U.S. Fish & Wildlife Service

Recovery Plan for the Florida Salt Marsh Vole

Microtus pennsylvanicus dukecampbelli

Southeast Region
Atlanta, Georgia

RECOVERY PLAN
FOR THE
FLORIDA SALT MARSH VOLE
(*Microtus pennsylvanicus dukecampbelli*)

prepared by

Jacksonville, Florida Field Office

for

U.S. Fish and Wildlife Service
Southeast Region
Atlanta, Georgia

Approved: _____
Acting Regional Director, U.S. Fish and Wildlife Service

Date: September 30, 1997

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By approving this document, the Regional Director certifies that the information used in its development represents the best scientific and commercial data available at the time it was written. Copies of all documents reviewed in development of the plan are available in the administrative record, located at the Jacksonville, Florida, Field Office.

Acknowledgement

The U.S. Fish and Wildlife Service thanks Dr. Charles Woods of the Florida Museum of Natural History at the University of Florida in Gainesville, for the cover photograph.

Literature citation should read as follows:

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EXECUTIVE SUMMARY

Current Status: The Florida salt marsh vole (*Microtus pennsylvanicus dukecampbelli*) is listed as an endangered species and is only known from one privately-owned site in Levy County, Florida.

Habitat Requirements and Limiting Factors: The Florida salt marsh vole inhabits one known coastal marsh site predominantly vegetated with smooth cordgrass (*Spartina alterniflora*), salt grass (*Distichlis spicata*), glasswort (*Salicornia* spp.), and black rush (*Juncus roemerianus*). The decline of this species appears to have occurred as a result of climatic changes and an associated rise in sea level. The vole is limited by two factors, an extremely restricted range encompassing only one known population, and the threat of losing this population to a storm event or population fluctuations.

Recovery Objective: The immediate objective is to prevent extinction by maintaining the existing population. Reclassification and delisting cannot be considered at this time.

Recovery Criteria: Because of the limited information currently available, specific recovery criteria cannot be developed at this time, but will be determined as information becomes available.

Major Actions Needed:

(1) Protect existing populations by:
- preserving habitat supporting the known population;
- monitoring the known population; and,
- surveying and, if appropriate, working to acquire potentially suitable habitat on private lands.

(2) Conduct distribution surveys to locate additional populations of voles and suitable habitat.
(3) Conduct life history studies to determine population demographics, habitat use, etc.
(4) Assess feasibility of captive breeding and reintroduction.
(5) Determine recovery criteria.

Estimated cost ($000's) of recovery:

Year	Need 1	Need 2	Need 3	Need 4	Need 5	Total
FY1	7	25	0	0	0	32
FY2	7	40	0	0	0	47
FY3	7	15	20	0	0	42
FY4	7	0	20	20	0	47
FY5	7	0	20	15	0	42
Total	35	80	60	35	0	210

Date of Recovery: The estimated date of recovery cannot be determined at this time.

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I. INTRODUCTION

Description

The Florida salt marsh vole (*Microtus pennsylvanicus dukecampbelli*) was listed as an endangered species on January 14, 1991 (U.S. Fish and Wildlife Service 1991). It was described in 1982 (Woods et al. 1982) based on specimens from near Cedar Key, Levy County, Florida.

The Florida salt marsh vole is a small (178-198 millimeters [7.0-7.8 inches] in length), short-tailed rodent with a blunt head and short ears. The fur is black-brown dorsally and dark gray ventrally. *Microtus pennsylvanicus dukecampbelli* is a subspecies of the widespread meadow vole (*M. pennsylvanicus*). *Microtus pennsylvanicus dukecampbelli* differs from *M. pennsylvanicus* in its larger size, darker coloration, relatively smaller ears, and certain skull characteristics.

Distribution

The Florida salt marsh vole is known from only one site in Waccasassa Bay, near Cedar Key, Levy County, Florida (Figure 1). Additional searches for this species have not revealed any other populations of *M. p. dukecampbelli* (Woods 1988; Bentzien 1989; T. Doonan 1996, Florida Game and Fresh Water Fish Commission, pers. comm.). The latest search (1996) primarily included trapping in suitable habitat on road-accessible areas of public lands in Taylor, Dixie, and Levy Counties (shaded counties in Figure 1).

