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## PRAIRIES AND FENS OF BATH TOWNSHIP, GREENE COUNTY, OHIO: 1802 AND 1984<sup>1</sup>

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**ABSTRACT.** Surveyor's records were used to determine the boundaries of prairies and fens that occurred in Bath Township, Greene Co., Ohio, in 1802. All of the old prairie sites were explored on foot in September and October 1984, to locate existing remnants. Four fen, four prairie, and four marsh remnants were located and the dominant prairie and fen species recorded. The fraction of total land area in these vegetation types went from 17% in 1802 to about 0.7% in 1984. This study illustrates the potential of using the original surveyors' records to locate existing remnants of these vegetation types.

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### INTRODUCTION

Although Gordon (1969) extensively studied and mapped the original vegeta-

tion of Ohio, the scope of his work was such that he necessarily omitted detailed borders of vegetational zones within smaller areas such as townships. The primary purpose of this study is to plot the boundaries of the prairies and fens occur-

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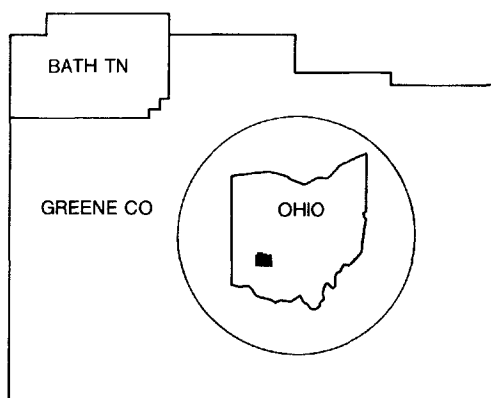


FIGURE 1. Location of study area.

ring in Bath Twp. of Greene Co., Ohio, at the time of the land surveys of 1802-03 (fig. 1). The secondary purpose is to locate and document all remaining prairie and fen remnants occurring in these areas. This report does not attempt to be a complete floristic or phytogeographic study of these remnants. Instead, it demonstrates that the original land surveys can be used successfully to locate restricted but interesting plant communities.

Data on the original vegetation of Bath Twp. were obtained from early land surveys conducted by Colonel Israel Ludlow in 1802 and 1803. These surveys were obtained from the Ohio State Auditor's Office, 88 East Broad St., Columbus, OH 43215. Col. Ludlow was a prominent figure in western Ohio at the time and actually laid out and named the city of Dayton in 1795 (Steele and Steele 1896). Fortunately, Col. Ludlow kept clear records of his field observations. Every corner of each square mile in the township was marked by two witness trees which were blazed and the species recorded, or by a post if the corner happened to be in a prairie (Ernst 1979). Additional blazes or posts often were used to mark corners at 0.3-km or even 0.15-km intervals. When travelling between corners, Ludlow noted whenever he entered or left a prairie, and the boundaries of all prairies encountered were sketched on a map of the township. Col. Ludlow's notes of the prairies encountered

together with his records of their boundaries provide the basis for determining the location of these areas in Bath Twp. in 1802.

Sears (1926) also used early land survey records to determine the distribution and species composition of Ohio prairies. Apparently the early surveyors, including Ludlow, were consistent about how they classified treeless areas. Although these records do not document herbaceous plant species, they would label each treeless area as "dry prairie," "wet prairie," "bog," "marsh," etc. For a complete description of the interpretation of these words and the corresponding plant communities that they are thought to represent, see Sears (1926).

#### METHODS AND MATERIALS

Data on the present location of prairies and fens in the township were obtained by plotting the location of each of the areas that Col. Ludlow encountered in 1802 onto a 7.5 minute U.S.G.S. topographical map and exploring each of these areas on foot. In addition, certain areas that appeared likely to harbor prairie remnants, but were between Col. Ludlow's section lines and therefore not documented, were explored as well. All of these surveys were conducted between 1 September and 15 October 1984.

A list of the dominant prairie and fen species encountered was made to illustrate the type of plant community on each of the remnant areas that were found (table 1). Terminology follows Fernald (1950). Voucher specimens are located in the Wright State University Herbarium.

