

Prairie Voles on Wildlife Management Areas
in Polk County, Minnesota

by Kelly Wolfe
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The purpose of this study was to determine whether prairie voles inhabit selected Wildlife Management Areas in Polk County. Small mammals were collected with mouse-traps on five areas during the summer of 1988. Prairie voles were found on the Tympanuchus Wildlife Management Area, but the others, with similar prairie habitat, were discovered to only contain meadow voles.

INTRODUCTION

The prairie vole (Microtus ochrogaster) is listed as an animal of Special Concern in Minnesota. In the book "Mammals of Minnesota" by Evan B. Hazard (1982), at least one specimen of this prairie species was found in Polk County. According to Hazard, "Microtus ochrogaster is typically found in grassy and treeless locations. In regions where Microtus pennsylvanicus is absent, the prairie vole may occupy a variety of open habitats, but in the Upper Midwest it is largely restricted to grasslands that are relatively dry and relatively undisturbed. Consequently, it is rare, and may be absent today from areas for which there are earlier valid locality records. Areas maintained as pasture and meadow are commonly preempted by the meadow vole." In a 1978 study by Stephen R. Pugh on the Pembina Trail Preserve and on the Crookston Cattle Company no prairie voles were found. There have been very few studies of the prairie vole in Minnesota.

The primary objective of this study was to determine if prairie voles inhabit Polk County's prairie Wildlife Management Areas (WMAs) and, if so, to compare populations of prairie voles on grasslands that have been burned at various times in recent years.

A secondary objective was to determine what other small mammals inhabit the grasslands.

MATERIALS AND METHODS

The field work for this project was completed during July and August, 1988. (See Table 1, pages 8 and 9.) Small mammal populations were sampled on five WMAs. (See maps pages 12 - 17.)

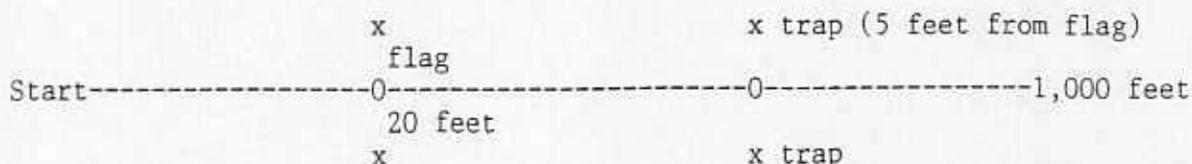
Stipa	3	sampling locations
Tympanuchus	5	
Chicog	6	
Dugdale	3	
Burnham	<u>3</u>	

20

A total of 20 sampling locations were trapped.

At each sampling location traplines were set in the following manner: 100 traps were set in a double line. Trap sites were approximately 20 feet apart and marked with a flag. At each flag two traps were set approximately

five feet from each side of the flag. (See diagram below.)



I used 220 Museum Special mousetraps, which are larger than conventional mousetraps and don't damage the mouse skulls. I also used about 100 conventional mousetraps.

Traps were baited with peanut butter, checked daily, mammals removed, and traps rebaited as needed. Traps were set late one afternoon, then checked and reset early the next morning. The following morning they were checked and picked up. I attempted to pick three-day periods when no precipitation was predicted. A total of 3,968 trap nights were tabulated.

Sampling locations on each WMA were determined in consultation with the local wildlife manager. In the beginning, many trap sites were set on dry, sparsely vegetated ridges (which are thought to be prairie vole habitat), but due to the drought this proved unproductive. I experimented with ridges, middle, and low ground locations in open, treeless habitat.

When working in the field, this project was supervised by myself, with guidance from the area wildlife manager. I usually had one or two 4-H members assisting. A total of seven 4-Hers assisted at various times during the course of the study.

Trapped mammals were identified in the field and then frozen for further study. When later studied, mammals that were not voles were measured and sexed for personal records and then discarded. Since meadow voles and prairie voles are quite similar in appearance, tooth formations were used to positively identify them. The 53 vole carcasses were placed in Dr. Robert Seabloom's dermested beetle colony at UND for about two months. Then I boiled the skulls to further clean them and looked at the upper teeth through a microscope for positive identification. Using diagrams in the book "The Mammals of Minnesota" by Gunderson and Beer (1953) made identification fairly simple. (See diagram, page 11,) Dr. Seabloom verified the identifications. A number of prairie vole and meadow vole skulls have been preserved.

