

# Survey of Native Prairie on Railroad Rights-of-Way in Minnesota

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A survey was conducted from September 15 to November 3, 1978, to identify railroad right-of-way with native prairie vegetation. A total of 2676 km (1663 miles) of right-of-way was sampled at 1.6-km (1-mile) intervals, and at each sampling point the right-of-way was characterized as either type A, high-diversity native prairie; type B, low-diversity native prairie; or type C, no native prairie present. The best-quality prairie, type A, was observed at 360 sampling points, which means that approximately 580 km (360 miles) of type A occurs on the surveyed right-of-way, or 22 percent of the total surveyed. Sixteen prairie corridors with concentrations of high-quality prairie were identified. These range from 21 km to 174 km (13-108 miles) long, with a total length of 875 km (544 miles). It is recommended that steps be taken to avoid major destructive impacts, conduct additional biological surveys, and appropriately manage native prairie or railroad rights-of-way.

Interest in Minnesota road and railroad rights-of-way has been stimulated by increased rail abandonment and the growing awareness that these are the only significant undeveloped areas in much of the prairie part of the state where cropland is most productive and costly. Figure 1 (1,2) shows the active and abandoned rail lines in Minnesota, excluding the Minneapolis-St. Paul area. Also shown are the rail lines surveyed in this study and the 16 prairie corridors recommended for protection. Figure 2 (1,2) shows which rail lines are abandoned or likely to be abandoned in the near future (note that abandonment is concentrated in the southern part of the state). Figure 3 (3) shows the cash rent paid for tillable land (note that values are highest in the southern part of the state, and higher in the prairie than in forested areas). Figure 4 (4) shows the vegetation of Minnesota at the time of early white settlement. The Minnesota State Planning Agency (1) reported to the legislature that railroad rights-of-way have high potential for recreation, wildlife management, and other public uses. Road-sides as a natural resource in Minnesota was the subject of a recent symposium (5) and a sizable body of literature is available on roadside-wildlife relationships (6,7).

Among the midwestern states to recognize the value of native prairie on rights-of-way are Illinois (8), where the natural areas inventory project carefully searched for prairie remnants and rights-of-way, and Michigan, where the National Railroad Passenger Corporation (Amtrak) and The Nature Conservancy are cooperating to protect prairie areas on the rail line southwest from Kalamazoo. Scientists who have studied or urged preservation of railroad rights-of-way include the following:

1. Iowa--Shimek (9);
2. Indiana--Betz (10) and Lindsey and others (11);
3. Michigan--Chapman and Pleznac (12), Kohring (13), Scharrer (14), and Thompson (15);
4. Ohio--King (16), Ramey (17), and Troutman (18);
5. Wisconsin--Curtis and Green (19), Curtis (20), Gould (21), Thomson (22), and Wilson (23);
6. Illinois--Adams (24), Douglas and others (25), Evers (26), Evers and Page (27), Goodnight and Koestner (28), Hankinson (29), Koestner (30), Long (31), Miller (32), Pepoon (33-36), Rapp (37),

Shackleford (38), Stupka and others (39), and Vestal (40,41); and

7. North Dakota--Ralston and Dix (42).

Unlike most preserved natural areas that are isolated from each other, long stretches of nearly continuous native grassland on railroad rights-of-way allow for the natural processes of species and gene migration. Prairie preservation is best achieved where gene flow and vertebrate movements can occur along a prairie corridor (43). It might be possible to maintain transects of relatively natural vegetation across the entire east-west moisture gradient in the Great Plains, which would present an invaluable opportunity to study and monitor the dynamic relationship among tallgrass, midgrass, shortgrass, and western steppe vegetation.

The purpose of this study was to locate and assess Minnesota railroad rights-of-way that support native prairie vegetation. The survey was conducted on selected stretches of Burlington Northern rail lines and did not include many potentially interesting rights-of-way in southern Minnesota (see Figures 1 and 2). A detailed report that includes data collected at each sampling point is on file with The Nature Conservancy.

