

Woody Vegetation of the Cass County Outdoor Education and Wildlife Area

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Introduction

The Cass County Outdoor Education and Wildlife Area (Sec. 17, T 27 N, R 2 E, Logansport Indiana Quadrangle) is a new park currently being developed on property located to the east of the Cass County Home. The vegetation found in the park is of two types. Along the central stream and the eastern ridge crest, the vegetation is relatively mature and could serve as a nature study area. Off the ridge crest to the east and west of the stream are a series of old abandoned fields in various stages of succession. Only the woody vegetation surrounding the central stream will be discussed in this paper. The authors hope that the information included in this paper will aid school teachers and hikers who are using the nature study area.

Materials and Methods

Two line transects were run roughly parallel to the stream bed. The ridge transect ran along the ridge crest from the northwestern to the southwestern corner of the park. The transect was discontinuous to avoid areas of tree fall. The lowland transect ran along the eastern stream bottom except in the southern part of the park where it crossed the stream and ran along its western border. Each transect was 500 m long. Both the tree and shrub layers were sampled along each transect. Importance values for the dominant tree species were determined using the point-centered quarter method (5, 6). The sampling points were located at 20 m intervals. The individual closest to the sampling point in each quarter whose diameter at ground level exceeded 4 in. (10 cm) was sampled. The shrub layer was sampled using 10 m sq quadrats. The 10 quadrats analyzed on each transect were located at 20 m intervals. All individuals taller than 1 m and having a diameter at ground level of less than 4 in. (10 cm) in the quadrat were recorded. The importance value for each shrub species encountered was calculated using the method of Curtis and McIntosh (1, 2). An analysis for stand disturbance was run also along the lowland transect (7).

Results

Stand disturbance analysis seemed to indicate that the vegetation of the stream bottom was not disturbed. Correlation analysis (8) indicated that the observed variation was not significantly different from a straight line ($r = -0.9219$). Other evidence at the site contradicted this conclusion, however. A logging road entered the stream valley at the southern end of the park. Numerous drag lines were encountered running up the ridges out of the stream valley. The majority of large diameter trees, particularly those on the ridge crest, were highly branched and not suitable for logging. These trees had branching patterns characteristic of trees grown in the open. Finally, a large number of escaped ornamentals, including *Lonicera tatarica*, *Berberis thunbergii*, and *Malus*, were found in the stream valley. The area was logged a considerable time ago, and the stream valley vegetation has apparently achieved a normal size distribution in all but the largest size classes.

A total of 37 different species were encountered along the lowland and ridge transects. In addition to these species, eight others were encountered while walking through the woods. The additional species encountered were *Rhus radicans*, *Ribes cynosbati*, *Viburnum dentatum*, *Parthenocissus quinquefolia*, *Rubus flagellaris*, *Populus deltoides*, *Fagus grandifolia*, and *Lonicera japonica*.

Except for the dominance of *Ulmus rubra* along both the lowland and ridge transects (Tables 1 and 2), the canopy layers in the stream valley and on the ridge crest were quite distinct. *Ulmus rubra* and *Juglans nigra* were distributed throughout the length of the lowland transect. The other species were distributed somewhat more randomly. *Asimina triloba* and *Plantanus occidentalis* were confined to the northern end, while *Prunus serotina*, *Celtis occidentalis*, *Fraxinus americana*, and *Morus rubra* were confined to the southern end of the lowland transect. *Acer saccharum* was found in the central area of the lowland transect. *Malus* was represented by a single individual. The distribution of canopy trees was irregular along the ridge transect and no one species was dominant along the entire length of the transect. *Acer saccharum*, *Ulmus rubra*, and *Prunus serotina* were most common on the southern part of the ridge; *Sassafras albidum* occurred exclusively in the central part; and *Quercus rubra*, *Juglans nigra*, and *Ulmus rubra* were the most abundant species at the northern end. The vegetation at the northern end of the ridge transect appeared to be the least disturbed of any vegetation in the park.

The shrub layer varied considerably between the stream valley and the ridge crest (Tables 1 and 2). The shrub layer was most diverse in the stream valley. Thirty different species were encountered in the stream valley, while only 14 were encountered along the ridge crest. All the additional species encountered while walking through the park occurred most frequently along the stream bottom. At the northern end of the lowland transect, the most common species were *Prunus serotina*, *Asimina triloba*, *Berberis thunbergii*, and *Rosa carolina*. Zan-

TABLE 1. Importance values of the woody plants found along the ridge transect in the Cass County Outdoor Education and Wildlife Area. The species were identified using Deam (3, 4).