RESULTS

A total of 122 small mammals were caught on the five WMAs studied. These included 17 prairie voles, 36 meadow voles, 37 prairie deer mice (*Peromyscus maniculatus bairdii*), 21 masked shrews (*Sorex cinereus*), 1 short-tailed shrew (*Blarina brevicauda*), 8 thirteen-lined ground squirrels (*Citellus tridecemlineatus*), 1 woodland deer mouse (*Peromyscus maniculatus gracilis*), and 1 meadow jumping mouse (*Zapus hudsonius*). (See table 2, page 10.)

The total catch per day and WMA was quite variable. Small mammal numbers appeared to be down in 1988 because of the drought. Few specimens were caught on dry, open ridges where prairie voles were expected to be. On high ground, there simply were not any grass seeds for food and even at night the ridges remained very warm and dry.

The study was successful because prairie voles were found on Polk County prairie WMAs, although only on the Tympanuchus, and only on three of the five areas that were sampled.

The Tympanuchus unit has the largest expanse of open grass with a good mix of ridges and upland prairie areas. The Chicog unit is also a large expanse of prairie, but contains more brush and timber. The Dugdale unit is a somewhat smaller expanse of land containing upland prairie. Prairie voles might be expected here, though it is interspersed with brush, marsh, and trees. The Burnham unit is a smaller prairie tract containing much sedge and brush interspersed throughout. The Stipa unit is a small prairie tract that was heavily grazed before becoming a WMA.

Each of the WMAs has been burned within the past few years. Since no prairie voles were found on the Chicog, Dugdale, Burnham, or Stipa units, the burn histories for these units will not be discussed in this paper.

Part of the Tympanuchus was last burned on May 19, 1986. The west one-half of Section 28 was prescribed burned. This includes some of the prairie vole habitat. On April 18, 1985 a wild fire burned most of the WMA, including all of the identified prairie vole habitat. On April 23, 1983 the south end of the WMA was prescribed burned. This was the west part of Section 33 that is owned by the Department of Natural Resources. Judging by the number of small mammals trapped, even during a drought year, it is a safe assumption to say that fires have not hurt the prairie vole population. Fires have probably helped the prairie vole population by keeping their habitat open.

For purposes of prescribed burning the DNR maintains a firebreak between sections 28 and 33. Plans call for only the north or south side to be burned at one time. Prairie voles are found on both sides of the firebreak so prescribed burns should not negatively affect prairie voles by temporarily eliminating all grassy cover.

DISCUSSION

It is reassuring to know that prairie voles are found in Polk County, although a little disheartening to see the small area they are in. At least one colony appears to be thriving on the Tympanuchus WMA.

The key to survival of the prairie vole and other species like it is that prairie habitat remain and not be plowed under or developed. The common meadow vole tends to edge out prairie voles on land that has been altered by man. We must leave this prairie on the Tympanuchus WMA relatively undisturbed.

I recommend that conservation practices on the five WMAs continue as they are. The Tympanuchus area is currently carefully managed for other prairie species, such as the greater prairie chicken (Tympanuchus cupido), and it appears that this management is successful.

Perhaps within the next few years, preferably during a wet or average precipitation year, another study of small mammal populations in Polk County - or at least the Tympanuchus WMA - could be undertaken to get a more accurate picture of the number of prairie voles in Polk County.

ACKNOWLEDGEMENTS

I would like to thank the following people:

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Thief Lake WMA personnel for use of the Museum Special mousetraps.

I would especially like to thank the Minnesota Nongame Wildlife Program for funding, suggestions, equipment, and simply making this project possible.

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1. Gunderson, H.L. and J.R. Beer. 1953. The Mammals of Minnesota. University of Minnesota Press. 190 Pages.
2. Hazard, E.B.. 1982. The Mammals of Minnesota. University of Minnesota Press. 280 Pages.
3. Pugh, S.R.. 1980. A Comparison of Small Mammal Populations in Grazed and Ungrazed Grassland Areas of the Aspen Parkland of Northwestern Minnesota. M.S. Thesis. University of North Dakota. 92 Pages.

