Proceedings of the Iowa Academy of Science

Volume 81 | Number Article 9

1974

Forest Communities in Woodman Hollow State Preserve, Iowa

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NIEMANN, DAVID A., and ROGER Q. LANDERS, JR. (Department of Botany and Plant Pathology, Iowa State University, Ames, Iowa 50010). Forest Communities in Woodman Hollow State Preserve, Iowa. *Proc. Iowa Acad. Sci.* 81(4): 176-184, 1974.

The vegetation of this relatively undisturbed forest in central Iowa was sampled by a transect across a stream valley to determine species presence. The presence data were used in delineation of communities and in a computer ordination of the vegetation. Analysis revealed four distinct groupings, or communities, in the preserve: oak-hickory, prairie opening, floodplain and north-facing slope. The communities and their boundaries, determined through comparisons of species distribution diagrams, were also identified in the continuum of plots arrived at by an ordination technique. The communities showed a strong relationship to the topography of the preserve. Species composition of the communities and successional trends in the preserve are discussed. A complete list of the vascular plants found in the preserve, along with their abundance and place of occurrence, is presented.

INDEX DESCRIPTORS: Iowa Forest Communities, Iowa Flora.

The predominant vegetation of Iowa prior to settlement was tall grass prairie, which originally covered about 85% of the land surface, mainly the rather poorly drained, gently rolling uplands. Forests, then as now, were mainly along rivers and streams.

The abundance of prairie vegetation led early botanists to concentrate their studies on that vegetation type. Fields of corn and soybeans now cover the former prairie lands of Iowa, leaving the forests along the rivers as the principal remaining areas of native vegetation (Aikman and Smelser, 1938).

This study was conducted in Woodman Hollow State Preserve, located on the west side of the Des Moines River in the S.½, N.½, Sec. 22, T.88N., R.28W., Webster County, Iowa. The preserve is approximately 32 hectares (80 acres) in area. A small unnamed stream flows from west to east through Woodman Hollow and enters the Des Moines River at the eastern boundary of the preserve. The stream, undoubtedly with the aid of glacial meltwater, has cut through the successive layers of glacial till and into the underlying Pennsylvanian sandstone. The local relief within the preserve is 52 m (170 feet).

Observations of early residents indicate that the area was very rich in plant species, including some species not commonly found in Iowa (Findlay, 1919; Hart, 1919). Some trees were cut, part of the preserve was used as a picnic ground, and domestic animals were free to wander throughout the area prior to its purchase by the state of Iowa in 1927, but the total effect of these disturbances was slight.

The objectives of this study were to determine whether the vegetation of this part of the state could be divided into communities based on species composition; to determine species composition of the communities; to determine the total number of species present and their distribution in the preserve; and to discover successional trends in the preserve.

METHODS

A transect was laid out near the eastern boundary of the preserve to determine the distribution of plant species across the stream valley at the point of greatest topographic variation. The transect ran from the upland on the north side of the valley, through the valley, to the upland on the south side of the valley, encountering all major plant communities to be found within the preserve. The transect consisted of 200 plots arranged in a grid 8 plots wide and 25 plots long (Figures 1 and 2). Each plot was a 10 x 10 meter square. Species-area curves (Cain, 1932, 1934) indicated that this would be an adequate plot size for this study. Presence of all vascular plant species was recorded for each plot.

Species distribution maps were constructed for all species which occurred in at least 5% of the plots. The distribution maps for these 136 species were compared with each other, and patterns of similar species distribution led to an objective determination of the limits of the communities in the preserve. Similar distributional patterns were determined in the following manner. Species which dominated certain parts of the preserve were sorted out, and those which were scattered and infrequent were eliminated from further consideration of community limits. The remaining dominant species were sorted into groups of overlapping distributional patterns. Species in a group with distributional patterns which did not coincide well with other species in a group (less than about 80% overlap) were also eliminated. The composite distribution of the remaining species was used to delineate community boundaries. Subjective decisions based on field experience allowed the drawing of boundaries through the transition between communities where objective data showed that the area was not clearly a part of one community or the other. Although sharp boundaries are drawn, there are, of course, gradual transitions between communities.

The distributional data were also processed by a computer program developed by Orloci (1966). A habitat is usually characterized by not one but many species. The problem is to discover whether the sample plots of the study area cluster, and techniques which may be used to discover this are called cluster analysis.

Ordination is one method of cluster analysis. Many methods of ordination have been developed, but the Orloci method has been used with some success in Iowa, so this is why it was used in this study. The Orloci ordination depends on calculating the Euclidean distance between points in the factor space. If we have a two-dimensional space, the distance between two points (a,b) and (x,y) can be calculated from the Pythagorean theorem as

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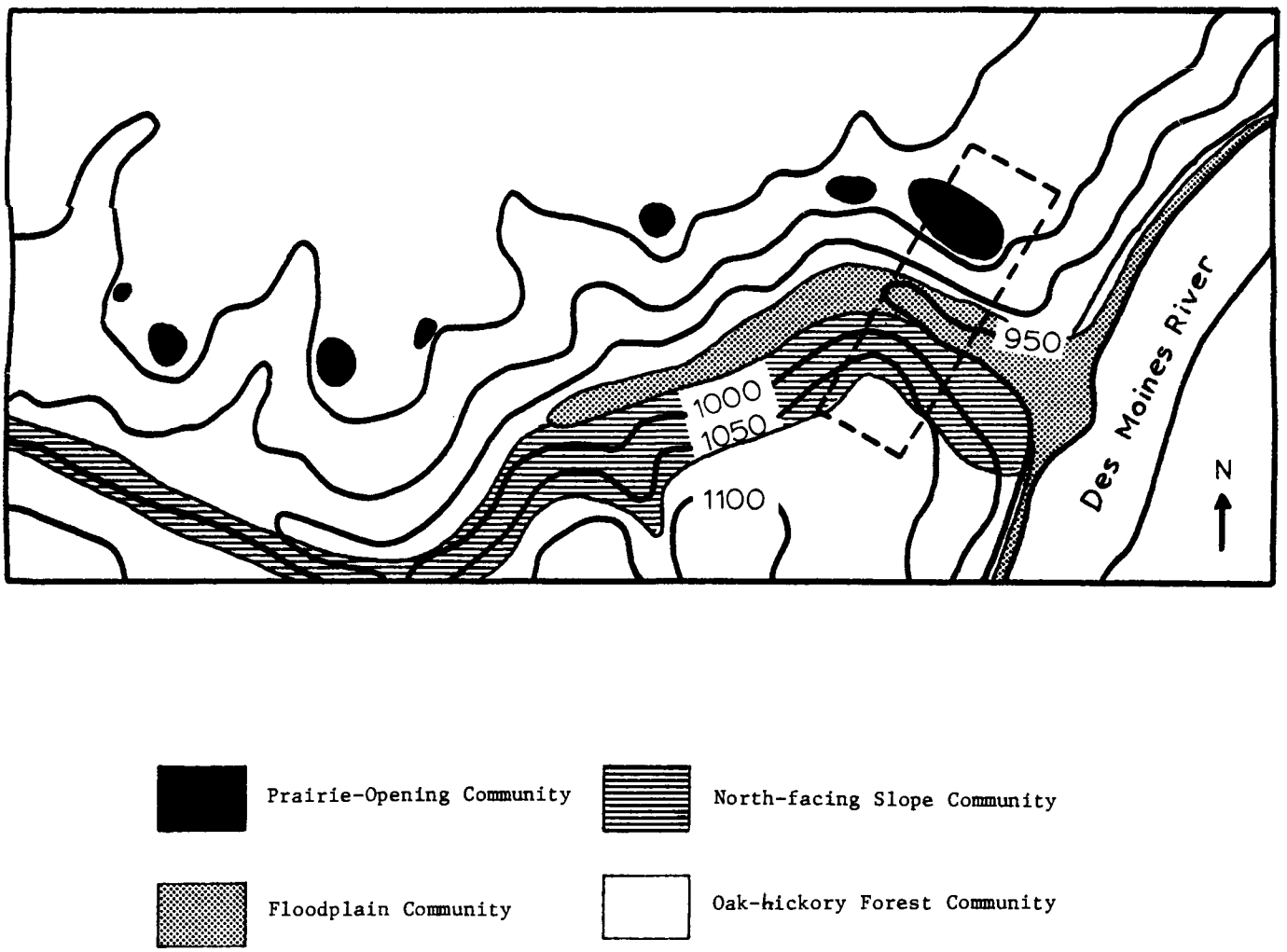

Figure 1. Topographic map of Woodman Hollow showing the location of the transect (dotted rectangle). Elevations are feet above sea level.

