

## Meadow Vole

### *Microtus pennsylvanicus*

Contributors (2005): Travis Perry (Furman University) and Mary Bunch (SCDNR)

Reviewed and Edited (2012): Steve Fields (Culture and Heritage Museums)

#### DESCRIPTION

##### Taxonomy and Basic Description

The meadow vole was originally described by George Ord in 1815 (*in* Guthrie 1815) from specimens collected “in meadows below Philadelphia” and was named *Microtus pennsylvanicus* (Wilson and Reeder 1993).

The meadow vole is a small to medium sized rodent and is characterized by relatively small eyes, inconspicuous ears and a short tail. Meadow voles range in total length from 140 to 196 mm (5.5 to 7.7 in.) and in weight from 33 to 65 g (1.2 to 2.3 oz.) (Hall 1981; Tamarin 1999). The pelage is dark brown above and silvery gray beneath (Brown 1997). Meadow voles are best distinguished from South Carolina’s other vole species, the pine or woodland vole (*Microtus pinetorum*), by 4 characteristics: (1) pine vole tails are barely longer than the hind foot whereas meadow vole tails are 2 to 3 times the length of the hind foot; (2) pine voles have elongate fore-claws relative to meadow voles; (3) pine voles (25 to 33 g; 0.88 to 1.16 oz.) are typically much smaller than meadow voles; and (4) the second upper molar in pine voles has four dentine islands; there are five to six dentine islands in the meadow vole.

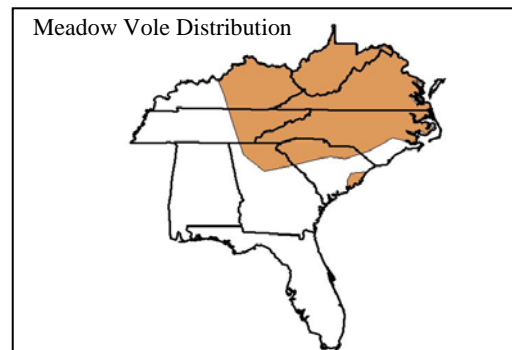


##### Status

The meadow vole is a globally secure species; however, the IUCN states that at least five of 26 subspecies are of conservation concern (MacDonald et al. 1998). The status of the subspecies found in South Carolina, *Microtus pennsylvanicus pennsylvanicus* is currently unknown but appears to be secure and is at the edge of its geographic range. An apparent isolated population of meadow voles in the Charleston area may be of particular concern. In Georgia, the species is vulnerable (S3) while in North Carolina it is considered secure (S5) (NatureServe 2013).

##### POPULATION SIZE AND DISTRIBUTION

Meadow voles purportedly range throughout the upper piedmont of South Carolina with an isolated population(s) in Charleston (Sanders 1978) and southern Georgetown County. Meadow vole populations fluctuate, sometimes dramatically from several to several hundred per hectare, within a period of 2 to 5 years (Krebs and Myers 1974).



## HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Meadow voles depend on grassland habitat. Apparently, density and height of grass cover are more important than food quality in determining the suitability of habitats in maintaining high, stable vole populations. In a 25-year study, Getz et al. (2001) found that meadow vole populations exhibited the highest densities and lowest fluctuations in tall grass prairie habitats as compared to bluegrass and alfalfa habitats, which had successively lower cover and increased food quality.

Meadow voles coexist with numerous other small mammal species. In the southern Appalachians, meadow voles generally coexist with star-nosed moles (*Condylura cristata*), southern bog lemmings (*Synaptomys cooperi*), and meadow jumping mice (*Zapus hudsonius*). However, there is some evidence to suggest that meadow voles avoid areas where short-tailed shrews (*Blarina brevicauda*) are present (Fulk 1972), and previous studies indicate that there may be competitive avoidance between meadow voles and other vole species (Klatt 1986 and Blatzi et al. 1999). Evidence of this phenomenon has not been investigated in South Carolina meadow and woodland voles.

## CHALLENGES

The major challenge to meadow vole populations is most likely habitat loss. Dense grassland habitats are lost through at least three mechanisms: agricultural development via cultivation or grazing, urban development, and the natural process of community succession whereby fields and meadows revert to pine or hardwood forest in the absence of disturbances such as fire. An additional problem may be displacement of native grasses by those favored for livestock production.

## CONSERVATION ACCOMPLISHMENTS

To date, very little work has been done on the status or management of the meadow vole in South Carolina. However, from 2001 to 2003, researchers at Furman University worked closely with SCDNR biologists to assess the effects of vegetation type, fire and mowing on meadow vole populations in an old field on the Bunched Arrowhead Heritage Preserve in Greenville County. The results of these studies indicated that mowing is the preferred means of maintaining early successional habitats as voles moved back into mowed habitats sooner than burned habitats. Further, meadow voles preferred dense stands of planted switchgrass (*Panicum virgatum*) to naturally regenerated stands of broomsedge (*Andropogon virginicus*) and blackberry briar (*Rubus* spp.) or planted stands of deer tongue (*Panicum clandestinum*).

## CONSERVATION RECOMMENDATIONS

- Conduct a multi-year live-trapping survey of suitable habitats throughout the historical range. As meadow vole populations are known to fluctuate dramatically within periods of two to five years, areas will need to be surveyed over successive years to ensure that populations cycling through low density are not overlooked. Use Sherman live traps to survey known populations and suitable habitats annually during mid to late summer when

densities should be highest. A standard trapping protocol should be used to enable reliable comparisons across years and sites. A trap density of 50 per 1/20 hectare (0.5 acre) in a grid formation should be sufficient.

- Investigate the apparently disjunct populations in the Charleston area with molecular techniques to determine if this isolate is unique and deserving of more serious independent conservation concern.
- Consider purchase of lands where meadow voles are documented on large areas of pasture or old-field habitat that can be easily maintained in an early succession grassland community.
- To the extent feasible, plant switchgrass (*P. virgatum*) and other tall, dense, native grassland species in open areas on existing SCDNR lands and mow on a two-year cycle to ensure tall dense stands and prevent conversion of grassland areas to brush and woodland.
- Partner with local colleges to complete initial survey work for meadow voles through educational field exercises.

## MEASURES OF SUCCESS

Surveys and monitoring will allow the re-evaluation of the status of the species in South Carolina. The molecular study of the coastal versus piedmont animals will allow researchers to discern the appropriate taxonomic designation of the coastal animals.

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