TABLE 1 - Field Work

<u>Date</u>	<u>WMA</u>	<u>Field Work</u>
7-14-88	Stipa WMA	Set Line 1 (100 traps)
7-15-88	Stipa	Checked Line 1, Caught: 1 thirteen-lined ground squirrel (g.s.) Set Line 2 (100 traps)
7-16-88	Stipa	Checked Line 1, Caught: 1 meadow vole (m.v.) (#1), 1 masked shrew (m.s.), 1 g.s.
	Stipa	Moved 1st 100 traps (became Line 3)
7-17-88	Stipa	Pulled Line 2, Caught: 2 m.s., 1 g.s. Pulled Line 3, Caught: 1 m.v. (#2), 1 m.s.
7-25-88	Tympanuchus WMA	Set Lines 1, 2, and 3 (300 traps)
7-26-88	Tympanuchus	Checked Line 1, Caught: 1 m.v. (#3) Checked Line 2, Caught: 2 prairie deer mice (p.d.m.) Checked Line 3, Caught: 1 m.v. (#4), 6 prairie voles (p.v.) (#5,6,7,8,9,10)
7-27-88	Tympanuchus	Pulled Line 1, Caught: 1 m.s., 1 p.d.m. Pulled Line 2, Caught: 3 m.v. (#11,12,13), 1 g.s. Pulled Line 3, Caught: 7 p.v., 2 m.v. (#14,15,16,17,18,19,20,21,22)
7-31-88	Chicog WMA	Set Lines 1, 2, 3 (300 traps), and 4 (68 traps)
8- 1-88	Chicog	Checked Line 1&2, Caught: 1 m.v. (#23)
8- 2-88	Chicog	Checked Line 1&2, Caught: 2 m.v. (#24,25), 1 m.s., 1 p.d.m., 1 jumping mouse (j.m.) Checked Line 3, Caught: 3 p.d.m.
8- 3-88	Chicog	Pulled Line 1&2, Caught: 2 m.v. (#26,27), 1 p.d.m. Pulled Line 3, Caught: 5 p.d.m. Pulled Line 4, Caught: 1 m.v. (#28), 1 p.d.m.
	Chicog	Set Lines 5 and 6 (200 traps)
8- 4-88	Chicog	Checked Line 5, Caught: 1 m.s., 2 p.d.m. Checked Line 6, Caught: 2 m.v. (#29,30)
8- 5-88	Chicog	Pulled Line 5, Caught: 1 m.v. (#31), 1 m.s. Pulled Line 6, Caught: 2 m.s., 1 short-tailed shrew (s.t.s.)
8-12-88	Tympanuchus WMA	Set Lines 4 and 5 (200 traps)

TABLE 1 (cont'd.)

8-13-88	Tympanuchus	Checked Line 4, Caught: 1 m.v. (#32), 1 p.d.m. Checked Line 5, Caught: 2 m.v. (#33,34), 1 m.s., 1 p.d.m.
8-14-88	Tympanuchus	Pulled Line 4, Caught: 2 p.v., 2 m.v. (#35,36,37,38), 1 m.s. Pulled Line 5, Caught: 2 p.v., 5 m.v. (#39,40,41,42,43,44,45)
8-19-88	Dugdale WMA	Set Lines 1, 2, and 3 (300 traps)
8-20-88	Dugdale	Checked Line 1, Caught: 1 p.d.m. Checked Line 2, Caught: 2 m.v. (#46,47), 3 p.d.m. Checked Line 3, Caught: nothing
8-21-88	Dugdale	Pulled Line 1, Caught: 1 m.s., 2 p.d.m. Pulled Line 2, Caught: 3 p.d.m. Pulled Line 3, Caught: 3 m.v. (#48,49,50), 1 m.s., 3 p.d.m., 1 g.s.
	Burnham WMA	Set Lines 1, 2, and 3 (300 traps)
8-22-88	Burnham	Checked Line 1&2, Caught: 3 m.v. (#51,52,53), 2 m.s., 7 p.d.m., 1 woodland deer mouse Checked Line 3, Caught: 1 m.s.
8-23-88	Burnham	Pulled Line 1&2, Caught: 3 m.s. Pulled Line 3, Caught: 1 m.s.

*Each prairie and meadow vole is numbered for skull identification purposes.

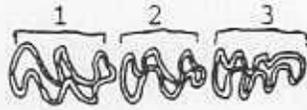
Key to abbreviations:

- g.s. - Thirteen-lined Ground Squirrel (Citellus tridecemlineatus)
- m.v. - Meadow Vole (Microtus pennsylvanicus)
- m.s. - Masked Shrew (Sorex cinereus)
- p.d.m. - Prairie Deer Mouse (Peromyscus maniculatus bairdii)
- p.v. - Prairie Vole (Microtus ochrogaster)
- j.m. - Meadow Jumping Mouse (Zapus hudsonius)
- s.t.s. - Short-tailed Shrew (Blarina brevicauda)
- w.d.m. - Woodland Deer Mouse (Peromyscus maniculatus gracilis)

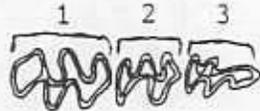
TABLE 2 - Wildlife Management Areas Sampled and Animals Caught

