MANAGEMENT PROBLEMS ASSOCIATED WITH THE RECOVERY PLAN FOR THE SALT MARSH HARVEST MOUSE AND CALIFORNIA CLAPPER RAIL[1/]

Howard S. Shellhammer
Department of Biological Sciences
San Jose State University
San Jose, CA 95192

ABSTRACT.

A single recovery plan is being developed for two endangered species; the salt marsh harvest mouse (Reithrodontomys raviventris) and the California clapper rail (Rallus longirostris obsoletus) in San Francisco Bay. The plan proposes acquisition of privately-owned marshes, creation of islands of habitat within established state game refuges, and modification of portions of federal refuges. Four of the more important management problems are: (1) development of nongame habitat within wetlands managed for waterfowl, (2) aerial monitoring of endangered species habitat, (3) restoration and maintenance of upper zones of marshes, and (4) maintenance of dikes, especially those within federal refuges.

INTRODUCTION

The salt marsh havest mouse (Reithrodontomys raviventris) and the California clapper rail (Rallus longirostris obsoletus) are listed as endangered species at both the federal and state levels, and are restricted to the marshes of the San Francisco Bay Area (with the exception of one rail population at Elkhorn Slough on Monterey Bay which, however, is not considered further in this paper). A recovery plan is being developed for these species by Thomas E. Harvey and myself for the U.S. Fish and Wildlife Service.

These species are restricted to marsh vegetation which has been reduced by approximately 80% in the last hundred years (from 283.5 mi^2 to 58.5 mi^2, Jones and Stokes et al. 1979). Most of the original marshes have been converted into salt ponds, diked wetlands, agricultural land, or modified in some other way (see Table 1).

Table 1. Present usage of the former marshes of San Francisco Bay[1]

Portion of Bay	Percentage In:				
	Agriculture	Diked Marshes	Diked Ponds	Other	Tidal Marshes
Suisun Bay	10	67	Tr.	3	19
San Pablo Bay	42	9	14	8	27
South San Francisco Bay	1	8	61	18	13

[1]Modified from Jones and Stokes et al. 1979.

[1/]Howard Shellhammer's presentation of this paper was judged by the Nelson-Hooper Award Committee to be the best presentation at the Annual Meeting.

The remaining tidal marshes are highly modified. Most have lost their upland edge of weedy vegetation and much to all of their uppermost zone of halophytes (periperal halophytes), both of which are important as refugia for both species during extreme high tides. Many marshes have reduced mid-marsh zones of pickleweed (Salicornia pacifica), the prime habitat for the harvest mouse and heavily used by the rail. Many middle zones have been invaded by cordgrass (Spartina foliosa) or alkali bulrush (Scirpus robustus) due to subsidence or changes in salinity. Increased amounts of cordgrass are detrimental to the mouse; both species are negatively impacted by increases in alkali bulrush. Hence, most of the marshes of the Bay Area have been greatly reduced in size (or have disappeared) and have had their vegetative composition greatly modified; this resulted in endangered status for the two species.

DISCUSSION

As part of the recovery plan, we have established requirements for optimal habitat for the two species. Optimal habitat for the salt marsh harvest mouse includes: (1) 100% cover; (2) cover 30 to 50 cm high; (3) a high percentage of pickleweed and associated plants such as fat hen (Atriplex patula) and alkali heath (Frankenia grandiflora); (4) no pure stands of alkali bulrush, brass buttons (Cotula coronopifolia), salt grass (Distichlis spicata), other bulrush (Scirpus sp.), or cattails (Typha sp.); (5) no barriers of open water; (6) large size, 100 acres or more, with corridors of optimum vegetation between habitat areas; (7) an upper edge of peripheral halophytes, especially if the marsh is tidal or flooded; and (8) minimal disruption including the absence of plowing, mowing, burning or artificial flushing.

Optimum habitat for the California clapper rail includes (1) tidal marshes, salt or brackish, (2) complete zonation with a zone of peripheral halophytes, (3) tidal channels and adjacent mudflats, and (4) minimal human impact and (5) the absence of potential nest predators such as rats.

It is impractical to create a broad band of optimal habitat for these two species along the edge of much of the Bay. We have proposed, instead, as the prime objective of the recovery plan to upgrade, restore, manage and protect a mosiac of large, optimum marshes throughout the original range of the two species within San Francisco Bay. In developing the recovery plan to accomplish this objective we have identified a number of management problems. Four of the more important are presented below.

