

**Florida Salt Marsh Vole**  
*Microtus pennsylvanicus dukecampbelli*

Listing status: USFWS = Endangered  
FWC = Endangered

Trend: First documented during a small mammal study in 1980-81 in marsh east of Cedar Key. Thirty-one individuals were captured initially. Subsequent surveys in this location yielded one individual in 1987-88 and 5 individuals in 1996. No surveys have been conducted in this area since 1996. Surveys in other potential Florida salt marsh vole habitat in 1988-89 and 1996 were not successful. In 2004, Lower Suwannee National Wildlife Refuge (LSNWR) staff surveyed salt marsh north of Cedar Key in the Suwannee Sound area and captured 3 individuals. This is the only other documented location for Florida salt marsh vole. Subsequent surveys of potential habitat in 2006 were unsuccessful. Surveys at LSNWR in 2009 by the University of Florida Cooperative Fish and Wildlife Research Unit yielded 2 individuals on Long Cabbage Key.

Threats: The primary threats in the near-term to this species are the extremely limited known range and the vulnerability of the population to a storm-related high-water event (which may increase in frequency due to global climate change). A longer term threat is the potential for loss of habitat due to sea-level rise. Also the type locality remains in private ownership and is subject to development.

Notes: This subspecies is considered to be a relict population of a formerly wide-ranging population. When sea levels were lower, approximately 10,000 years ago, suitable habitat extended west of the current coastline of Florida and encompassed a much larger area.

Prioritization information:

PLCP PVA proportion of pops modeled to persist on public lands = 1.0

PLCP PVA probability of a 50% decline on public lands = 0.0

Millsap biological score = **34**

Millsap supplemental score = **17**

Legacy population trend = **Unknown**

Legacy population status = **Unknown**

Summary: This species triggers 4 of the prioritization parameters, and is considered to be a high priority species. While the PVA model did not indicate a high probability of decline, the model did not consider the possibility of a catastrophic event which is the primary threat to the species. The model also was based on assumptions of initial population size and distribution that exceeds the population size and distribution known from surveys. Further, the model is based on a potential habitat model that overestimates potential habitat. For these reasons, the result of the PVCA should be used with caution, maybe ignored. Due to the limited range of this species, it is a priority where it occurs.

Life History: Little is known about the life history of the Florida salt marsh vole. The meadow vole (*M. pennsylvanicus*) is well studied and some aspects of life history are likely similar to the Florida salt marsh vole. Voles are active day and night and feed on a variety of plant matter including grass, roots, and seeds. Golley (1962) reported that voles breed throughout the year with the peak of breeding activity in spring. Woods et al. (1982) reported breeding for Florida salt marsh voles in spring. Voles mature rapidly and breed at about 2 months of age. Gestation is 21 days and litters average 5 young. The life span of voles is short and typically does not exceed 6 months. Estimated average home range of the Florida salt marsh vole is 804 m<sup>2</sup> (Woods et al. 1983) while Harris (1953) reported an average home range of 1164 m<sup>2</sup> for *M. p. nigrans* in a Maryland salt marsh.

Preferred Habitat Parameters: The two locations where the Florida salt marsh vole has been captured are salt marshes dominated by saltgrass (*Distichlis spicata*) with smooth cordgrass (*Spartina alterniflora*) and glasswort (*Salicornia* spp.) also present. Both areas were near patches of black needlerush (*Juncus roemerianus*).

Minimum Habitat Requirement:

From PVA: Populations with at least 22 females.

From Literature: N/A

Best Management Practices: N/A

Monitoring Protocol: N/A

PVA Summary: The validity of the PVA is questionable due to several problems. First the potential habitat model is based on the broader salt marsh community not the saltgrass dominated areas and likely exaggerates the amount and connectivity of suitable habitat. The analysis also assumed no changes in habitat or catastrophic events. Given the very small known distribution of this species and the vulnerability to catastrophic storm events the model likely underestimates the risk of extinction for this species. Additionally, the species has only been documented at 2 locations and it is unlikely that all potential habitat is occupied as the model assumes. Further, the model was based on assumptions of initial population size and distribution that exceed the population size and distribution known from surveys. For these reasons, the PVA results should be used with caution, or ignored.

Root and Barnes (2007) developed the PVA analysis for Florida salt marsh vole under two statewide scenarios; one considerate of all potential habitat and one that only considered managed (i.e., public) lands. Based on the home range of 804 m<sup>2</sup> and an average distance between captures of 32 meters (Woods et al. 1982), an estimated average neighborhood size of 160 m<sup>2</sup> was used. The model with all potential habitat contained 33 populations, while the managed habitat model contained 31 populations.

Florida salt marsh voles do not have a long life expectancy; therefore survival and fecundity parameters were created using 2 stages; juveniles and adults. Reported estimates of survival for female *M. pennsylvanicus* (Coffman et al. 2001) are 64% in a 2-month period and 49% in juveniles. Fecundity was assumed to be similar with an average of 5 young per litter. These parameters produced a model with a population growth rate of 1.0656.

Probability of extinction over 100 years was zero under both scenarios and there was little chance of decline. Sensitivity analysis indicated that adult survival was the most influential parameter on population growth.

2003 Landcover used for model:

Salt Marsh

FNAI Natural Communities used:

Tidal Marsh

FNAI field guide description of habitat: Poorly known, but apparently uses saltgrass meadows adjacent to black needlerush and may avoid areas with smooth cordgrass.

Important Links:

FNAI field guide species account:

[http://www.fnai.org/FieldGuide/pdf/Microtus\\_pennsylvanicus\\_dukecampbelli.PDF](http://www.fnai.org/FieldGuide/pdf/Microtus_pennsylvanicus_dukecampbelli.PDF)

USFWS species recovery plan:

[http://ecos.fws.gov/docs/recovery\\_plan/970930d.pdf](http://ecos.fws.gov/docs/recovery_plan/970930d.pdf)

USFWS 2007 5-year review for the species:

[http://ecos.fws.gov/docs/five\\_year\\_review/doc1915.pdf](http://ecos.fws.gov/docs/five_year_review/doc1915.pdf)

Pertinent Documents/Literature:

Coffman, C. J., J. D. Nichols, and K. H. Pollock. 2001. Population dynamics of *Microtus pennsylvanicus* in corridor-linked patches. *Oikos* 93:3-21.

Golley, F.B. 1962. Mammals of Georgia. Univ. of Georgia Press, Athens. 218 pp.

Harris, Van T., 1953. Ecological Relationships of Meadow Voles and Rice Rats in Tidal Marshes. *Journal of Mammalogy* 34: 479-487.

Reich, L. M. 1981. *Microtus pennsylvanicus*. *Mammalian Species* 159:1-8.

Woods, C. A., W. Post, and C. W. Kirkpatrick. 1982. *Microtus pennsylvanicus* (Rodentia:Muridae) in Florida: A Pleistocene relict in a coastal saltmarsh. *Bull. Florida State Museum., Biol. Sci.* 28(2):25-52.

Woods, C. A. 1992. Florida salt marsh vole. Pp. 131-139 in Rare and endangered biota of Florida. Vol. 1. Mammals (S.R. Humphrey, ed.). University Press of Florida, Gainesville, FL.

Note: due to this species requiring specific marsh conditions that cannot be easily modeled, this model overestimates the amount of potential habitat.