. Grazing; water management practices; land use practices; contaminants; and human-made structures, such as dikes and levees, continue to degrade the quality of remaining habitat areas.

VISION

The vision for the Suisun ornate shrew is to recover this California species of species concern and contribute to the overall species richness and diversity. Achieving this vision will reduce conflict between protection for this species and other beneficial uses of land and water in the Bay-Delta.

Protecting existing suitable habitat areas from potential activities that could adversely affect the Suisun shrew could be achieved through cooperative agreements with land management agencies, conservation easements, or purchase from willing sellers. Restoration of adjacent upland habitat will help to recover this species by increasing habitat area. Uplands provide the shrew with refuge from flooding.

Reducing the factors that contribute to degradation of marshes would promote natural restoration and maintenance. Increasing the quantity and quality of Suisun shrew habitat and reducing the adverse effects of stressors would establish conditions necessary to maintain existing populations and allow them to naturally recover.

INTEGRATION WITH OTHER RESTORATION PROGRAMS

Existing restoration programs that could benefit the Suisun shrew are:

- Suisun Marsh Recovery Plan
- San Francisco Bay Joint Venture
- Bay Area Wetlands Planning Group
- California Coastal Conservancy
- Delta Native Fishes Recovery Plan
- California Department of Fish and Game Delta/Bay Enhanced Enforcement Program
- Grizzly Island Wildlife Area
- National Estuarine Reserve Research System
- North Bay Wetlands Protection Program
- San Francisco Bay National Wildlife Refuge
- Tidal Wetlands Species Recovery Plan, and
- San Francisco Bay Area Wetlands Ecosystem Goals Project.

LINKAGE WITH OTHER ECOSYSTEM ELEMENTS

Restoring tidal habitat to increase populations of the Suisun shrew would benefit the other species found in this habitat. These species include the salt marsh harvest mouse and wading and shorebirds.

STRATEGIC OBJECTIVE, TARGETS, AND PROGRAMMATIC ACTIONS



The Strategic Objective is to restore Suisun ornate shrew to representative habitats within its range.

LONG-TERM OBJECTIVE: Restore Suisun ornate shrew to tidal wetland habitats throughout its native range.

SHORT-TERM OBJECTIVE: Identify the remaining populations of Suisun ornate shrew and develop a conservation plan to stop the decline of this species.

RATIONALE: The Suisun ornate shrew is listed as a species of special concern by the California Department of Fish and Game, but its limited habitat and distribution indicate it may qualify as a threatened species. Long-term survival of this subspecies is dependent upon tidal wetland, as opposed to diked wetlands, and has to have adequate physical structures and plant communities for survival. Its tidal marsh habitat has to have adjacent upland habitat for survival of the species during periods when the marsh is inundated. The upland habitat has to have relatively low densities of exotic predators. Restoring habitat would not only benefit the Suisun ornate shrew but other species, such as the

salt marsh harvest mouse, that also use tidal marsh and upland marsh habitats.

STAGE 1 EXPECTATIONS: All remaining populations of Suisun ornate shrew will have been identified and protection/restoration plans developed and implemented.

REFERENCES

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