It was not the purpose of this project to assess vegetation other than prairie. Significant prairie remnants may have been missed because of the use of a sampling technique. It should not be assumed, therefore, that all areas on the surveyed rights-of-way with biological or environmental significance have been discovered.

## SURVEY METHOD

The survey was conducted in early fall 1978 when native prairie grasses cure to distinctive golden colors. By conducting the survey in the fall, however, meant that many native forbs were inconspicuous. (A forb is a nongrasslike herbaceous plant. Native prairies are very diverse communities, usually with many more nongrass than grass species.) If native grasses were observed at the sampling points, a careful search was made for native prairie forbs.

Field work was conducted between September 15 and November 3, 1978. The surveyor, John Borowske, drove on roads that paralleled rights-of-way, stopping at 1.6-km (1-mile) intervals for sampling. In long stretches of uniform disturbed grassland with no apparent native prairie grasses, the interval between stops was extended to every second kilometer with the intermediary sampling point described as "no change."

At sampling points, the surveyor recorded data on right-of-way vegetation either from the roadside or while walking a transect perpendicular to the tracks. The right-of-way was described from the roadside if no native prairie was observed and if an accurate description could be made from that distance. Otherwise, the surveyor walked across the entire width of the right-of-way on a transect. Vegetation was sampled by using a belt transect approximately 30 cm (11.7 in) wide. If an accurate description could be made from a distance, the sur-

veyor simply visualized a strip 30 cm wide that traversed the right-of-way. If it was necessary to walk the transect, the surveyor walked down the center of the transect and recorded data in an estimated 30-cm-wide belt.

In some cases fences, water, and private land made it difficult to reach the railroad right-of-way from the roadside. If the survey could be made accurately by using binoculars, this was done.

Figure 1. Active and abandoned rail lines in Minnesota, excluding the Minneapolis-St. Paul area.

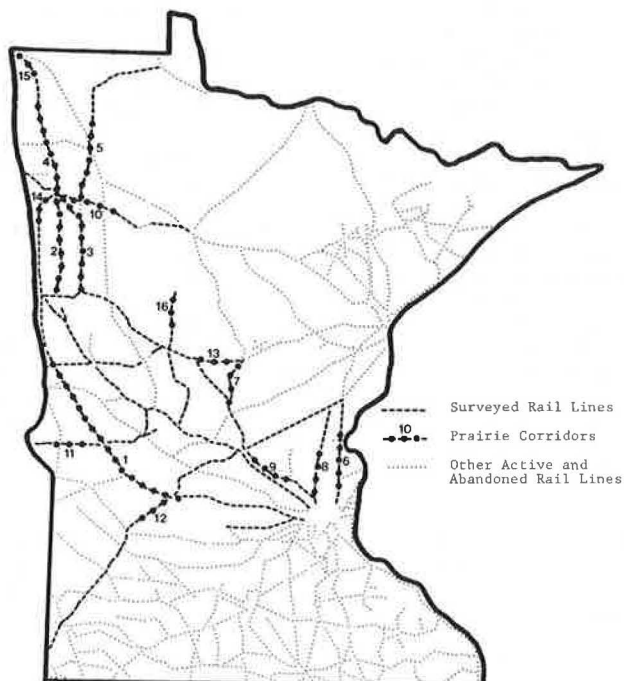


Figure 2. Minnesota rail lines abandoned and likely to be abandoned in the near future.



An attempt was made to use a trail motorcycle, but the rough surface of the rights-of-way made this method slow and unsafe. Problems of separation between road and right-of-way prevented data collection for about nine percent of the total kilometers

Figure 3. Cash rent paid for tillable land in Minnesota as an indication of land value.