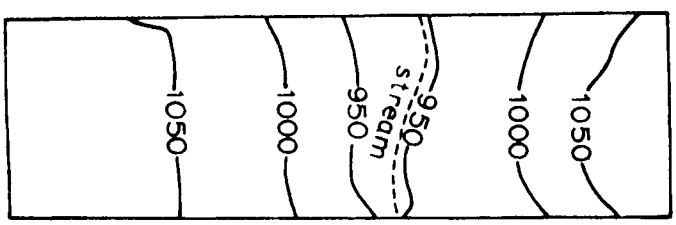

Figure 2. Enlargement of transect shown in Figure 1, with elevations in feet above sea level.

$$D = \sqrt{[(x\text{-}a)^2 + (y\text{-}b)^2]}$$

This extends immediately to a space in many dimensions. In Orloci's method of ordination, the distances between all stands (based on species composition) are computed, and then the first or principal axis is determined as a line joining the two points (or vegetational sites) which are furthest apart in the space defined by their species composition. Each other point is then projected onto this line, and thus takes up a position on this axis. The second axis is obtained by joining the two points which deviated furthest from the first. Subsequently we can obtain a third axis, but it is seldom advisable to go beyond this. These axes are, of course, oblique, that is, they do not cross at right angles, although when we represent the results graphically we show them as if they were orthogonal (D. Jowett, personal communication).

The results of the Orloci ordination were printed out as three coordinates for each of the 200 quadrats. These data were submitted to the computer, which then drew a three-dimensional graph and three two-dimensional graphs of the results.

Voucher specimens of the vascular plants found during the 1970 growing season are on deposit in the Herbarium of Iowa State University. Nomenclature for grasses follows Pohl (1966). Orchid nomenclature follows Correll (1950). Nomenclature for all other vascular plants follows Fernald (1950).

RESULTS AND DISCUSSION

During the 1970 growing season, 354 species of vascular plants were collected in Woodman Hollow and identified.

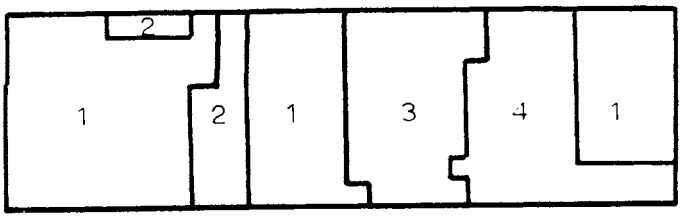

Figure 3. Classification of the transect, based on a comparison of species distribution diagrams. The communities were delimited as follows: 1 represents the oak-hickory community; 2 represents the prairie opening community; 3 represents the floodplain community; 4 represents the north-facing slope community.

Four more species were encountered after the study was completed. The Appendix lists these species and also contains information concerning their abundance and the communities in which they are most likely to be found.

The vegetation of Woodman Hollow was first subdivided into communities based on a comparison of species distribution maps as discussed above. We recognized four rather distinct communities in the preserve: oak-hickory forest, prairie opening, floodplain and north-facing slope. Figure 3 shows the transect and the location of the four communities based on species distribution diagrams. The location of the four communities is strongly dependent on the topography of the preserve. The nearly level upland locations are subject only to the regional climate and support the climax vegetation of the region (oak-hickory forest) when fire is not a factor. The south-facing slope is subject to greater insolation than the level ground. Consequently, higher temperatures, lower soil moisture levels and earlier snow melt lead to more xeric conditions, which allow subclimax prairie communities to persist on this slope. The north-facing slope receives less insolation than the level land and consequently is cooler and has higher soil moisture levels and later snow melt. These more mesic conditions allow the north-facing slope to support a post-climax maple forest. The lower part of the valley has an alluvial and colluvial soil which is quite different from the other soils of the preserve. This soil difference, coupled with high moisture levels and occasional flooding by the Des Moines River, leads to a distinct floodplain community, but not one typical of Iowa, probably because of infrequent floods of short duration.

The Orloci (1966) ordination of the transect data indicated that the best description of the vegetation across the stream valley is that it is a continuum. The three-dimensional graph of the ordination of the transect quadrats (Figure 4) shows this continuum of vegetation types based on species composition. The two-dimensional graph of the ordination in the xz plane (Figure 5) also shows the vegetational change across the valley to be a continuum. However, when one determines where the points (quadrats) on the graph fell in the transect, it becomes apparent that this ordination technique placed quadrats together into the groups which we described based on species distribution diagrams. The circled group of points on the left represents the prairie opening quadrats. The circled group of points in the center represents the north-facing slope quadrats. The circled group of points on the right represents the floodplain quadrats. The uncircled group of points in the center represents the oak-hickory forest quadrats. The placement of the groups from left to right indicates a change from a xeric, open environment (the prairie opening community) to a very moist and protected environment (the floodplain community).

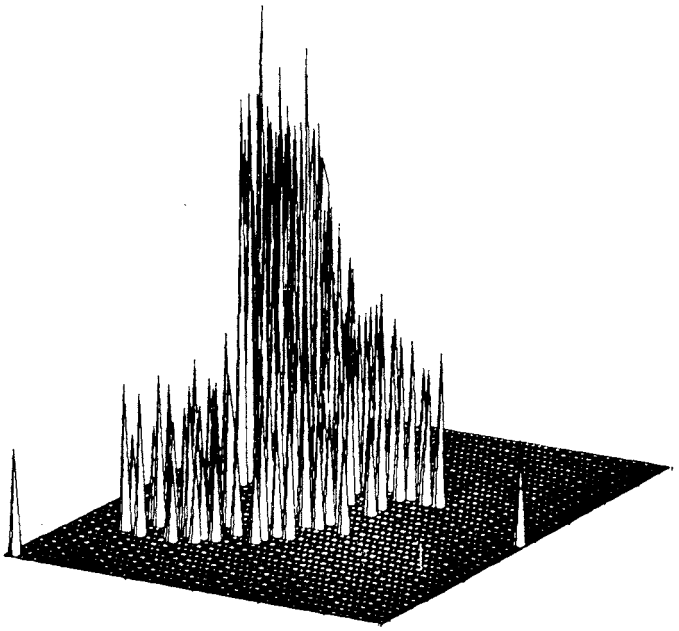

Figure 4. Three-dimensional graph of the 200 sample plots based on Orloci ordination of the distribution data for the 100 most frequent species in the transect.