Habitat

The vole is known to occur only at the type locality in salt marsh habitat where the vegetation is dominated by salt grass (*Distichlis spicata*) with smooth cordgrass (*Spartina alterniflora*) and glasswort (*Salicornia* spp.) also present (Woods et al. 1982). During a 1996 survey at the type locality, this vegetation was dense and 45-60 centimeters (17.7-23.6 inches) high in most areas (T. Doonan pers. comm.). Only a few areas along the Gulf coast salt marshes sampled supported habitat with similar characteristics. Florida salt marsh voles may need the dense, matted ground-level vegetation that these areas provide (T. Doonan pers. comm.).

Life History/Ecology

Because of its rarity, the life history and reproductive behavior of the Florida salt marsh vole have not been well studied. Life history of the meadow vole has been well studied and some aspects are expected to be similar to that of the Florida salt marsh vole. Typically, meadow voles are active both day and night. They feed on a variety of plant matter, including bark, grass, roots, and seeds. Voles have a high reproductive rate and breed throughout most the year with a peak of breeding activity occurring in the spring (Golley 1962). Woods et al. (1982) also reported breeding activity for Florida salt marsh voles during spring. The gestation period for voles is 21 days, and the average litter size is five young. The young mature rapidly and start breeding when about 2 months of age (Golley 1962). The life span of voles is short; typically, few individuals live longer than 6 months (Golley 1960).