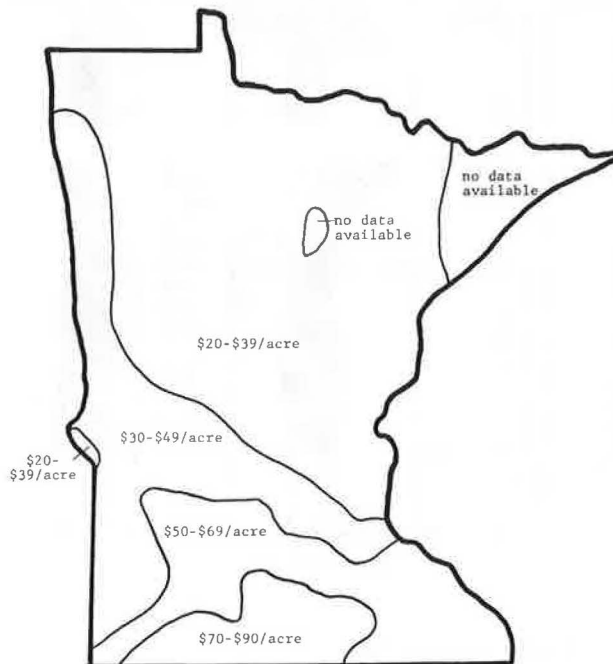


Figure 4. Vegetation of Minnesota at time of early white settlement.

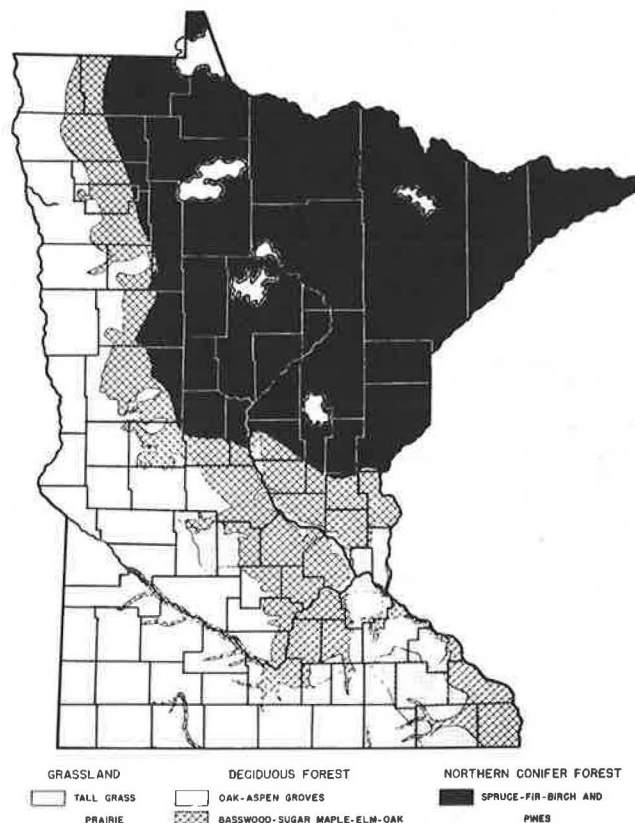
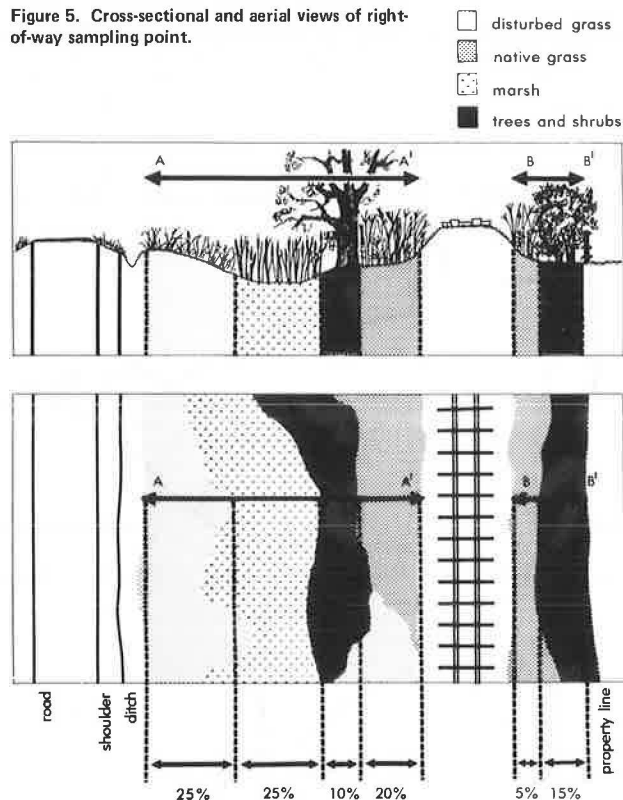


Figure 5. Cross-sectional and aerial views of right-of-way sampling point.



that might have been included in this survey.

