

Final Report

A Field Survey of Microtus chrotorrhinus

in St. Louis County, Minnesota

Summer, 1982

Submitted to:

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February 10, 1982

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IN ST. LOUIS COUNTY, MINNESOTA

Introduction

The range of Microtus chrotorrhinus, the yellow-nosed vole or rock vole, extends from Ontario and northern Minnesota east to the Atlantic coast and from Nova Scotia, south through the Appalachian Mountains. The habitat of this species appears to be restricted to isolated pockets within this broad distribution. These "islands" are characterized by moss/lichen covered boulders, partially open canopy of predominantly black spruce (Picea mariana) and a great variety of forbs which almost always includes two species: bunchberry (Cornus canadensis) and blueberry (Viburnum spp.).

Until recently, few studies have dealt with the distribution or habitat preferences of the species. In Minnesota, studies in the past three years have documented 59 new sites and attempted to characterize various habitat parameters (Daniels, 1980; 1981; Christian and Daniels, 1982; Christian, 1982). All new sites were located in Cook County, Minnesota, the most northeastern county in the state. The only specimen trapped in Minnesota, outside Cook Co., was taken in St. Louis Co. by Vernon Bailey in 1921 (Handley, 1954; Swanson, 1945). This site is approximately 60 miles west of the next closest documented site. Several investigators in recent years have attempted to locate this colony without success. In addition to the fact that Bailey's field notes are not precise enough to indicate the exact location of this site, significant development in the area has occurred, eliminating all possibilities of locating the

original site. Successional changes following logging of the early 1900's and a dramatic increase in recreational use has also had considerable effect on the area. Today logging is again altering habitat in this area. It is unclear what effect such disturbances have on rock vole populations.

The objective of this study was to locate several areas whose habitat suggests the presence of rock voles. Two or more of these sites would then be trapped to determine whether populations of rock voles exist at these sites and to what extent.

Methods and Materials

With the help of the soil scientist and wildlife biologists at the U.S. Forest Service Kawishiwi District Office in Ely, Minnesota, several areas were chosen for consideration as study sites. Topographic maps, aerial photos, and results from earlier habitat and distribution studies, were used to determine areas of possible interest. Final selection of two sites was based on suitability of habitat and accessibility. Grids were constructed to follow the size and shape of the boulder field at each site. Trap stations were marked at 8 m. intervals. Site "A" consisted of 45 stations: 3 rows, roughly parallel to the road, with 15 stations in each row. Rows were approximately 8 m. apart, the last row being slightly less, as it followed the perimeter of the stream/marsh edge. Site "B" consisted of 8 rows parallel to the road, each with 6 trap stations, for a total of 48 trap stations. One folding, aluminum Sherman live trap was placed within 1 m. of each station marker, near a runway entrance, fallen log, stump, etc. Traps were baited and set the evening of the first day and checked, baited and reset each morning and afternoon for three days. Species and trap station code was recorded for each animal captured. Each specimen was

subsequently released at the appropriate station marker. Vegetation and physical characteristics (presence of boulders and water, slope, etc.) were recorded. Photos of the area were taken for a permanent record of each site.

Study Areas

Site A

This site was located on the west side of St. Louis Co. Rd. 21, south of Ely. Legal description: SE $\frac{1}{4}$, SE $\frac{1}{4}$, SE $\frac{1}{4}$, S 19, T. 62N, R. 12W. A partially open canopy consisted of jack pine (Pinus banksiana), black spruce, and quaking aspen (Populus tremuloides). The shrub layer was mostly open with some hazelnut (Corylus cornuta), willow (Populus sp.), and small spruce. Herbaceous ground cover consisted of: violets (Viola sp.), raspberry (Rubus sp.), bunchberry, twinflower (Linnaea borealis), labrador tea (Ledum groenlandicum), blueberry, wild sarsaparilla (Aralia nudicaulis), wild rose (Rosa acicularis), grasses and sedges, wild lily-of-the-valley (Maianthemum canadense), wood horsetail (Equisetum sp.), ferns, currants (Ribes spp.), mushrooms, starflower (Trientalis borealis), large leaf aster (Aster macrophyllus), bush honeysuckle (Diervilla lonicera), club moss (Lycopodium spp.), bugleweed (Lycopus sp.), and woodbine (Parthenocissus inserta). The ground was covered with moss, lichen and some leaf litter. Soil development in this area was patchy. Boulders formed the basic substrate at this site and varied from 6 inches to 4 feet in diameter. Several fallen trees were scattered on the forest floor. This site was adjacent to Johnson Creek and was characterized by standing water between many of the rock crevasses.