WMA	Trap Nights Completed	Voles	Deer Mice	Shrews	Others	Total Catch
Stipa	500	2 meadow	-----	4 masked	6 thirteen-lined ground squirrels	12
Tympanuchus	1,000	17 prairie 17 meadow	5 prairie	3 masked	1 thirteen-lined ground squirrel	43
Chicog	1,268	9 meadow	13 prairie	5 masked 1 short-tailed	1 meadow jumping mouse	29
Dugdale	600	5 meadow	12 prairie	2 masked	1 thirteen-lined ground squirrel	20
Burnham	600	3 meadow	7 prairie 1 woodland	7 masked	-----	18
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TOTALS	3,968	17 prairie 36 meadow	37 prairie 1 woodland	21 masked 1 short-tailed	8 thirteen-lined ground squirrels 1 meadow jumping mouse	122

DIAGRAM 1 - Upper Molar Series of the
Prairie Vole and Meadow Vole



Meadow vole -
3rd molar has 3 loops on the
top and 4 on the bottom.



Prairie vole -
3rd molar has 2 loops on the
top and 3 on the bottom.

Stipa WMA

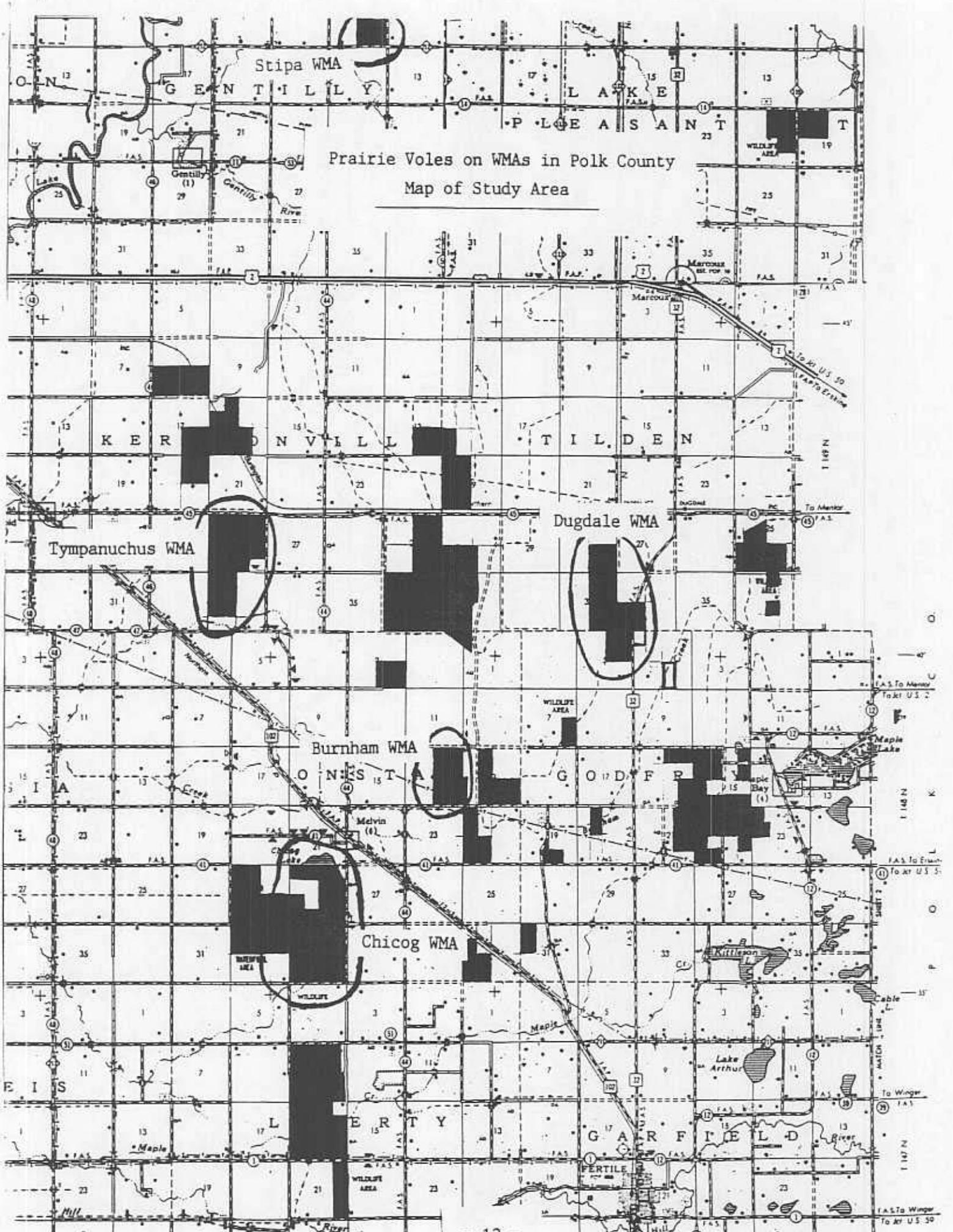
GENTILLY

LAKE

PLEASANT

Prairie Voles on WMAs in Polk County

Map of Study Area



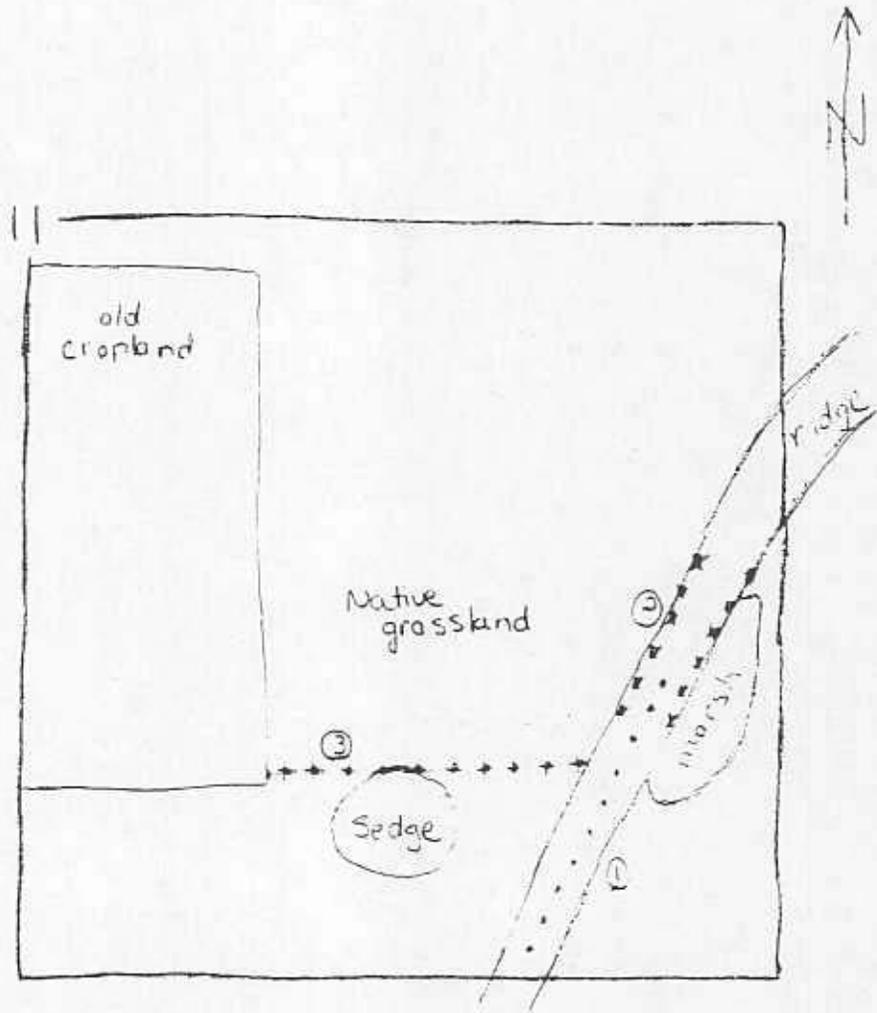
Tympanuchus WMA

Dugdale WMA

Burnham WMA

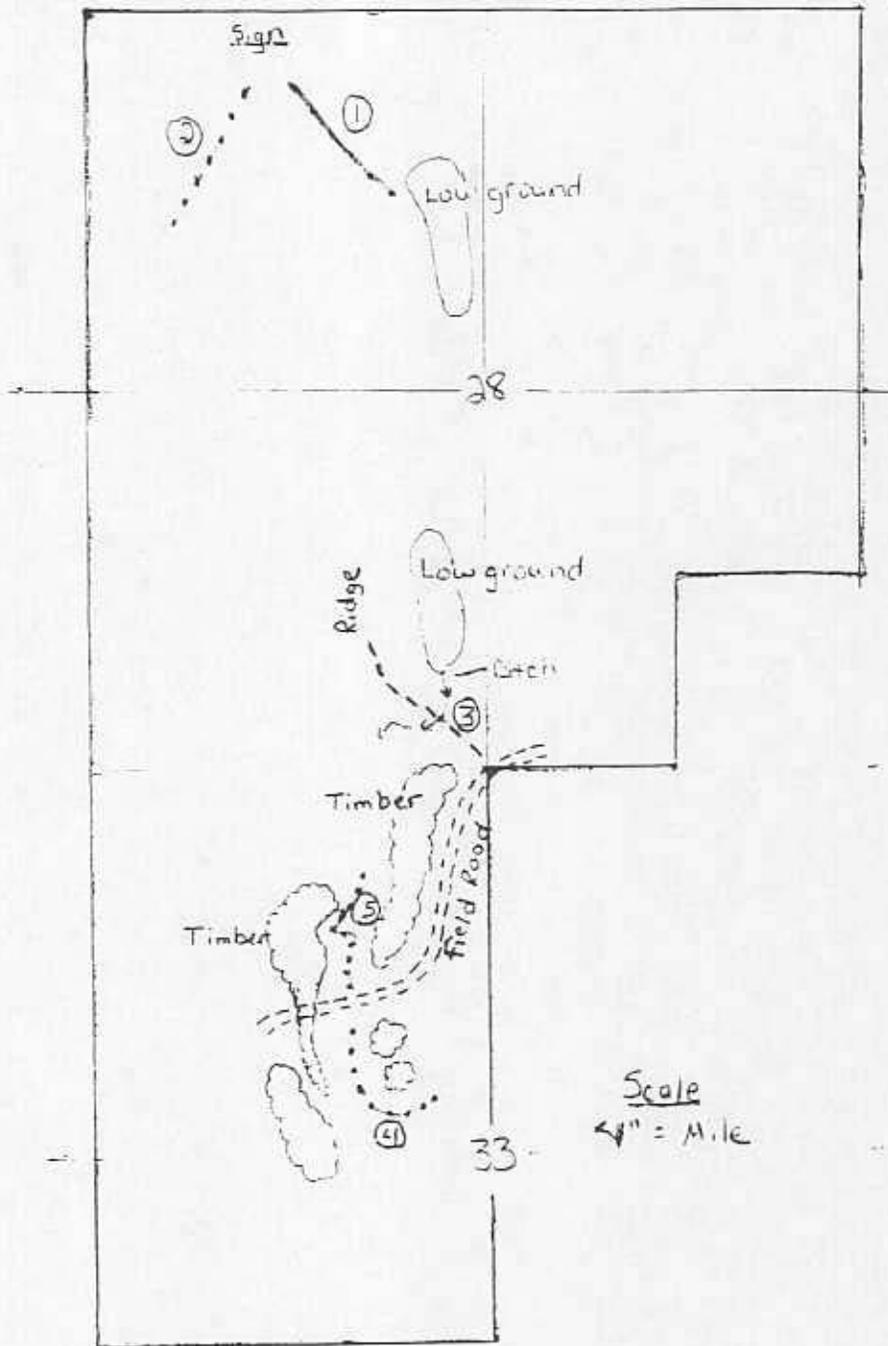
Chicog WMA

Stipa WMA