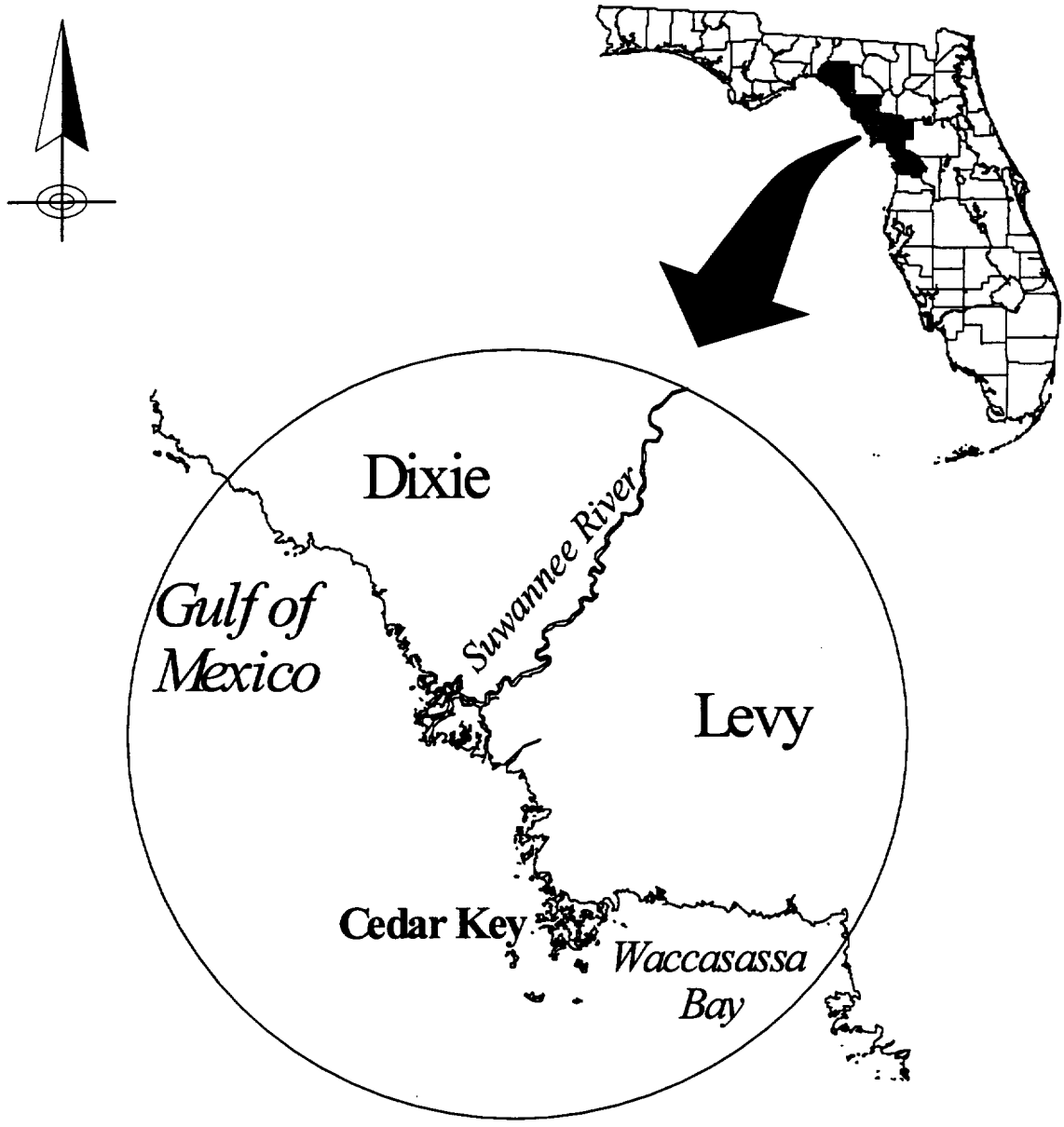

Figure 1. Distribution and vicinity of type locality for the Florida salt marsh vole. Surveys have been conducted in shaded counties (from north to south) Taylor, Dixie, Levy, and Citrus.

Limited data on the average distance between captures for Florida salt marsh voles and other vole populations allow for a comparison of home range size between vole populations (Woods et al. 1982). Using data from Harris (1953) for *M. p. nigrans* in a Maryland salt marsh, Woods et al. (1982) calculated an average home range size of 1164 square meters (m^2) for the Maryland population, which compares to 804 m^2 for the Florida population. Madison (1980) used radiotelemetry to determine daily ranges for male voles of 192 m^2 (69 m^2 for females) from an oldfield site in Virginia.

The following is derived from information in Woods et al. (1982).

The nearest known population of *Microtus pennsylvanicus* to the Florida salt marsh vole is located approximately 500 kilometers (km) or 313 miles to the north in Georgia. However, fossil *Microtus pennsylvanicus* have been found in late Pleistocene deposits at four sites in Alachua, Citrus, and Levy Counties, Florida, indicating a much more extensive past distribution. The ages of these fossils may be from 8,000-30,000 years before the present. Lower sea levels in the past exposed large areas of coastal lands along Florida's west coast that are now submerged. About 10,000 years ago, sea level may have been 25 meters (82 feet) lower than at present, exposing land as far as 100 km (63 miles) west of the current shoreline. This coastal corridor is believed to have consisted of savanna and prairie vegetation that would have provided much more extensive meadow vole habitat than now exists.

The Florida salt marsh vole is believed to represent a relict population that has persisted at the Waccasassa Bay site after a long-term reduction in range. Woods et al. (1982) concluded that the salt marsh vole existed in low numbers under harsh ecological conditions and was vulnerable to natural storm events.

Reasons for Listing

The Florida salt marsh vole was listed on the basis of two primary concerns, an extremely limited range encompassing one known population, and the threat of losing this population to a storm or other event causing a population decline.

The vole is restricted to a single known site in the salt marsh of Waccasassa Bay, Levy County, Florida. Woods et al. (1982) were able to trap only 31 individuals; subsequent trapping efforts at the site located only one individual (Woods 1988). Trapping efforts for small rodents elsewhere in the coastal salt marshes of Citrus and Levy Counties have not yielded voles (Bentzien 1989). Additionally, recent (1996) trapping efforts yielded five voles (all male) from the type locality; no voles were captured at other sites supporting coastal salt marsh habitat dominated by *Distichlis* in Taylor, Dixie, and Levy Counties (T. Doonan pers. comm.).