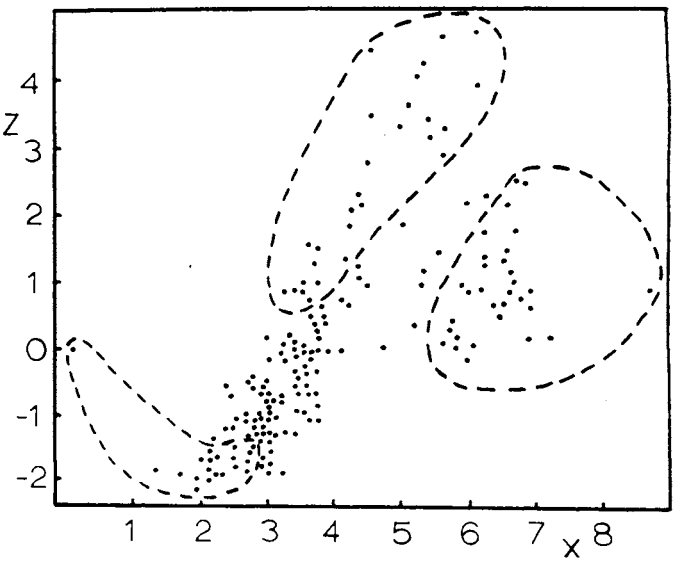

Figure 5. Two-dimensional graph of the Orloci ordination of the transect data. The group of points at the left represents the prairie opening quadrats. The group of points in the center represents the north-facing slope quadrats. The group of points at the right represents the floodplain quadrats. The remaining uncircled points represents the oak-hickory community.

The Oak-Hickory Forest Community

The oak-hickory forest is the most extensive community in Woodman Hollow. It occupies most of the gently sloping upland as well as part of the lower south-facing slope of the stream valley. The dominant tree species are *Quercus alba*

and *Carya ovata*, with *Quercus rubra* somewhat less abundant.

A few groves of aspen (*Populus tremuloides* and *P. grandidentata*) occur on the upland in the oak-hickory forest. *Populus grandidentata* is probably present due to wind-throw of the more permanent members of the community. *Populus tremuloides* grows in an area of poor water drainage, giving the appearance of an aspen bog.

Ostrya virginiana occurs as an understory tree throughout much of the oak-hickory community. Kucera and McDermott (1955) found this to be the predominant understory tree in central Missouri. Daubenmire (1936) mentions it as important in Minnesota, and Potzger (1935) describes it as the predominant understory tree in Indiana. In Woodman Hollow, a number of the older specimens have several trunks arising from the ground. This may indicate that they were burned back to the ground occasionally and only grew into trees after the fires ceased.

Ribes cynosbati is an abundant shrub in the oak-hickory forest community. *Parthenocissus quinquefolia* trails along the ground throughout this community. *Carex pensylvanica* and *Galium concinnum* are the most abundant herbs. *Corallorhiza odontorhiza, Liparis lilifolia* and *Orchis spectabilis* are three orchid species present in the oak-hickory community, but none of these is abundant.

A number of large, low-branching oak specimens, mostly *Quercus alba* but some *Quercus macrocarpa*, occur in this community throughout the preserve. These specimens are concentrated near the shoulder slope position around the stream valley. The large, low branches indicate that for much of their lives they grew in an open, savanna-like area rather than in a closed forest. Daubenmire (1936) in Minnesota, and Cottam (1949) in southern Wisconsin, made similar observations. The prairie fires, which burned through Iowa annually (White, 1870) before the state was settled, killed most of the fire-sensitive trees except in locations where the topography was too steep to allow sufficient vegetation to grow and provide an adequate fuel source to carry a fire. This left only the fire-resistant oaks on upland locations. Later, when the prairie fires ceased, fire-sensitive trees returned to the uplands and restored closed forest conditions. The younger trees are now growing taller than the original oaks, which may ultimately be shaded out.

Cottam (1949) and McIntosh (1957) studied deciduous forests in Wisconsin and concluded that sugar maple (*Acer saccharum*) was displacing the oaks. Our study indicates that although there are some species of a less xeric nature moving in under the oaks, they are all rather young, and do not live very long. *Fraxinus pennsylvanica* var. *subintegerrima*, for example, has a rather high rate of reproduction in the upland forest of Woodman Hollow. About 14 seedlings less than 25 cm tall were found per 10 x 10 m plot in our study. The number in each size class diminished until the specimens reached a diameter of about 10 cm (dbh). Trees of this species die when they reach this size on the upland. The same was true for other species, except for the oaks and *Carya ovata*, which appeared to be reproducing adequately and reaching mature size. Reproduction of *Quercus marcrocarpa* was rather poor, however, probably due to increased shading. Thus it appears that although the oak-hickory forest of Woodman Hollow seems to be undergoing some successional changes, these changes are not expected to be nearly as drastic as those predicted for similar forests in Wisconsin. There may be many factors contributing to this, but a main one is undoubtedly the severity of periodic droughts in central Iowa which kill all but the most drought-resistant upland species (Albertson and Weaver, 1945; Aikman and Smelser, 1938).

The Prairie Opening Community

The prairie opening community occupies the shoulder of the south-facing slopes in the preserve, mainly in patches only a few meters in diameter. Shimek (1910) described such prairie openings in Iowa. The presence of some prairie species under an oak-hickory canopy in similar topographic locations suggests that prairie may have been present in a continuous strip along the shoulder position of the south-facing slope not very long ago. The dominant species of the prairie openings are *Andropogon gerardii, Andropogon scoparius, Ceanothus ovatus* and *Amorpha canescens*.

The prairie openings are not generally subjected to frequent fire, although one opening burned during April, 1970. The vegetation of the burned opening appeared distinctly more vigorous than the unburned openings except for some slight damage to woody species. We confirmed that the burned opening had a greater percentage cover of the dominant species and more flowering stems per unit area than three other unburned openings. On the burned opening, *Andropogon gerardii* had a percentage cover of 46%, while on the three unburned openings the values were 29%, 33% and 27%. The frequency of occurrence of *Andropogon gerardii* on the burned opening, 96%, was, however, very similar to the figures for the unburned openings, which had frequencies of 90%, 95% and 93% for this species. The value for flowering stems per square meter for *Andropogon gerardii* was 6.0 on the burned prairie opening as opposed to 0.4, 2.2 and 2.8 on the unburned openings. The results for *Andropogon scoparius* were similar, but not so striking. Thus it appears that even on a prairie patch as small as 10 x 10 m, fire may influence considerably the vigor of the dominant species.

A number of woody species are encroaching upon the prairie openings. *Juniperus virginiana, Rhus glabra, Carya ovata* and *Quercus macrocarpa* are becoming established in various places. Shrubs and trees shading the margins of the prairie openings present obvious difficulties for the prairie plants. Their vigor is greatly reduced, resulting in dwarfed plants which rarely flower. This continued replacement of prairie species with woody species will probably lead to the complete exclusion of prairie remnants from the preserve.

The Floodplain Community

The alluvium and colluvium along the Des Moines River and the small stream within the preserve provide the habitat for the floodplain community, which is characterized by a lush growth of *Laportea canadensis* in the understory. Other herbs in this community include *Cryptotaenia canadensis, Impatiens capensis, Hydrophyllum virginianum* and *Ranunculus pensylvanicus*.

Ulmus americana, Acer nigrum and *Tilia americana* are some of the trees present in the floodplain community. This floodplain community is not typical for Iowa, perhaps due to infrequent floods of short duration and the narrowness of the canyon. The trees mentioned are also found on the lower slopes facing both north and south, so it is the herbs which give this community its characteristic appearance, not the trees.