Site B

Site "B" was located on the east side of Co. Rd. 21, approximately 2 3/4 mi. south of Site "A". This site was on F.S. property in a marshy area between Bear Island River and Canary Lake. Legal description: NE ¼, NW ¼, S. 7, T. 61N, R. 12W. This site was characterized by a partially open canopy of red pine (Pinus resinosa), balsam fir (Abies balsamea), black spruce, paper birch (Betula papyrifera), and aspen. The shrub layer was sparse and consisted of: hazelnut, juneberries (Amelanchier sp.), mountain maple (Acer spicatum), willow, small fir, small spruce and mountain ash (Sorbus sp.). The ground vegetation was dense, and included: wild lily-of-the-valley, labrador tea, blueberry, ferns, including bracken fern (Pteridium aquilinum), bunchberry, twinflower, fireweed (Epilobium angustifolium), violets, large leaf aster, currants, raspberry, Spirea alba, grasses and sedges, clintonia (Clintonia borealis), and wintergreen (Gaultheria procumbens). In addition, a layer of moss/lichen covered most of the forest floor. Many scattered logs lay fallen and rotting. Some leaf litter had accumulated, of which pine needles represented a considerable proportion. The majority of this site was somewhat dry, as indicated by the vegetation. Rows furthest from the road however were very wet with standing water present and characterized primarily by grasses and sedges.

In Addition

The following locations were also determined to be possible areas of suitable habitat. However, due to inaccessibility, lack of time and/or funds, these sites were not trapped:

S ½, S ½, S. 29, T. 62N, R. 12W (Private Property)

S ½, S. 21, T. 62N, R. 12W

E ½, S.15, T. 62N, R. 12W

SE ½, SW ¼, S. 10, T. 63N, R. 12W

Results and Discussion

The results (Table, page 6) show that M. chrotorrhinus was not present at either site, though trapping success was quite high (37% and 22% respectively). The animals that were captured represent species most often associated with rock voles. Proportions of those species associated with rock voles, varies widely, particularly those of C. gapperi and P. m. gracilus. The figures represented in the Table are well within the range found in other studies (Daniels, 1980; Daniels, 1981; Kirkland, 1977; Kirkland and Knipe, 1979; Martell and Radvanyi, 1977; Timm, 1974; Timm, 1975; Timm, Heaney and Baird, 1977.).

Similarity in habitat of the sites studied to those in Cook Co. where rock voles are found, is noteworthy. Similarities include the presence of boulders, standing water, and vegetation. Most notable in terms of vegetation are black spruce, bunchberry, blueberry and dense moss/lichen cover associated with all known rock vole colonies.

There are several possible explanations for the absence of rock voles at these sites. (1) Local extinction due to habitat disturbance. County Road 21 is a well maintained and heavily traveled road. Salt and sand applied during winter months and frequent asphalt repairwork may make these sites unsuitable. (2) Though rock vole populations were high in Cook Co. during this same period, considerable climatic differences occur between these two areas due to the effect of Lake Superior. Weather conditions, an important influence on survivorship and reproduction in voles, may have kept populations low in this area. (3) Though several habitat components appear to be the same at both the Cook Co. and St. Louis Co. sites, the St. Louis County sites may be unsuitable for reasons not yet identified.

Table. Results of live trapping over 3-day trap period in St. Louis County, MN.

Site A

135 Total Trap-nights

<u>Species</u>	<u>Number</u>	<u>Proportion</u>
<u>Microtus chrotorrhinus</u>	0	(0.0)
<u>Clethrionomys gapperi</u>	25	(.83)
<u>Peromyscus maniculatus gracilis</u>	1	(.03)
<u>Eutamias minimus</u>	0	(0.0)
<u>Tamiasciurus hudsonicus</u>	0	(0.0)
<u>Sorex cinereus</u>	3	(.10)
<u>Blarina brevicauda</u>	<u>1</u>	(.03)
	30	

Site B

142 total trap-nights

<u>Species</u>	<u>Number</u>	<u>Proportion</u>
<u>M. Chrotorrhinus</u>	0	(0.0)
<u>C. gapperi</u>	35	(.83)
<u>P. m. gracilus</u>	3	(.03)
<u>E. minimus</u>	5	(.10)
<u>T. hudsonicus</u>	8	(.15)
<u>S. cinereus</u>	1	(.02)
<u>B. brevicauda</u>	<u>0</u>	(0.0)
	52	

(4) Differences in trapping methodology (use of live traps versus snap-traps).

Further work in this area needs to be done to determine the extent of rock vole populations in N.E. Minnesota and throughout their range. The Ely area of northern St. Louis Co., is an area of increasing recreational use and protection and/or management of land for this species may be necessary. In addition, it may be desirable to attempt to re-introduce this species to (a) re-establish colonies in this area and (b) learn more about the extent to which specific habitat parameters and habitat disturbances influence the colonization of this species.

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