The fraction of Bath Twp. in treeless areas in 1802 was computed by weighing photocopies of the original (larger) version of fig. 2. The fraction in 1984 was obtained using the estimated areas given in table 1.

#### RESULTS AND DISCUSSION

Fig. 2 outlines and classifies each of the treeless areas encountered by Ludlow in 1802 in Bath Twp. Those areas designated "Tallgrass prairies in 1802" in fig. 2 were originally described as "dry prairie" or "prairie." Analysis of Riddell's list of species found in these prairies (Sears 1926) together with the species composition of modern remnants from these areas indicate that most of these prairies were "true prairies" (Gordon 1969) dominated by grasses such as *Andropogon gerardi* and

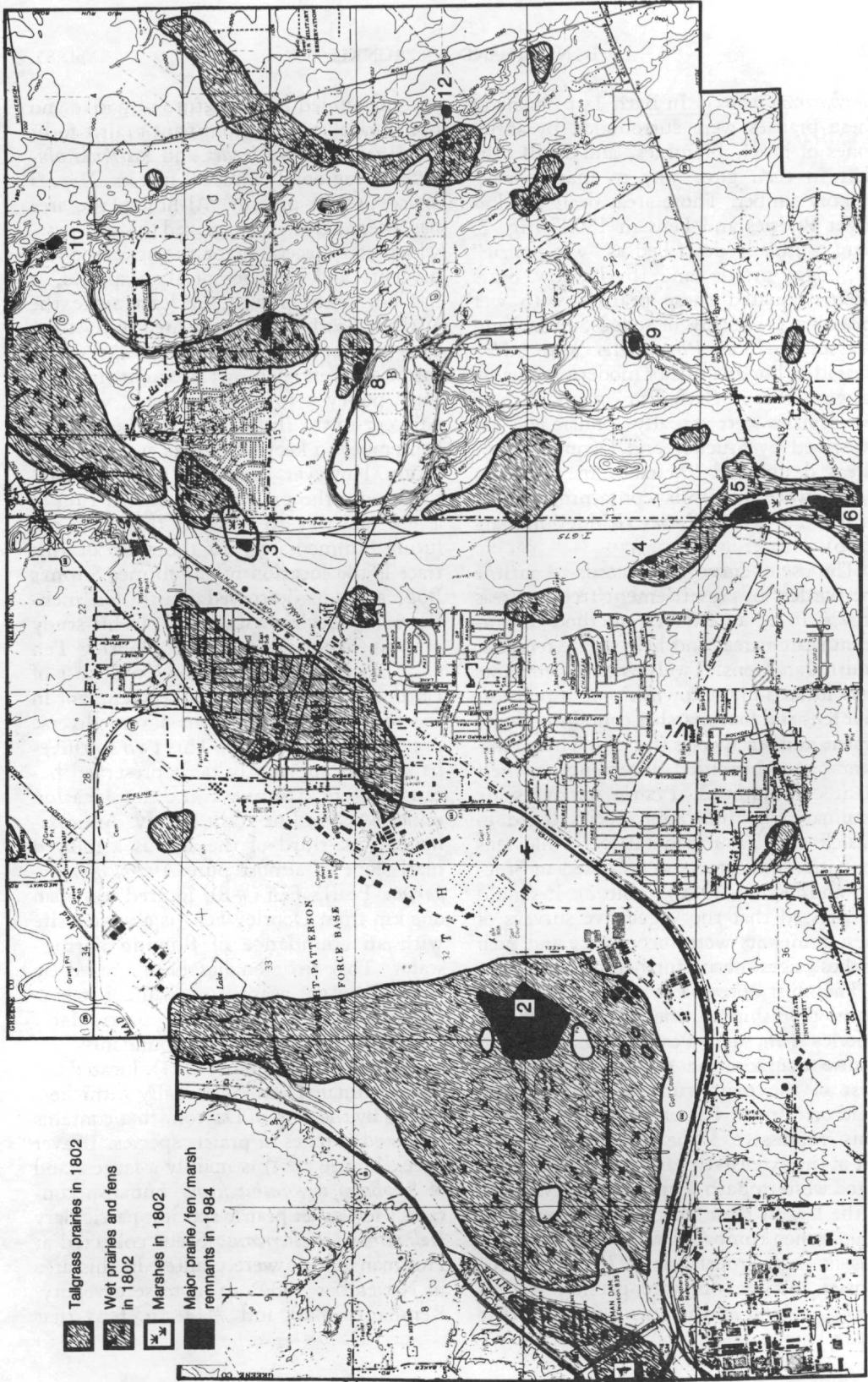


FIGURE 2. Prairies, fens, and marshes of Bath Twp., Greene Co., OH, in 1802 and 1984. Site numbers are as in table 1.

*Sorghastrum nutans*. In Bath Twp. many of these prairies were surrounded by shrub zones of hazel, brambles, and small oaks that in turn gave way to mature oak-hickory timber. Those areas designated as "Wet Prairies and Fens in 1802" (fig. 2) were originally described as "wet prairie" or "boggy prairie land" by Ludlow. Sears (1926) equated these prairies with wet meadows consisting of sedges, rushes and grasses such as *Phragmites* and *Calamagrostis*, but analysis of modern remnants suggests that in Bath Twp. many of these wet prairies were actually "prairie fens" as described by Stuckey and Denny (1980). Areas designated "Marshes in 1802" in fig. 2 were wetlands containing plants such as *Typha* and *Rumex* (Riddell in Sears 1926).

The use of surveyors' records to outline the borders of presettlement treeless areas proved to be an effective method to pinpoint search areas and help locate remnant prairies and fens. Twelve major remnants were located in the township: four prairies, four fens and four marshes containing some prairie and fen species (fig. 2). These remnants were classified according to their plant communities. Prairie remnants are dominated by indicator species listed in Cusick and Troutman (1978) while fens contained indicator species listed in Stuckey and Denny (1980) (table 1). It should be stressed that the vegetative surveys of these remnants were incomplete and each of these sites merits further study.