This isolated population of voles is also vulnerable to storm or other events or from population fluctuations. In August of 1985, Hurricane Elena remained stationary off the coast of Waccasassa Bay for 24 hours, and may have accounted for the decline of the Florida salt marsh

vole observed between the 1981 (Woods et al.) and 1987 (Woods 1988) surveys. Another unnamed storm in March 1993 created extremely high tides and may have affected the number of voles captured in 1996. A single storm event could extirpate the only known population of the vole. The population may currently be at such a low level that little genetic diversity remains. Woods et al. (1982) found little genetic variability in 14 specimens of the Florida salt marsh vole.

The Levy County population appears to represent a small remnant of a formerly wide-ranging population (Woods et al. 1982). The decline of the species appears natural, due to climatic changes and an associated rise in sea level. Grassland prairie habitats, probably widespread on the much larger Pleistocene Florida peninsula that existed during low sea levels, have become woodland unsuited to meadow voles.

Conservation Measures

To date, conservation efforts for the Florida salt marsh vole, have consisted of periodic survey work and use of the provisions under Section 7 of the Endangered Species Act (Act), Section 404 of the Clean Water Act (CWA), and the Fish and Wildlife Coordination Act (FWCA).

The Florida salt marsh vole is protected as an endangered species under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The Act places an affirmative mandate on Federal agencies to carry out programs for the conservation of federally listed endangered and threatened species. Further, the Act requires all Federal agencies to ensure that their actions are not likely to jeopardize the continued existence of any federally listed endangered or threatened species. Federal agency actions that can directly or indirectly affect endangered or threatened species include any activity that is authorized, funded, or carried out by such agency. Compliance with these standards is ensured under Section 7 of the Act because agencies must consult with the Fish and Wildlife Service on actions that may affect listed species or critical habitat.

In addition to Section 7 consultations, protection and conservation of salt marsh habitat is provided by CWA and FWCA. The Fish and Wildlife Service and the U.S. Army Corps of Engineers review proposed dredge-and-fill activities and construction projects in waters of the United States where projects may affect the Florida salt marsh vole or its habitat. Since its listing (1991), there have been no proposed dredge-and-fill activities or construction projects in the vicinity of Florida salt marsh vole distribution.

Cooperative management opportunities for private landowners of suitable salt marsh habitat exist through the Fish and Wildlife Service's Partners for Wildlife program. The Partners program improves wildlife habitat on private lands through alliances between the Fish and Wildlife Service, other organizations, and individuals or corporations, while leaving the land in private ownership. The Fish and Wildlife Service is available to provide technical and funding assistance to landowners. Agreements between the Fish and Wildlife Service and a landowner remain in effect for a minimum of 10 years (Habitat Development Agreement), but can be modified or canceled at any time. Areas of suitable habitat on private lands that have not been surveyed may support populations of the Florida salt marsh vole. Thus, the Partners for Wildlife program may be beneficial to the recovery of this species.

II. RECOVERY

A. Recovery Objective and Criteria

The ultimate recovery objective for the Florida salt marsh vole is reclassification from endangered to threatened with eventual delisting. However, the immediate recovery objective for this subspecies is to prevent extinction by maintaining the existing population. Because of the limited information currently available, recovery criteria for the Florida salt marsh vole cannot be developed at this time, but will be determined at a later date.

B. Outline for Recovery Actions Addressing Threats

1. Protect existing population.

1.1 Encourage conservation of existing population on private land. The only known population of Florida salt marsh voles occurs on private land. Maintenance of this population is crucial to the existence of the species. Cooperative management opportunities with private landowners exist through the Fish and Wildlife Service's Partners for Wildlife program.

1.2 Conduct monitoring of the known population. Monitoring (trap and release) of the known population should be done annually or semi-annually (with written permission from landowners).

1.3 Acquire habitat. Acquisition of the only known site for the Florida salt marsh vole could be attempted through the State's Conservation And Recreational Lands (CARL) program. The U.S. Fish and Wildlife Service could possibly acquire the land as an addition to nearby Cedar Key National Wildlife Refuge.

2. Conduct surveys in suitable habitat.

2.1 Search for additional populations. Additional surveys should be conducted along the Gulf coast to locate any unknown populations of voles. Since most of the salt marsh accessible by land has already been surveyed, additional surveys should focus on areas accessible only by airboat or helicopter. Surveys should initially be conducted in the Waccasassa Bay area.