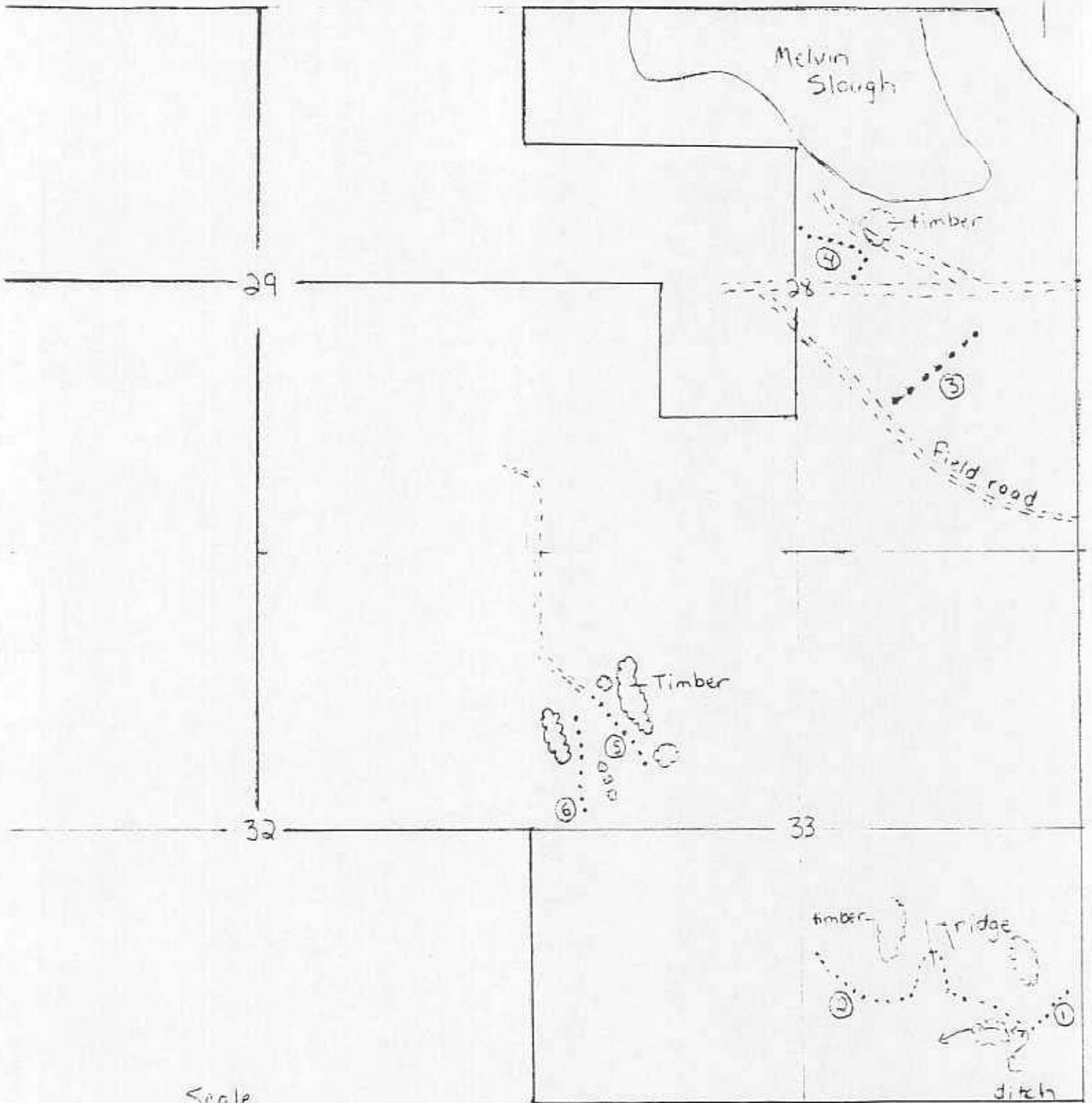


Scale
3" = 1 Mile

Tympanuchus WMA

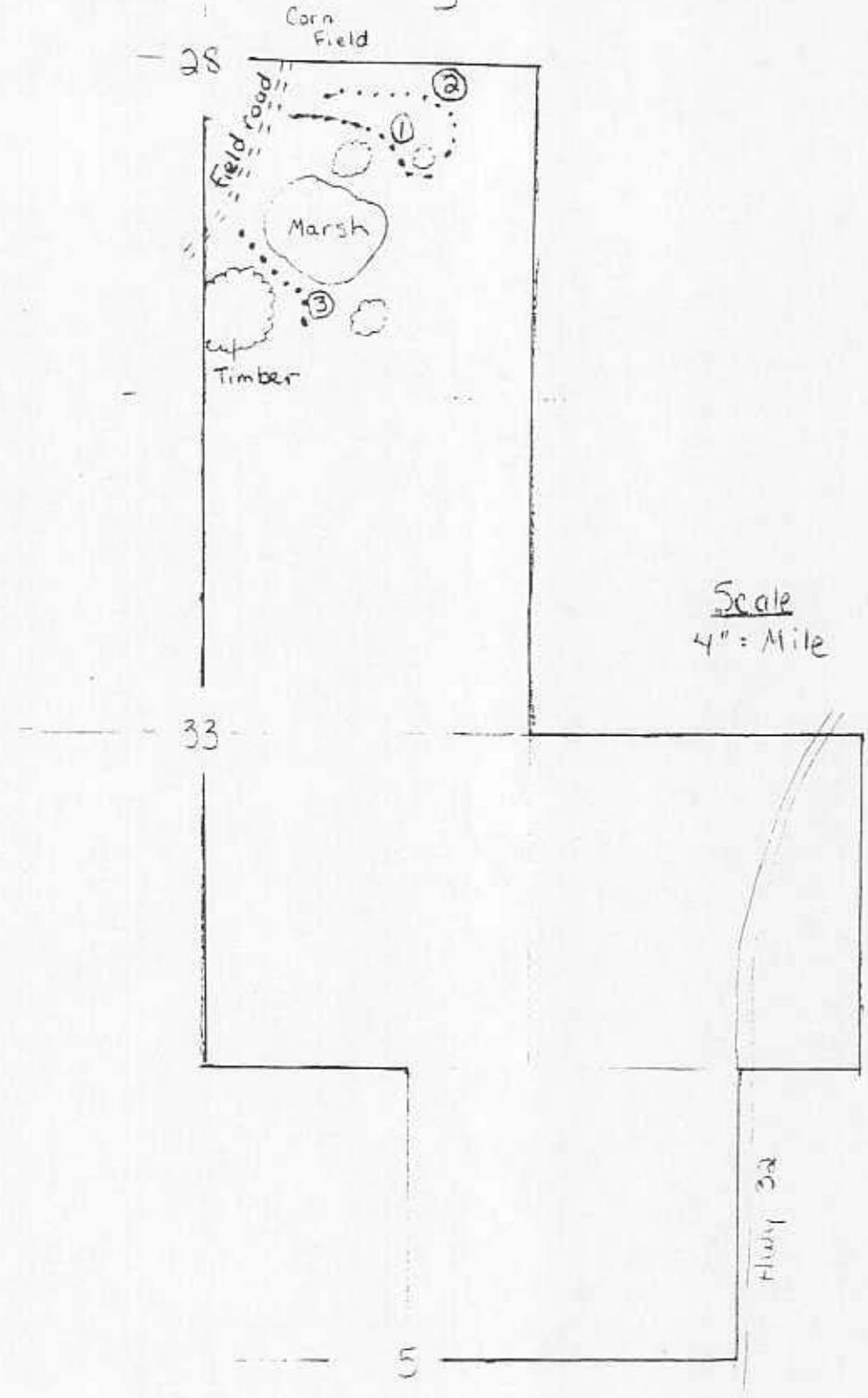


Chicog WMA



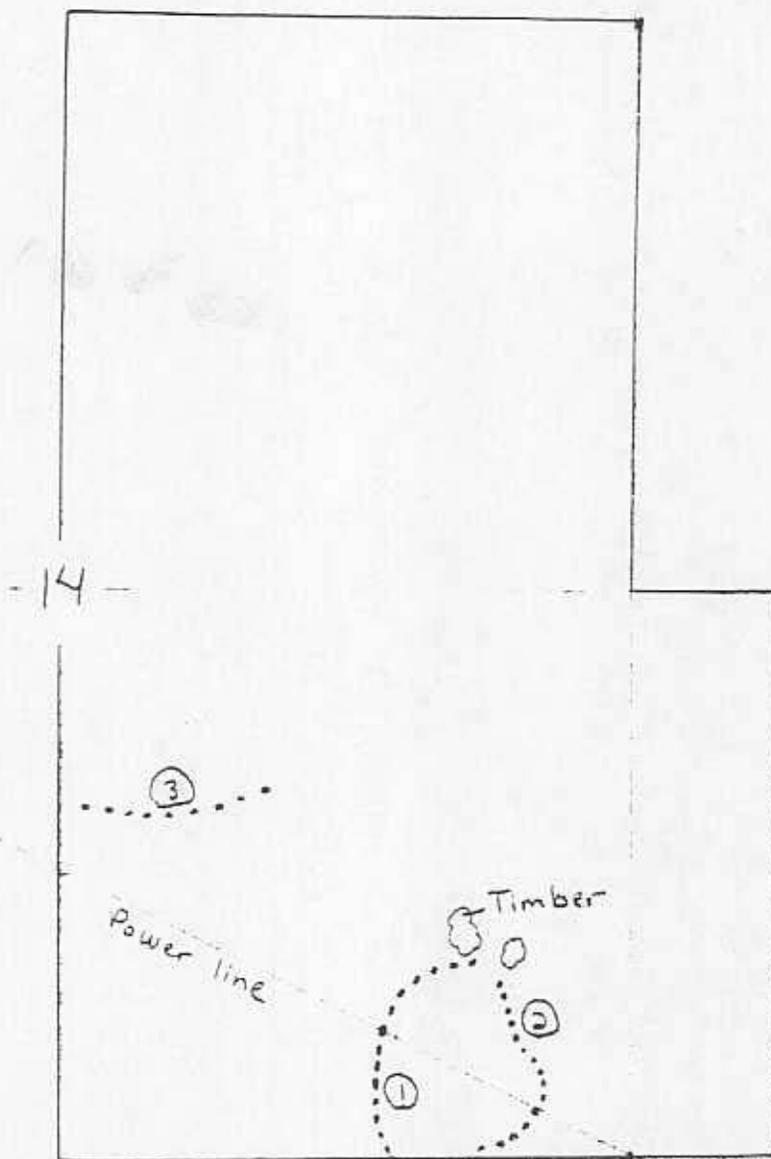
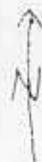
Scale
4" = Mile

Dugdale WMA



Scale
4" = Mile

Burnham WMA



Scale
6" = 1 mile