The most noteworthy remnants located in the township are the Huffman Prairie, Doorley Fen, and Pearl's Fen. Huffman Prairie (map location #2) is located southwest of the main runways of Patterson Field on Wright-Patterson Air Force Base. This impressive 32-ha tract is all that is left of the extensive prairie that once dominated western Bath Twp., but it is still one of the largest reported prairie remnants in Ohio, when compared with those listed in Cusick and Troutman (1978). The area consists mainly of large patches of *Andropogon gerardi* and *Sorghastrum nutans* that

are surrounded by a mixture of native and non-native grasses. Dominant prairie forbs are *Heliopsis helianthoides* and *Ratibida pinnata*. A regionally unusual species, *Napaea dioica*, is also present. Although the area has been extensively grazed in the past, which could account for the apparent low diversity and presence of alien species, it has not been plowed, at least since the Wright Brothers used the area to fly their early airplanes in 1903 (L. Walker, base historian, pers. comm.). Current management policy is to mow the tract, which is adjacent to the flightline, once per year in September to keep it clear of woody vegetation. However, expansion of nearby hayfields onto the prairie and construction of a new taxi-way are possible threats in the future. Immediately to the west of this tract is the location of the former Simm's Bog, a large, destroyed prairie fen mentioned by Dachnowski (1912) in his study of peat deposits in Ohio. Doorley Fen (#7), located along Hebble Creek east of Fairborn, is the least disturbed remnant in the township and contains a very diverse prairie fen community. This two to three-ha site has apparently been preserved because of its dampness and its location under a power line right of way. Approximately one-third of the area is a mowed marl slope of almost pure *Andropogon scoparius*. Pearl's Fen (#8), located less than one km from Doorley Fen, is a wetter site with an abundance of flowing springwater. This rich fen has been grazed by horses in recent years but continues to harbor many unusual species, particularly *Gentiana procera*, which is abundant.