The North-Facing Slope Community

In the north-facing slope community the dominant arborescent species are *Acer nigrum, Tilia americana* and *Carya cordiformis.* These trees are not very large in diameter. Erosion on the steep slopes undoubtedly plays some role in the early death of trees in this community by removal of soil from the roots and toppling. A severe windstorm in July, 1971, uprooted many trees.

The abundant herbs of this community are *Hepatica acutiloba* and *Mitella diphylla.* In certain respects this small community is the most interesting of all. A number of plant species rather uncommon this far west may be found on the cool, constantly moist sandstone slopes. Among these are *Actaea rubra, Aralia racemosa, Diervilla lonicera, Dirca palustris, Maianthemum canadense* and *Panax quinquefolius.* On deeply shaded sandstone the delicate fern *Cryptogramma stelleri* is found.

Woodman Hollow, with at least 358 species of vascular plants in an area of only 32 hectares (80 acres), is undoubtedly one of the richest botanical areas in Iowa that is still almost completely undisturbed by the activities of man. Such areas are becoming increasingly difficult to find in Iowa as more land is developed for agricultural, recreational and other purposes. The best use for Woodman Hollow is to leave it as an unimproved state preserve where research projects can be conducted relatively free from disturbance, and where interested persons can see a portion of Iowa as it appeared to its original inhabitants before intensive settlement.

ACKNOWLEDGMENTS

This paper is a portion of a thesis submitted as partial fulfillment of the requirements for the Master of Science degree, Department of Botany and Plant Pathology, Iowa State University. The authors thank Dr. R. Pohl, who checked some species determinations; Dr. D. Isely, who helped identify the *Desmodium* species; Dr. J. Zimmerman of the University of Wisconsin, Madison, who helped identify the *Carex* species; and the other members of the graduate committee who checked the manuscript during its preparation. Thanks also go to Roger Mrachek for statistical assistance. The work was carried out while the first author held an NDEA Title IV fellowship.

APPENDIX: VASCULAR PLANTS COLLECTED IN WOODMAN HOLLOW

"Rare" indicates that the species was not encountered in the transect but was found elsewhere in the preserve. "Infrequent" indicates presence in less than 5% of the plots. "Occasional" indicates presence in 5 to 25% of the plots. "Frequent" indicates presence in 25.5 to 50% of the plots. "Very frequent" indicates presence in 50.5 to 75% of the plots. "Abundant" indicates presence in 75.5 to 100% of the plots. The community listed is the one in which the species is most likely to be found, not the only one. An asterisk indicates a species not indigenous to North America.

PTERIDOPHYTA

Equisetaceae (Horsetail Family): *Equisetum arvense* L., Common Horsetail. Rare; floodplain community. *Equisetum hyemale* L., Smooth Scouring-Rush. Infrequent; floodplain community.

Ophioglossaceae (Adder's-Tongue Family): *Botrychium virginianum* (L.) Sw., Rattlesnake Fern. Occasional; oak-hickory forest.

Osmundaceae (Flowering Fern Family): *Osmunda claytoniana* L. Occasional; north-facing slope community.

Polypodiaceae (Fern Family): *Adiantum pedatum* L., Maidenhair Fern. Occasional; north-facing slope community. *Athyrium felix-femina* (L.) Roth, Lady Fern. Occasional; north-facing slope community. *Camptosorus rhizophyllus* (L.) Link, Walking Fern. Occasional; north-facing slope community. *Cryptogramma stelleri* (Gmel.) Prantl, Fragile Rock-Brake. Infrequent; on moist sandstone in the floodplain community. *Cystopteris bulbifera* (L.) Bernh., Bulblet Fern. Occasional; north-facing slope community. *Cystopteris fragilis* (L.) Bernh., Fragile Fern. Frequent; north-facing slope community. *Dryopteris goldiana* (Hook.) Gray, Goldie's Fern. Occasional; upper reaches of the floodplain community. *Dryopteris spinulosa* (O. F. Muell.) Watt, Spinulose Wood Fern. Rare; north-facing slope community. *Polypodium virginianum* L., Rock Polypody. Infrequent; north-facing slope community. *Pteretis pensylvanica* (Willd.) Fern., Ostrich Fern. Occasional; upper reaches of the floodplain community. *Woodsia obtusa* (Spreng.) Torr., Blunt-Lobed Woodsia. Rare; on rocks around the prairie openings.

SPERMATOPHYTA

GYMNOSPERMAE

Pinaceae (Pine Family): *Juniperus virginiana* L., Red Cedar. Occasional; prairie openings.

ANGIOSPERMAE

Monocotyledoneae

Alismataceae (Water Plantain Family): *Alisma subcordatum* Raf., Water Plantain. Rare; floodplain community.

Araceae (Arum Family): *Arisaema atrorubens* (Ait.) Blume, Jack-in-the-Pulpit. Frequent; floodplain community.

Commelinaceae (Spiderwort Family): *Tradescantia virginiana* L., Spiderwort. Occasional; prairie openings.

Cyperaceae (Sedge Family): *Carex albursina* Sheldon. Occasional; floodplain community. *Carex convoluta* Mackenz. Occasional; oak-hickory forest. *Carex cristatella* Britt. Rare; floodplain community. *Carex emoryi* Dew. Infrequent; oak-hickory forest. *Carex jamesii* Schwein. Occasional; oak-hickory forest. *Carex normalis* Mackenz. Rare; oak-hickory forest. *Carex oligocarpa* Schukuhr. Occasional; oak-hickory forest. *Carex pensylvanica* Lam. Very frequent; oak-hickory forest. *Cyperus ferruginescens* Boeckl. Rare; floodplain community. *Cyperus filiculmis* Vahl. Rare; floodplain community. *Cyperus inflexus* Muhl. Rare; floodplain community. *Cyperus strigosus* L. Rare; floodplain community. *Eleocharis calva* Torr. Rare; floodplain community. *Scirpus atrovirens* Willd. Rare; floodplain community.

Dioscoreaceae (Yam Family): *Dioscorea villosa* L. Rare; oak-hickory forest.

Gramineae (Grass Family): *Agrostis alba* L., Redtop. Rare; floodplain community. *Agrostis hiemalis* (Walt.) B.S.P., Ticklegrass. Rare; on rock outcrops in the oak-hickory forest. *Agrostis perennans* (Walt.) Tuck. Rare; oak-hickory forest. *Andropogon gerardii* Vitmann, Big Bluestem. Occasional; restricted to prairie openings where it is a dominant. *Andropogon scoparius* Michx., Little Bluestem. Occasional; restricted to prairie openings where it is a dominant. *Bouteloua curtipendula* (Michx.) Torr., Side-Oats Grama. Infrequent; prairie openings. *Bromus purgans* L. Occasional; oak-hickory forest. *Bromus pubescens* Muhl. Rare; oak-hickory forest.