Species	Canopy Layer	Shrub Layer
<i>Ulmus rubra</i>	92.7	27.4
<i>Acer saccharum</i>	55.1	156.3
<i>Prunus serotina</i>	45.6	59.4
<i>Quercus rubra</i>	37.4	6.9
<i>Tilia americana</i>	14.5	
<i>Crataegus sp.</i>	12.0	4.8
<i>Platanus occidentalis</i>	11.4	
<i>Juglans nigra</i>	6.6	
<i>Morus rubra</i>	6.5	2.6
<i>Juglans cinerea</i>	5.7	
<i>Celtis occidentalis</i>	4.6	7.1
<i>Sassafras albidum</i>	4.2	7.3
<i>Quercus muhlenbergii</i>	3.8	
<i>Viburnum lentago</i>		7.9
<i>Asimina triloba</i>		6.2
<i>Lindera benzoin</i>		4.6
<i>Rosa carolina</i>		4.6
<i>Carpinus caroliniana</i>		2.5
<i>Viburnum rafinesquianum</i>		2.5

TABLE 2. Importance values of the woody plants found along the lowland transect in the Cass County Outdoor Education and Wildlife Area. The species were identified using Deam (3, 4).

Species	Canopy Layer	Shrub Layer
<i>Ulmus rubra</i>	132.5	83.6
<i>Platanus occidentalis</i>	32.5	1.5
<i>Juglans nigra</i>	22.0	1.3
<i>Prunus serotina</i>	22.0	38.6
<i>Celtis occidentalis</i>	20.6	8.8
<i>Acer saccharum</i>	16.8	45.3
<i>Crataegus sp.</i>	16.6	10.1
<i>Asimina triloba</i>	11.4	29.5
<i>Morus rubra</i>	10.8	1.2
<i>Fraxinus americana</i>	10.7	
<i>Malus sp.</i>	4.0	
<i>Rosa carolina</i>		18.0
<i>Lindera benzoin</i>		14.6
<i>Berberis thunbergii</i>		9.9
<i>Fraxinus americana</i>		7.1
<i>Sambucus canadensis</i>		3.1
<i>Rubus allegheniensis</i>		3.1
<i>Carya ovalis</i>		2.8
<i>Viburnum lentago</i>		2.6
<i>Zanthoxylum americanum</i>		2.6
<i>Lonicera tatarica</i>		2.3
<i>Carya cordiformis</i>		1.7
<i>Carpinus caroliniana</i>		1.4
<i>Gleditsia triachanthos</i>		1.3
<i>Cornus florida</i>		1.2
<i>Ostrya virginiana</i>		1.2
<i>Viburnum rafinesquianum</i>		1.2
<i>Smilax rotundifolia</i>		1.2
<i>Quercus rubra</i>		1.2
<i>Aesculus glabra</i>		1.2
<i>Vitis riparia</i>		1.2
<i>Salix nigra</i>		1.2

thoxylum americanum and *Rubus allegheniensis* were most common in the central area. *Acer saccharum* and *Lonicera tatarica* were most common at the southern end of the lowland transect. Unfortunately, *Rhus radicans* was very abundant throughout the stream valley. In addition, the percentage of plants in the shrub layer of the stream valley having spines or thorns was quite high, making any deviations from the regular nature trails very difficult. The low diversity of species in the shrub layer along the ridge crest parallels the low diversity that was found in the canopy layer. *Acer saccharum*, *Ulmus rubra*, and *Prunus serotina* were most common in the southern part of the transect. *Sassafras albidum*, due to the production of sucker shoots, was very common in the central portion. The remainder of the species occurred most frequently at the northern end of the ridge transect. The diversity on the ridge crest increases at the northern end of the park and approaches that of the stream valley.

Conclusions

The lowland stream valley and adjacent ridge crests are well suited to serve as a nature study area. Most of the common species are visible from the nature trails. However, many people may be discouraged from wandering through the area due to the spiny nature of most of the shrub layer plants and the abundance

of *Rhus radicans*. The vegetation outside of the study area is less suitable for nature study. Some of the old field area should be retained as an aid in studying plant succession, but the vast majority of this area could be modified for other purposes such as picnicking and athletics.

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