West Huffman Prairie (#1), located below Huffman Dam, is actually a thicket, owned by the City of Dayton, that contains scattered patches of prairie species. Beaver Creek Prairie (#4) is mainly a large stand of *Silphium terebinthinaceum* but also contains a few other prairie species, particularly *Helianthus grosseserratus*. Seeds collected at Huffman Prairie were planted in this area in November 1984, to increase diversity. Remnants #10 and #11 are fens that

TABLE 1

Dominant prairie and fen species occurring on remnant areas during September-October, 1984, in Bath Twp., Greene Co., OH. Symbols are as follows: X = present, 0 = absent but found nearby, † = introduced, - = not observed. Sites are numbered as follows: #1 = West Huffman Prairie (8 ha), #2 = Huffman Prairie (32 ha), #3 = Spangler Marsh (4 ha), #4 = Beaver Creek Prairie (1 ha), #5 = Park Hills Marsh (4 ha), #6 = Legion Marsh (8 ha), #7 = Doorley Fen (2-3 ha), #8 = Pearl's Fen (1 ha), #9 = Byron Rd. Marsh (1 ha), #10 = Wet Kame Fen (1 ha), #11 = Grazed Fen (1 ha), #12 = Herr Rd. Prairie (1 ha).

Prairie* and Fen** Indicator Species	Remnant Number (as in fig. 2)											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Andropogon gerardi</i>	X	X	-	†	-	-	X	-	-	X	X	0
<i>Andropogon scoparius</i>	X	X	-	†	-	-	X	-	-	X	X	X
<i>Anemone virginiana</i>	X	X	-	†	-	-	X	-	-	-	-	-
<i>Asclepias tuberosa</i>	0	-	-	-	-	-	-	X	-	-	-	-
<i>Aster novae-angliae</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Aster praealtus</i>	-	-	-	-	-	-	X	X	-	-	-	-
<i>Carex</i> spp.	-	-	X	-	X	X	X	X	X	X	X	-
<i>Cirsium discolor</i>	X	X	-	X	-	-	-	-	-	-	-	X
<i>Cirsium muticum</i>	-	-	-	-	-	-	X	X	-	-	X	X
<i>Cornus racemosa</i>	X	0	X	X	X	X	X	X	X	X	X	X
<i>Elymus canadensis</i>	X	-	-	X	-	X	-	-	-	-	-	-
<i>Eupatorium altissimum</i>	X	X	X	X	X	X	X	X	X	X	X	X
<i>Eupatorium maculatum</i>	-	-	-	-	-	-	X	X	X	-	X	-
<i>Filipendula rubra</i>	-	-	-	-	-	-	X	X	-	-	-	-
<i>Gaura biennis</i>	0	-	-	-	-	-	X	-	-	-	-	-
<i>Gentiana procera</i>	-	-	-	-	-	-	-	X	-	-	-	-
<i>Helenium autumnale</i>	-	-	-	-	-	-	X	X	-	-	-	-
<i>Helianthus giganteus</i>	-	-	-	-	X	X	X	X	-	-	-	-
<i>Helianthus grosseserratus</i>	-	-	-	X	-	X	X	-	-	-	-	-
<i>Heliopsis belianthoides</i>	X	X	-	†	-	-	0	-	-	-	-	-
<i>Juncus</i> spp.	-	-	-	-	-	-	X	-	-	-	-	-
<i>Liatris pycnostachya</i>	†	-	-	-	-	-	-	-	-	-	-	-
<i>Liatris squarrosa</i>	†	-	-	-	-	-	-	-	-	-	-	-
<i>Lobelia kalmii</i>	-	-	-	-	-	-	-	X	-	X	X	-
<i>Lycopus americanus</i>	-	-	-	-	-	-	X	X	-	-	-	-
<i>Lysimachia quadriflora</i>	-	-	-	-	-	-	-	-	-	-	X	-
<i>Mirabilis nyctaginea</i>	-	X	-	-	-	-	-	-	-	-	-	-
<i>Monarda fistulosa</i>	X	X	-	†	-	-	X	X	-	X	X	X
<i>Onosmodium hispidissimum</i>	X	-	-	-	-	-	X	-	-	X	-	-
<i>Panicum</i> spp.	X	X	-	-	-	X	X	X	-	X	-	X
<i>Parnassia glauca</i>	-	-	-	-	-	-	-	X	-	-	X	-
<i>Pedicularis lanceolata</i>	-	-	-	-	-	-	X	X	-	-	-	-
<i>Physostegia virginiana</i>	-	-	-	-	X	-	-	X	-	-	X	-
<i>Potentilla fruticosa</i>	-	-	-	-	-	-	X	X	-	-	X	-
<i>Prenanthes racemosa</i>	-	-	-	-	-	-	X	X	-	-	-	-
<i>Pycnanthemum virginianum</i>	-	-	-	-	-	-	X	X	X	-	-	-
<i>Ratibida pinnata</i>	X	X	-	†	X	-	-	-	-	-	-	-
<i>Rudbeckia hirta</i>	X	X	-	X	-	-	X	X	-	X	-	-
<i>Ruellia</i> sp.	-	X	-	-	-	-	-	-	-	-	-	-
<i>Sanguisorba canadensis</i>	-	-	-	-	-	-	X	X	-	-	X	-
<i>Silphium terebinthaceum</i>	X	-	-	X	-	-	0	-	-	-	-	-
<i>Silphium trifoliatum</i>	-	-	-	-	-	-	X	X	-	-	-	-
<i>Solidago ohioensis</i>	-	-	-	-	-	-	-	-	-	X	X	-
<i>Solidago riddellii</i>	-	-	-	-	-	-	X	-	-	-	X	X
<i>Solidago rigida</i>	†	-	-	-	-	-	-	-	-	-	-	-
<i>Sorghastrum nutans</i>	X	X	-	†	-	-	X	X	X	X	X	X
<i>Spartina pectinata</i>	-	X	-	0	-	-	-	-	-	-	-	-
<i>Sporobolus asper</i>	X	X	-	-	-	-	-	-	-	X	-	-