Cinna arundinacea L., Woodreed. Rare; floodplain community. *Danthonia spicata* (L.) Beauv., Poverty Oatgrass. Occasional; prairie openings. **Digitaria sanguinalis* (L.) Scop., Hairy Crabgrass. Rare; in paths in the oak-hickory forest. *Echinochloa muricata* (Beauv.) Fern. Rare; in damp, open places in the oak-hickory forest. *Elymus canandensis* L., Canada Wild Rye. Occasional; prairie openings. *Elymus villosus* Muhl. Rare; oak-hickory forest. *Elymus virginicus* L., Virginia Wild Rye. Infrequent; oak-hickory forest. *Elymus wiegandii* Fern. Rare; floodplain community. *Eragrostis capillaris* (L.) Nees., Lacegrass. Rare; oak-hickory forest. *Eragrostis hypnoides* (Lam.) B.S.P. Rare; floodplain community. *Eragrostis pectinacea* (Michx.) Nees. Rare; floodplain community. *Festuca obtusa* Biehler. Frequent; oak-hickory forest. *Glyceria striata* (Lam.) Hitch. Occasional; floodplain community. *Hordeum jubatum* L., Squirrel-Tail Barley. Rare; disturbed areas in the oak-hickory forest. *Hystrix patula* (L.) Moench, Bottlebrush Grass. Occasional; oak-hickory forest. *Koeleria cristata* (L.) Pers., Junegrass. Infrequent; north-facing slope community. *Leersia oryzoides* (L.) Sw., Cutgrass. Rare; floodplain community. *Leersia virginica* Willd., Whitegrass. Rare; floodplain community. *Muhlenbergia cuspidata* (Torr.) Rydb. Rare; prairie openings. *Muhlenbergia frondosa* (Poir.) Fern. Rare; floodplain community. *Muhlenbergia mexicana* (L.) Trin. Rare; floodplain community. *Muhlenbergia racemosa* (Michx.) B.S.P. Occasional; prairie openings. *Oryzopsis racemosa* (J. E. Smith) Ricker. Infrequent; floodplain community. *Panicum capillare* L., Witchgrass. Rare; floodplain community. *Panicum latifolium* L. Infrequent; oak-hickory forest. *Panicum leibergii* (Vasey) Scribn. Infrequent, prairie openings. *Panicum virgatum* L., Switchgrass. Infrequent; prairie openings. **Phleum pratense* L., Timothy. Infrequent; open places in the oak-hickory forest. **Poa compressa* L., Canada Bluegrass. Infrequent; prairie openings. **Poa pratensis* L., Kentucky Bluegrass. Occasional; prairie openings. **Setaria lutescens* (Weigel) F. T. Hubb., Yellow Foxtail. Rare; open disturbed places in the oak-hickory forest. *Sorghastrum nutans* (L.) Nash, Indian Grass. Infrequent; present only in prairie openings where it is abundant. *Spartina pectinata* Link., Sloughgrass. Rare; floodplain community. *Sporobolus asper* (Michx.) Kunth. Infrequent; prairie openings.

Iridaceae (Iris Family): *Sisyrinchium campestre* Bickn., Blue-Eyed Grass. Infrequent; prairie openings.

Juncaceae (Rush Family): *Juncus tenuis* Willd. Rare; disturbed areas in the oak-hickory forest.

Liliaceae (Lily Family); *Allium canadense* L., Wild Garlic. Infrequent; oak-hickory forest. *Allium tricoccum* Ait., Wild Leek. Rare; oak-hickory forest. **Asparagus officinalis* L., Asparagus. Infrequent; prairie opening. *Erythronium albidum* Nutt., White Dog's-Tooth Violet. Rare; north-facing slope community. *Lilium michiganense* Farw., Michigan Lily. Rare; oak-hickory forest. *Maianthemum canadense* Desf., Wild Lily-of-the-Valley. Infrequent; north-facing slope community. *Polygonatum canaliculatum* (Muhl.) Pursh, Solomon's Seal. Very frequent; oak-hickory forest. *Smilacina racemosa* (L.) Desf., False Spikenard. Frequent; north-facing slope community. *Smilacina stellata* (L.) Desf. Rare; oak-hickory forest. *Smilax ecirrhata* (Engelm.) S. Wats. Occasional; north-facing slope community. *Smilax herbacea* L., Carrion Flower. Occasional; oak-hickory forest. *Smilax tamnoides* L. var. *hispida* (Muhl.) Fern., Bristly Greenbrier. Occasional; floodplain community. *Trillium nivale* Riddell, Snow Trillium. Rare; north-facing slope community. *Uvularia grandiflora* Sw., Bellwort. Occasional; north-facing slope community.

Orchidaceae (Orchis Family): *Corallorhiza odontorhiza* (Willd.) Nutt., Autumn Coral-Root. Rare; oak-hickory forest. *Habenaria viridis* (L.) R. Br. var. *bracteata* (Muhl. ex Willd.), Gray, Long-Bracted Orchid. Infrequent; oak-hickory forest. *Liparis lilifolia* (L.) L. C. Rich. ex Lindl., Large Twayblade. Infrequent; oak-hickory forest. *Orchis spectabilis* L., Showy Orchis. Infrequent; oak-hickory forest.

Typhaceae (Cat-Tail Family): *Typha latifolia* L., Common Cat-Tail. Rare; floodplain community.

Dicotyledoneae

Aceraceae (Maple Family): *Acer negundo* L., Box Elder. Infrequent; floodplain community. *Acer nigrum* Michx. f., Black Maple. Frequent; lower slopes in the oak-hickory forest. *Acer saccharinum* L., Silver Maple. Infrequent; floodplain community.

Amaranthaceae (Amaranth Family): *Acnida tamariscina* (Nutt.) Wood, Water Hemp. Rare; floodplain community.

Anacardiaceae (Cashew Family): *Rhus aromatica* Ait., Fragrant Sumac. Rare; probably planted, oak-hickory forest. *Rhus glabra* L., Smooth Sumac. Infrequent; prairie openings. *Rhus radicans* L., Poison Ivy. Frequent; floodplain community.

Apocynaceae (Dogbane Family): *Apocynum androsaemifolium* L., Spreading Dogbane. Infrequent; floodplain community. *Apocynum cannabinum* L., Indian Hemp. Infrequent; oak-hickory forest.

Araliaceae (Ginseng Family): *Aralia nudicaulis* L., Wild Sarsaparilla. Frequent; north-facing slope community. *Aralia racemosa* L., Spikenard. Occasional; oak-hickory forest. *Panax quinquefolius* L., Ginseng. Occasional; north-facing slope community.

Aristolochiaceae (Birthwort Family): *Asarum canadense* L., Wild Ginger. Occasional; north-facing slope community.

Asclepiadaceae (Milkweed Family): *Asclepias incarnata* L., Swamp Milkweed. Rare; floodplain community. *Asclepias syriaca* L., Common Milkweed. Infrequent; floodplain community. *Asclepias tuberosa* L., Butterfly Weed. Infrequent; prairie openings. *Asclepias verticillata* L., Whorled Milkweed. Occasional; prairie openings. *Asclepias viridiflora* Raf., Green Milkweed. Infrequent; prairie openings.

Balsaminaceae (Touch-Me-Not Family): *Impatiens capensis* Meerb., Spotted Touch-Me-Not. Occasional; floodplain community.

Berberidaceae (Barberry Family): *Caulophyllum thalictroides* (L.) Michx., Papooseroot. Occasional; floodplain community.

Boraginaceae (Borage Family): *Hackelia virginiana* (L.) I. M. Johnston, Stickseed. Infrequent; oak-hickory community. *Lithospermum canescens* (Michx.) Lehm., Puccoon. Occasional; prairie openings.

Campanulaceae (Bluebell Family): *Campanula americana* L., Tall Bellflower. Rare; floodplain community. *Lobelia siphilitica* L., Great Lobelia. Rare: floodplain community.