Management Problem #1: The creation of nongame habitat within wetlands managed for waterfowl. Suisun Marsh has been protected by the State legislation and is managed by the Suisun Resource Conservation District and the California Department of Fish and Game. This marsh is managed as waterfowl habitat, with techniques to promote alkali bulrush, a plant species seldom used by the mouse or rail. Pickleweed, a species seldom used by waterfowl but critical to the mouse, is selected against by present waterfowl management methods. To insure that such management practices can continue the Suisun Marsh Management Plan has been initiated by the Bureau of Reclamation. Water flow through Suisun Marsh will be modified to halt salinity increases and promote waterfowl management. Mitigation measures for the loss of salt marsh harvest mouse habitat should include development of 100 acres of optimum habitat at the extreme southwest corner of the marsh (to the east of Montezuma Slough), 700 acres of such habitat within Grizzly and Joice Island Wildlife Areas, 100 acres in Hill Slough at the northern edge of the Marsh, and approximately 1,500 acres on private lands. Together with maintenance of the 206 acres of Peytonia Slough, Ecological Reserve, optimum mouse habitat would total about 2,500 acres.

The problems associated with such a mitigation senario include: (1) Finding room for three of the optimal mouse habitat units at the periphery of the marsh and (2) the unlikelihood that private hunting clubs will create mouse habitat if doing so will reduce waterfowl habitat.

Management Problem #2: Aerial monitoring of habitat. Aerial monitoring, even with ground truthing and some trapping, will not be sufficient to accurately monitor optimum mouse habitat. Aerial photographs indicate the nature of the surface but not the substructure of the vegetation, and the latter is very important in diked marshes in the Suisun Marsh (Jackson and Shellhammer, 1980). Lack of funding may preclude adequate ground truthing and trapping. A subsequent greater reliance on aerial photographs will likely overestimate the amount of optimal mouse habitat present.

Management Problem #3: Creation and maintenance of the upper zones of marshes. The upland edge of weedy vegetation is absent from over 95% of the margin of the Bay. The upper zones of most marshes are greatly reduced. These two zones are vital to the mice and rails as refugia during daily and annual high tides. Both the mouse and the rail are highly cover-dependent animals. The mouse cannot survive in marshes deprived of scuh refugial areas (Fisler 1965 and personal observations). To reestablish an upland edge or an upper marsh zone will be very expensive and will require land purchase, earth movement, filling, and possibly sowing or plantings. It is vital to the viability of many of the marshes around the Bay that this work be undertaken if they are to continue to support mice and rails.

One critically important area for providing such zones is the San Francisco Bay National Wildlife Refuge in South San Francisco Bay. If and when the Leslie Salt Company stops making salt within refuge boundaries, full control of the ponds will revert to the Fish and Wildlife Service. We suggest in the recovery plan that at least 5,000 acres be converted to tidal marshes. A strip of land should be added to a number of areas around the refuge to insure that both upper marsh and upland zones can be created.

Management Problem #4: Maintenance of dikes bordering salt ponds, especially those within federal refuges. Most dikes, and essentially all those within Leslie Salt properties, are reinforced at various intervals. The procedure involves dredging mud from the adjacent salt ponds and piling it on the dike or dike road, allowing it to settle for a year or two, and then blading a new road down the top of the new dike. Such practices impact the narrow upper zone of peripheral halophytes both upon deposition and when the new road is created. This is an especially serious problem in the southern tip of the bay where subsidence and vegetational changes induced by changes in water salinity have greatly reduced the width of both the pickleweed and peripheral halophyte zones of the marshes. The solution to this problem lies in placing the dredged mud slightly to the inside edge of the dike. This will reduce the impact on the halophytes bordering the dike but will require slightly more mud and slightly reduce the size of the salt ponds. If this technique is adopted, compensation to the Leslie Salt Company (for ponds within the refuge) will be required as it has unrestricted use of the ponds under the agreement establishing the Refuge.

CONCLUSION

These are a few, but by no means the only, management problems associated with the recovery of the salt marsh harvest mouse and the California clapper rail. They must be overcome if recovery of these two species is to be successful. In addition the recovery plan, now at the technical review stage, needs to be accepted in its entirety.

LITERATURE CITED

Jackson, R. and H. Shellhammer. 1980. Report on the 1980 summer trapping program for the endangered salt marsh harvest mouse at the Montezuma Powerplant site. Prepared for Pacific Gas and Electric Company by Biosystems Analysis, Inc. 30 pp.

Fisler, G. 1965. Adaptions and speciation in harvest mice of the marshes of San Francisco Bay. Univ. Publ. in Zoology 77:1-108.

Jones and Stokes Associates, Inc., Harvey and Stanley Associates, Inc., and John Blaney Associates. 1979. Protection and restoration of San Francisco Bay fish and wildlife habitat. Prepared for Calif. Dept. of Fish and Game and U.S. Fish and Wildlife Service Vol. I. 23 pp. & 20 maps.