TABLE 1. (Continued)

Prairie* and Fen** Indicator Species	Remnant Number (as in fig. 2)											
	1	2	3	4	5	6	7	8	9	10	11	12
<i>Teucrium canadense</i>	-	-	-	-	-	-	X	-	-	X	-	-
Other Notable Species												
<i>Asclepias incarnata</i>	-	-	X	-	X	X	-	X	X	-	-	-
<i>Helianthus tuberosus</i>	X	X	-	-	-	X	-	X	-	-	-	-
<i>Napaea dioica</i>	-	X	-	-	-	-	-	-	-	-	-	-
<i>Pbragmites communis</i>	-	-	X	-	-	-	-	-	-	-	-	-
<i>Poa palustris</i>	-	-	-	-	-	-	-	-	-	-	X	-
<i>Solidago graminifolia</i>	-	X	-	X	-	-	-	-	-	-	X	-
<i>Solidago patula</i>	-	-	-	-	-	-	X	X	X	-	X	-
<i>Solidago uliginosa</i>	-	-	-	-	-	-	X	X	X	X	X	-

\*From Cusick and Troutman (1978)

\*\*From Stuckey and Denny (1980)

occur on the sides of glacial deposits. Although both of these sites have been altered by grazing and agriculture they continue to support many prairie and fen species including *Lobelia kalmii* and *Solidago ohioensis*. Herr Road Prairie (#12), also located on the slope of a glacial deposit, is a dry prairie site dominated by *Andropogon scoparius* and *Sorghastrum nutans*, although *Solidago riddellii* occurs at the base of the slope.

Altogether, treeless sites composed about 17% of Bath Twp. in 1802. The remnants described in this paper made up about 0.7% of the total land surface, or 4.0% of the 1802 value. Huffman Prairie by itself accounted for over half of the area remaining in those vegetation types.

In conclusion, analysis of original land surveys proved to be an effective way to determine the boundaries of the original treeless areas occurring in the township and to locate existing remnants. The identification of eight remnant prairies and fens plus four marshes with prairie species suggests that many significant remnants may remain undiscovered in the rest of Greene Co. and in surrounding counties, and that

surveyors' records can be a valuable tool in locating them.

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