Caprifoliaceae (Honeysuckle Family): *Diervilla lonicera* Mill., Herbe Bleue: Infrequent; north-facing slope community. *Lonicera dioica* L., Honeysuckle. Frequent, north-facing slope community. *Sambucus canadensis* L., Common Elder. Infrequent; floodplain community. *Symphoricarpos orbiculatus* Moench, Coralberry. Rare; oak-hickory forest. *Triosteum perfoliatum* L., Tinker's Weed. Infrequent; oak-hickory forest. *Viburnum lentago* L., Sweet Viburnum, Nannyberry. Rare; oak-hickory forest. *Viburnum rafinesquianum*

Schultes, Downy Arrowwood. Occasional; oak-hickory forest.

Caryophyllaceae (Pink Family): *Paronychia canadensis* (L.) Wood, Forked Chickweed. Infrequent; oak-hickory forest. *Silene stellata* (L.) Ait. f., Starry Campion. Infrequent; oak-hickory forest.

Celastraceae (Staff-Tree Family): *Celastrus scandens* L., Waxwort. Frequent; prairie openings. *Euonymus atropurpureus* Jacq., Burning-Bush. Occasional; oak-hickory forest.

Chenopodiaceae (Goosefoot Family): *Atriplex patula* L. var. *hastata* (L.) Gray, Orach. Rare; floodplain community. **Chenopodium album* L., Pigweed. Infrequent; oak-hickory forest.

Cistaceae (Rockrose Family): *Helianthemum bicknellii* Fern., Frostweed. Rare; rocky openings in the oak-hickory forest. *Lechea stricta* Leggett, Pinweed. Rare; prairie openings.

Compositae (Composite Family): *Actinomeris alternifolia* (L.) DC., Wingstem. Rare; floodplain community. *Ambrosia artemisiifolia* L., Common Ragweed. Infrequent; disturbed areas of the oak-hickory forest. *Ambrosia trifida* L., Great Ragweed. Infrequent; stunted specimens in disturbed areas of the oak-hickory forest. *Antennaria plantaginifolia* (L.) Hook., Pussy's Toes. Occasional; prairie openings. **Arctium minus* (Hill) Bernh., Common Burdock. Rare; disturbed areas in the oak-hickory forest. *Artemisia ludoviciana* Nutt., Western Mugwort. Infrequent; prairie openings. *Aster azureus* Lindl. Occasional; prairie openings. *Aster cordifolius* L. Very frequent; oak-hickory forest. *Aster dumosus* L. var. *strictior* T. & G. Rare; oak-hickory forest. *Aster ericoides* L. Rare; oak-hickory forest. *Aster laevis* L. Frequent; prairie openings. *Aster ontarionis* Wieg. Rare; oak-hickory forest. *Aster parviceps* (Burgess) Mackenz. & Bush. Occasional; oak-hickory forest. *Aster pilosus* Willd. var. *demotus* Blake. Rare; oak-hickory forest. *Aster sericeus* Vent. Infrequent; prairie openings. *Bidens comosa* (Gray) Wieg., Beggar-Ticks. Rare; floodplain community. *Bidens frondosa* L., Beggar-Ticks. Rare; floodplain community. *Cacalia tuberosa* Nutt., Indian Plantain. Rare; prairie openings. *Chrysopsis camporum* Greene. Infrequent; open places in the oak-hickory forest. *Cirsium altissimum* (L.) Spreng. Rare; oak-hickory forest. **Cirsium vulgare* (Savi) Tenore, Bull Thistle. Rare; oak-hickory forest. *Coreopsis palmata* Nutt., Coreopsis. Occasional; prairie openings. *Echinaceae pallida* Nutt., Purple Coneflower. Occasional; prairie openings. *Erigeron annuus* (L.) Pers., Daisy Fleabane. Infrequent; floodplain community. *Erigeron canadensis* L., Horseweed. Rare; floodplain community. *Erigeron philadelphicus* L. Rare; floodplain community. *Eupatorium altissimum* L. Rare; prairie openings. *Eupatorium perfoliatum* L., Thoroughwort. Rare; floodplain community. *Eupatorium purpureum* L., Sweet Joe-Pye Weed. Occasional; oak-hickory forest. *Eupatorium rugosum* Houtt., White Snakeroot. Rare; oak-hickory forest. *Helianthus strumosus* L. Occasional; open areas of the oak-hickory forest. *Heliopsis helianthoides* (L.) Sweet, Oxeye. Rare; open areas of the oak-hickory forest. *Kuhnia eupatorioides* L., False Boneset. Infrequent; prairie openings. *Lactuca canadensis* L. Infrequent; floodplain community. *Lactuca floridiana* (L.) Gaertn. Rare; floodplain community. **Lactuca scariola* L., Prickly Lettuce. Rare; floodplain community. *Liatris aspera* Michx. Rare; prairie openings. *Prenanthes alba* L., White Lettuce. Occasional; north-facing slope community. *Ratibida pinnata* (Vent.) Barnh., Prairie Coneflower. Infrequent; prairie openings. *Rudbeckia hirta* L. Rare; floodplain community. *Rudbeckia laciniata* L. Occasional; floodplain community. *Senecio plattensis* Nutt. Infrequent; prairie openings. *Solidago altissima* L. Rare; open areas of the oak-hickory forest. *Solidago flexicaulis* L. Frequent; oak-hickory forest. *Solidago nemoralis* Ait. Occasional; prairie openings. *Solidago rigida* L. Rare; prairie openings. *Solidago ulmifolia* Muhl. Very frequent; oak-hickory forest. **Taraxacum officinale* Weber, Common Dandelion. Occasional; stunted specimens in the oak-hickory forest. *Vernonia fasciculata* Michx. Rare; floodplain community. *Xanthium italicum* Moretti, Cocklebur. Rare; floodplain community.

Cornaceae (Dogwood Family): *Cornus alternifolia* L. f., Pagoda Dogwood. Rare; oak-hickory forest. *Cornus drummondi* Meyer, Dogwood. Frequent; oak-hickory forest. *Cornus rugosa* Lam., Round-Leaved Dogwood. Occasional; north-facing slope community.

Corylaceae (Hazel Family): *Carpinus caroliniana* Walt., American Hornbeam. Frequent; north-facing slope community. *Corylus americana* Walt., American Hazelnut. Occasional; oak-hickory forest. *Ostrya virginiana* (Mill.) K. Koch, American Hop Hornbeam. Abundant; oak-hickory forest.

Cruciferae (Mustard Family): *Arabis canadensis* L., Sicklepod. Infrequent; oak-hickory forest. **Barbarea vulgaris* R. Br., Common Winter Cress. Rare; floodplain community. *Cardamine bulbosa* (Schreb.) BSP., Spring Cress. Rare; floodplain community. *Cardamine pensylvanica* Muhl., Bitter Cress. Rare; floodplain community. *Dentaria laciniata* Muhl., Toothwort. Rare; floodplain community. *Draba reptans* (L.) Fern. Infrequent; north-facing slope community. **Erysimum cheiranthoides* L., Wormseed Mustard. Rare; floodplain community. **Lepidium densiflorum* Schrad., Pepperwort. Rare; floodplain community. *Rorippa islandica* (Oeder) Borbas, Yellow Cress. Rare; floodplain community.

Euphorbiaceae (Spurge Family): *Acalypha rhomboidea* Raf. Rare; disturbed areas of the oak-hickory forest. **Euphorbia esula* L., Wolf's Milk. Infrequent; prairie openings.

Fagaceae (Beech Family): *Quercus alba* L., White Oak. Frequent; oak-hickory forest. *Quercus macrocarpa* Michx., Mossy-Cup Oak. Occasional; oak-hickory forest. *Quercus rubra* L., Red Oak. Abundant; oak-hickory forest.