The percentage of vegetation cover at sampling points was estimated for four categories: (a) native prairie, (b) disturbed grassland, (c) trees and shrubs, and (d) wetlands. Figure 5 shows the cross-sectional and aerial views of a sample right-of-way (note that the vertical scale is exaggerated, and that the road ditch and rail bed were excluded from the survey). If the road and railroad rights-of-way were contiguous, the area examined was from the back slope of the road ditch to the far edge of the right-of-way as defined by a fence line or other obvious change in land ownership or use. Data were recorded for only the railroad right-of-way if it was separated from the road right-of-way. The area taken up by unvegetated ballast was discounted in estimating the percentage of cover.

The following information was recorded for each category of vegetation:

1. Native prairie--(a) Percentage of right-of-way covered by native prairie vegetation (grasses and forbs); (b) presence and relative abundance of the following prairie indicator grasses: big bluestem, little bluestem, Indian grass, prairie June grass, side-oats grama, and prairie cordgrass; and (c) diversity of native prairie forbs along a transect (recorded as high diversity if five or more species, low diversity if less than five);

2. Disturbed grassland--(a) Percentage of right-of-way covered by plants associated with disturbed soil conditions, and (b) presence and relative abundance of the following common Eurasian species that are characteristic of disturbed sites: smooth brome, quackgrass, and bluegrass (*Poa* spp.);

3. Trees and shrubs--(a) Percentage of right-of-way covered by trees and shrubs, (b) whether tree and shrub growth was sparse or dense, and (c) presence of aspen, other hardwoods, coniferous trees, willow, and other shrubs; and

4. Wetlands--(a) Percentage of right-of-way covered by wetlands, and (b) presence of submerged vegetation, emergent vegetation (e.g., cattails), and wet meadows.

Information was also recorded on other adjacent land uses: crop or cultivated, pasture, wooded, highways or roads, and residential.

Each sampling point was characterized as type A, B, or C, based on the presence and quality of native prairie vegetation, as follows:

1. Type A: High-diversity native plants--(a) Major prairie grasses present on the right-of-way and (b) a high diversity of native prairie forbs present on the right-of-way;

2. Type B: Low-diversity native prairie--(a) Major prairie grasses present on the right-of-way and (b) a low diversity of native prairie forbs present on the right-of-way; and

3. Type C: No native prairie present--No native prairie observed on the right-of-way.

Prairie corridors are stretches of 21 or more kilometers (13 miles) with relatively continuous type A native prairie in the right-of-way. One corridor is only 25 percent type A, but it was included because it goes through a very intensively cultivated part of Minnesota. The amount of type B right-of-way, in which major prairie grasses were found but native forb diversity was low, was also considered in the identification of prairie corridors.

## RESULTS

The surveyor collected data at 1663 sampling points spaced at 1.6-km (1-mile) intervals along railroad rights-of-way. The prairie types were divided as shown in the table below:

Prairie Type	No. of Sampling Points	Percentage of Total
A	360	21
B	411	25
C	892	54
Total	1663	

Prairie corridors number 16 and total 575 km (544 miles) (see Figure 1). The longest corridor, from Breckenridge to the town of Kandiyohi, southeast of Willmar, is 174 km (108 miles). The shortest is 21 km (13 miles) (see Table 1). The 16 corridors listed in Table 1 include 79 percent of the high-diversity native prairie surveyed.