2.2 Search for suitable unoccupied habitat. Large tracts of publicly owned coastal marsh along the Gulf coast may contain suitable habitat for the Florida salt marsh vole. These areas should be surveyed for potential reintroduction sites.

3. Conduct life history studies. Very little is known about this population of voles. Information such as population demographics, habitat use, reproduction, diseases, etc. is necessary to determine recovery criteria for this subspecies. A radio-telemetry study designed to yield this type of information would be useful for management and future recovery efforts.

4. **Assess feasibility of captive breeding and reintroduction.** Given the high reproductive potential of *Microtus*, and the ease of maintaining them in captivity, captive breeding should be evaluated as a potential tool for recovery. Captive breeding should only take place if suitable, secure reintroduction sites exist. All captive breeding efforts must comply with current Fish and Wildlife Service policy and procedures.

5. **Determine recovery criteria.** Due to the lack of information on this subspecies, recovery criteria cannot be developed at this time. However, once recovery tasks are accomplished and additional data evaluated, the Fish and Wildlife Service should develop specific criteria to accomplish recovery objectives.

C. Literature Cited

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PART III. IMPLEMENTATION SCHEDULE

The Implementation Schedule that follows outlines actions and estimated costs for the recovery program. It is a guide for meeting the objective discussed in Part II of this Plan. This schedule indicates task priorities, task numbers, task descriptions, duration of tasks, the responsible agencies, and lastly, estimated costs. These actions, when accomplished, should bring about the recovery of the Florida salt marsh vole and protect its habitat. It should be noted that not all the estimated monetary needs for all parties involved in recovery are identified; and, therefore, Part III reflects only the estimated financial requirements for the recovery of this species.

While the U.S. Fish and Wildlife Service has no power to require other Federal and State agencies to carry out specific actions for endangered species recovery, we believe the designated agencies have the necessary authority to implement the identified tasks. The Implementation Schedule serves to alert those agencies to the need for these actions and to justify seeking funds to carry out the actions.

Priorities in Column 1 of the Implementation Schedule are assigned as follows:

Priority 1 An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.

Priority 2 An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.

Priority 3 All other actions necessary to provide for full recovery of the species.

NOTE: Each task in the Implementation Schedule is assigned a priority number. While the number reflects the importance of the activity, it does not mean that the highest-priority tasks will necessarily be accomplished first.

Abbreviations in the Implementation Schedule:

FDEP	Florida Department of Environmental Protection
FGFC	Florida Game and Fresh Water Fish Commission
FWS	U.S. Fish and Wildlife Service
BRD	U.S. Geological Service, Biological Resources Division (Formerly NBS)

IMPLEMENTATION SCHEDULE

Priority	Task Number	Task Description	Task Duration	*Responsible Agency*	*Cost estimates ($000)* FY 1	FY 2	FY 3	FY 4	FY 5	Comments
1	1.1	Encourage conservation of existing populations on private land.	ongoing	landowner/manager	2	2	2	2	2	
1	1.2	Population monitoring.	ongoing	FGFC, FWS, BRD, universities	5	5	5	5	5	
1	1.3	Habitat acquisition.	ongoing	FGFC, FDEP, FWS						Actual costs of acquiring land by purchase or protecting it through conservation easements is not included here.
2	2.1	Search for populations	2 years	FGFC, BRD, FDEP, FWS, universities	25	25				Will require the use of an airboat or helicopter.
2	2.2	Search for suitable habitat	2 years	FGFC, BRD, FDEP, FWS, universities		15	15			Will require the use of an airboat or helicopter.
2	3	Life history studies.	3 years	FGFC, BRD, universities			20	20	20	
3	4	Captive breeding	5 - 10 yrs.	FGFC, BRD, FWS, universities				20	15	
3	5	Determine recovery criteria	few months	FWS					N/A	Can only be accomplished after life history information becomes available.

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Names in **bold face** type denote those agencies/individuals who provided written comments on the draft version of this recovery plan.

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