Geraniaceae (Geranium Family): *Geranium maculatum* L., Wild Cranesbill. Rare; oak-hickory forest.

Hydrophyllaceae (Waterleaf Family): *Ellisia nyctelea* L. Rare; oak-hickory forest. *Hydrophyllum virginianum* L., John's-Cabbage. Occasional; floodplain community.

Juglandaceae (Walnut Family): *Carya cordiformis* (Wang.) K. Koch, Pignut. Very frequent; floodplain community. *Carya ovata* (Mill.) K. Koch, Shagbark Hickory. Very frequent; oak-hickory forest. *Juglans cinerea* L., Butternut. Occasional; floodplain community. *Juglans nigra* L., Black Walnut. Rare; oak-hickory forest.

Labiatae (Mint Family): *Agastache nepetoides* (L.) Ktze., Yellow Giant Hyssop. Rare; oak-hickory forest. **Leonuris cardiaca* L., Common Motherwort. Rare; floodplain community. *Lycopus americanus* Muhl. Infrequent; floodplain community. *Lycopus virginicus* L. Rare; floodplain community. *Mentha arvensis* L., Mint. Rare; floodplain community. *Monarda fistulosa* L., Wild Bergamot. Infrequent; prairie openings. **Nepeta cataria* L., Catnip. Rare; floodplain community. *Physostegia virginiana* (L.) Benth. Rare; floodplain community. *Prunella vulgaris* L. var. *lanceolata* (Bart.) Fern. Rare; oak-hickory forest. *Scutellaria lateriflora* L., Mad-Dog Skullcap. Rare; prairie openings. *Scutellaria parvula* Michx. var. *leonardi* (Epling) Fern. Infrequent; floodplain community. *Stachys tenuifolia* Willd. Occasional; floodplain commu-

nity. *Teucrium canadense* L., American Germander. Rare; floodplain community.

Leguminosae (Pulse Family): *Amorpha canescens* Pursh, Leadplant. Occasional; a dominant on some prairie openings. *Amorpha fruticosa* L., False Indigo. Rare; prairie openings. *Amphicarpa bracteata* (L.) Fern., Hog Peanut. Frequent; oak-hickory forest. *Apios americana* Medic. Rare; floodplain community. *Astragalus canadensis* L. Infrequent; prairie openings. *Astragalus caryocarpus* Ker., Ground Plum. Infrequent; prairie openings. *Cassia fasciculata* Michx., Partridge Pea. Infrequent; prairie openings. *Desmodium canadense* (L.) DC. Rare; prairie openings. *Desmodium cuspidatum* (Muhl.) Loud. Infrequent; prairie openings. *Desmodium glutinosum* (Muhl.) Wood. Very frequent; oak-hickory forest. *Desmodium illinoense* Gray. Rare; prairie openings. *Desmodium paniculatum* (L.) DC. Rare; prairie openings. *Lathyrus ochroleucus* Hook. Rare; north-facing slope community. *Lathyrus venosus* Muhl. Infrequent, prairie openings. *Lespedeza capitata* Michx. Occasional; prairie openings. **Medicago lupulina* L., Black Medic. Rare; paths in the oak-hickory forest. **Melilotus alba* Desr., White Sweet Clover. Occasional; prairie openings. **Melilotus officinalis* (L.) Lam., Yellow Sweet Clover. Infrequent; prairie openings. *Petalostemum candidum* (Willd.) Michx., White Prairie Clover. Occasional, prairie openings. *Petalostemum purpureum* (Vent.) Rydb., Purple Prairie Clover. Occasional; prairie openings. *Psoralea tenuiflora* Pursh. Occasional; prairie openings. **Trifolium pratense* L., Red Clover. Rare; floodplain community. **Trifolium repens* L., White Clover. Rare; paths in the oak-hickory forest.

Linaceae (Flax Family): *Linum sulcatum* Riddell, Flax. Infrequent; prairie openings.

Lythraceae (Loosestrife Family): *Lythrum alatum* Pursh, Loosestrife. Rare; floodplain community.

Menispermaceae (Moonseed Family): *Menispermum canadense* L., Yellow Parilla, Moonseed. Occasional; floodplain community.

Moraceae (Mulberry Family): *Morus alba* L., White Mulberry. Rare; oak-hickory forest.

Nyctaginaceae (Four-O'clock Family): *Mirabilis albida* (Walt.) Heimerl. Infrequent; prairie openings. *Mirabilis nyctaginea* (Michx.) MacM. Rare; prairie openings.

Oleaceae (Olive Family): *Fraxinus americana* L., White Ash. Occasional; floodplain community. *Fraxinus pennsylvanica* Marsh. var. *subintegerrima* (Vahl.) Fern., Green Ash. Frequent; oak-hickory forest.

Onagraceae (Evening Primrose Family): *Circaea quadrisulcata* (Maxim.) Franch. & Sav. var. *canadensis* (L.) Hara., Enchanter's Nightshade. Occasional; oak-hickory forest. *Epilobium glandulosum* Lehm. var. *adenocaulon* (Haussk.) Fern., Willow Herb. Rare; floodplain community. *Oenothera biennis* L., Evening Primrose. Rare; prairie openings.

Oxalidaceae (Wood-Sorrel Family): *Oxalis stricta* L., Occasional; prairie openings. *Oxalis violacea* L., Violet Wood-Sorrel. Rare; oak-hickory forest.

Papaveraceae (Poppy Family): *Dicentra canadensis* (Goldie) Walp., Squirrel Corn. Rare; north-facing slope community. *Dicentra cucullaria* (L.) Bernh., Dutchman's Breeches. Rare; north-facing slope community. *Sanguinaria canadensis* L., Bloodroot. Frequent; north-facing slope community.

Phrymaceae (Lopseed Family): *Phryma leptostachya* L., Lopseed. Occasional; oak-hickory forest.

Plantaginaceae (Plantain Family): *Plantago rugelii* Dcne. Infrequent; disturbed areas of the oak-hickory forest.

Polemoniaceae (Polemonium Family): *Phlox divaricata* L., Blue Phlox. Occasional; floodplain community. *Phlox pilosa* L. Rare; prairie openings.

Polygalaceae (Milkwort Family): *Polygala senega* L., Seneca Snakeroot. Rare; prairie openings.

Polygonaceae (Buckwheat Family): **Polygonum aviculare* L., Knotweed. Rare; oak-hickory forest. *Polygonum coccineum* Muhl. Rare; floodplain community. **Polygonum convolvulus* L., Black Bindweed. Infrequent, oak-hickory forest. *Polygonum pensylvanicum* L., Pinkweed. Rare; floodplain community. *Polygonum punctatum* Ell. var. *leptostachyum* (Meisn.) Small, Water Smartweed. Rare; floodplain community. *Polygonum tenue* Michx. Rare; prairie openings. **Rumex crispus* L., Yellow Dock. Rare; floodplain community. *Rumex maritimus* L., var. *fueginus* (Phil.) Dusen, Golden Dock. Rare; floodplain community. *Rumex verticillatus* L., Swamp Dock. Rare; floodplain community. *Tovara virginiana* (L.) Raf., Jumpseed. Infrequent; floodplain community.

Portulacaceae (Purslane Family): *Claytonia virginica* L., Spring Beauty. Infrequent; north-facing slope community.

Pyrolaceae (Wintergreen Family): *Monotropa uniflora* L. Rare; oak-hickory forest.