The seven prairie corridors in northwestern Minnesota include 49 percent of all corridors identified in this survey. Corridors 2, 14, and 15 are highly significant because they represent remnants of the level Lake Agassiz Lacustrine Plain (inside the beach ridges), in which there is only one known protected prairie preserve in Minnesota. The other corridors in this area are interesting transects that include sections of lake plain, beach ridges, and till (44). Corridor 10 spans a transect from prairie to aspen parkland.

Corridors 16 and 13 traverse areas of jack pine barrens and prairie openings. Corridor 7 is a transect from prairie and oak savanna areas to jack pine barrens. Corridors 6, 8, and 9 are on sandy soils deposited as outwash. The vegetation in these areas was originally oak savanna with prairie openings.

Except for one 24-km (15-mile) portion, corridors 1, 11, and 12 are all within the most fertile cropland soils in the state (3, Map I). The length of

**Table 1. Prairie corridors or stretches of relatively consistent good-quality prairie in Minnesota.**

No.	Prairie Corridor	Highway	Total Kilometers <sup>a</sup>	Type <sup>b</sup> (%)			
				A	B	C	No Data <sup>c</sup>
1	Breckenridge-Kandiyohi	MN-9	174	50	31	17	2
2	Crookston-Glyndon	MN-9	98	41	21	21	17
3	Crookston-Dale	MN-102, 32	97	41	29	17	13
4	Crookston-1.6 km north of Stephen	US-75	77	42	42	14	2
5	Holt-4.8 km south of Marcoux	MN-32	68	64	5	10	21
6	4.8 km north of Forest Lake-3.2 km north of Rush City	US-61	48	64	13	10	13
7	Little Falls-Brainerd	MN-371	43	56	22	18	4
8	1.6 km south of Cambridge-6.4 km south of Andover	MN-65	37	65	0	0	35
9	Elk River-1.6 km north of Clear Lake	US-10	35	68	23	9	0
10	Erskine-11.3 km east of Crookston	US-2	35	41	41	9	9
11	Alberta-Graceville	MN-28	32	25	40	5	30
12	Willmar-Clara City	MN-23	31	63	26	11	0
13	Staples-1.6 km east of Pilliger	MN-210	27	47	23	12	18
14	Nielsenville-6.4 km north of Eldred	US-75	26	50	44	6	0
15	St. Vincent-3.2 km north of Hallock	US-75	26	63	25	6	6
16	6.4 km south of Menahga-8.1 km south of Park Rapids	US-71	21	38	46	8	8

Note: 1 km = 0.62 mile.

<sup>a</sup>Total kilometers = 875.

<sup>b</sup>Average percent by prairie type: A = 51; B = 27; C = 11; and no data = 11.

<sup>c</sup>No data figures are parts of the right-of-way that could not be observed because of construction or other barriers.

corridor 1, and the possibility that additional native grassland may occur that continues west across North Dakota and Montana, makes it a very high priority for protection.

#### RECOMMENDATIONS

Several recommendations are given for additional study and management of railroad rights-of-way in Minnesota. They include the following:

1. A preliminary prairie survey on all railroad rights-of-way should be completed. A shorter sampling interval than that used in this study is suggested in the southern part of Minnesota where little native prairie is known to survive.

2. Steps should be taken to ensure that prairie is not inadvertently or needlessly destroyed in the course of road and rail maintenance, or by incursion from adjacent landowners.

3. Efforts should be made to maintain and enhance native grassland through controlled burning.

4. Rights-of-way should be used for vegetation monitoring and ecological research.

In order to accomplish the goals listed above, a great deal of cooperation is needed from the Minnesota Department of Transportation, railroad corporations, private landowners, scientists, resource managers, and others. Prairie rights-of-way are important biological resources and are worthy of additional study, protection, and management.

#### ACKNOWLEDGMENT

The research and preparation of this report were funded in part by a grant from the Burlington Northern Foundation to The Nature Conservancy. Individuals who reviewed drafts of this paper include Geoffrey S. Barnard, Robert Dana, John W. Humke, Jay G. Hutchinson, Frank D. Irving, Donald B. Lawrence, Harrison B. Tardoff, and Robert Vockrodt. Their helpful suggestions are gratefully acknowledged.

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