Ranunculaceae (Crowfoot Family): *Actaea rubra* (Ait.) Willd., Red Baneberry. Occasional; floodplain community. *Anemone cylindrica* Gray, Thimbleweed. Infrequent; prairie openings. *Anemone quinquefolia* L., Wood Anemone. Frequent; oak-hickory forest. *Anemone virginiana* L., Thimbleweed. Infrequent; prairie openings. *Anemonella thalictroides* (L.) Spach, Rue Anemone. Infrequent; north-facing slope community. *Aquilegia canadensis* L., Wild Columbine. Occasional; oak-hickory forest. *Clematis virginiana* L., Virgin's Bower. Infrequent; oak-hickory forest. *Hepatica acutiloba* DC., Hepatica. Frequent; north-facing slope community. *Ranunculus abortivus* L., Kidneyleaf Buttercup. Frequent; floodplain community. *Ranunculus pensylvanicus* L. f., Bristly Crowfoot. Occasional; floodplain community. *Ranunculus sceleratus* L., Cursed Crowfoot. Rare; floodplain community. *Ranunculus septentrionalis* Poir. Swamp Buttercup. Rare; oak-hickory forest. *Thalictrum dasycarpum* Fisch. & Lall., Purple Meadow Rue. Infrequent; oak-hickory forest. *Thalictrum dioicum* L., Early Meadow Rue. Very frequent; oak-hickory forest.

Rhamnaceae (Buckthorn Family): *Ceanothus americanus* L., New Jersey Tea. Rare; prairie openings. *Ceanothus ovatus* Desf. Occasional; prairie openings. **Rhamnus cathartica* L., Common Buckthorn. Infrequent; oak-hickory forest.

Rosaceae (Rose Family): *Agrimonia gryposepala* Wallr. Occasional; oak-hickory forest. *Amelanchier arborea* (Michx. f.) Fern. Very frequent; oak-hickory forest. *Crataegus mollis* (T. & G.) Scheele. Occasional; oak-hickory forest. *Fragaria vesca* L., var. *americana* Porter, Sow-Teat Strawberry. Rare; oak-hickory forest. *Fragaria virginiana* Duchesne. Occasional; oak-hickory forest. *Geum canadense* Jacq. Frequent; oak-hickory forest. *Potentilla norvegica* L. Rare; oak-hickory forest. *Prunus americana* Marsh., Wild Plum. Rare; oak-hickory forest. *Prunus mahaleb* L., Mahaleb. Rare; oak-hickory forest. *Prunus serotina* Ehrh., Black Cherry. Frequent; oak-hickory forest. *Prunus virginiana* L., Chokecherry. Frequent; oak-hickory forest. *Rosa arkansana* Porter. Occasional; oak-hickory forest. *Rosa blanda* Ait. Rare; floodplain community. *Rubus allegheniensis* Porter, Sow-Teat Bramble. Rare; oak-hickory forest. *Rubus occidentalis* L., Black Raspberry. Occasional; oak-hickory forest.

Rubiaceae (Madder Family): *Galium aparine* L., Cleav-

ers. Occasional; floodplain community. *Galium boreale* L., Northern Bedstraw. Rare; oak-hickory forest. *Galium concinnum* T. & G., Bedstraw. Frequent; oak-hickory forest. *Galium triflorum* Michx., Sweet-Scented Bedstraw. Infrequent; floodplain community.

Rutaceae (Rue Family): *Xanthoxylum americanum* Mill., Northern Prickly Ash. Occasional; oak-hickory forest.

Salicaceae (Willow Family): *Populus deltoides* Marsh., Cottonwood. Rare; floodplain community. *Populus grandidentata* Michx., Large-Toothed Aspen. Occasional; oak-hickory forest. *Populus tremuloides* Michx., Quaking Aspen. Rare; oak-hickory forest. **Salix fragilis* L., Crack Willow. Rare; floodplain community. *Salix nigra* Marsh., Black Willow. Rare; oak-hickory forest.

Santalaceae (Sandalwood Family): *Comandra richardsiana* Fern., Bastard Toadflax. Infrequent; prairie openings.

Saxifragaceae (Saxifrage Family): *Mitella diphylla* L., Coolwort. Occasional; north-facing slope community. *Penthorum sedoides* L., Ditch Stonecrop. Rare; floodplain community. *Ribes cynosbati* L., Prickly Gooseberry. Abundant; oak-hickory forest.

Scrophulariaceae (Figwort Family): *Lindernia dubia* (L.) Pennell, False Pimpernel. Rare; floodplain community. *Mimulus ringens* L., Monkey Flower. Rare; floodplain community. *Pedicularis canadensis* L., Common Lousewort. Occasional; north-facing slope community. *Scrophularia marilandica* L., Carpenter's Square. Infrequent; oak-hickory forest. **Verbascum thapsus* L., Common Mullein. Infrequent; oak-hickory forest. *Veronica perigrina* L., Neckweed. Rare; floodplain community. *Veronicastrum virginicum* (L.) Farw., Culver's Root. Occasional; oak-hickory forest.

Solanaceae (Nightshade Family): *Physalis heterophylla* Nees., Ground Cherry. Infrequent; oak-hickory forest. *Solanum americanum* Mill., Nightshade. Rare; oak-hickory forest.

Tiliaceae (Linden Family): *Tilia americana* L., Basswood. Very frequent; north-facing slope community.

Thymeliaceae (Mezereum Family): *Dirca palustris* L., Wicopy. Infrequent; oak-hickory forest.

Ulmaceae (Elm Family): *Celtis occidentalis* L., Hackberry. Frequent; floodplain community. *Ulmus americana* L., American Elm. Very frequent; floodplain community.

Umbelliferae (Parsley Family): *Cryptotaenia canadensis* (L.) DC., Honewort. Occasional; floodplain community. *Osmorhiza claytoni* (Michx.) C. B. Clarke, Sweet Jarvil. Frequent; oak-hickory forest. *Sanicula gregaria* Bickn., Sanicle. Rare; oak-hickory forest. *Sanicula marilandica* L., Sanicle. Frequent; oak-hickory forest. *Zizia aurea* (L.) W. D. J. Koch, Golden Alexanders. Occasional; prairie openings.

Urticaceae (Nettle Family): *Laportea canadensis* (L.) Wedd., Wood Nettle. Occasional; a dominant of the floodplain community. *Pilea pumila* (L.) Gray, Clearweed. Infrequent; floodplain community. **Urtica dioica* L., Stinging Nettle. Rare; floodplain community.

Verbenaceae (Vervain Family): *Lippia lanceolata* Michx. var. *recognita* Fern. & Grisc., Frog-Fruit. Rare; floodplain community. *Verbena hastata* L., Blue Vervain. Rare; floodplain community. *Verbena stricta* Vent., Hoary Vervain. Infrequent; prairie openings. *Verbena urticifolia* L., White Vervain. Rare; oak-hickory forest.

Violaceae (Violet Family): *Viola pedatifida* G. Don. Infrequent; prairie openings. *Viola pensylvanica* Michx., Smooth Yellow Violet. Occasional; floodplain community. *Viola sororia* Willd. Frequent; oak-hickory forest.

Vitaceae (Vine Family): *Parthenocissus quinquefolia* (L.) Planch., Virginia Creeper. Abundant; oak-hickory forest. *Vitis riparia* Michx., Riverbank-Grape. Frequent; oak-hickory forest.

SUMMARY

	Families	*Genera*	*Species*	
			Native	Naturalized
Pteridophyta	4	12	15	0
Spermatophyta				
Gymnospermae	1	1	1	0
Angiospermae				
Monocotyledoneae	11	49	75	7
Dicotyledoneae	61	172	237	23
Total	77	234	328	30

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