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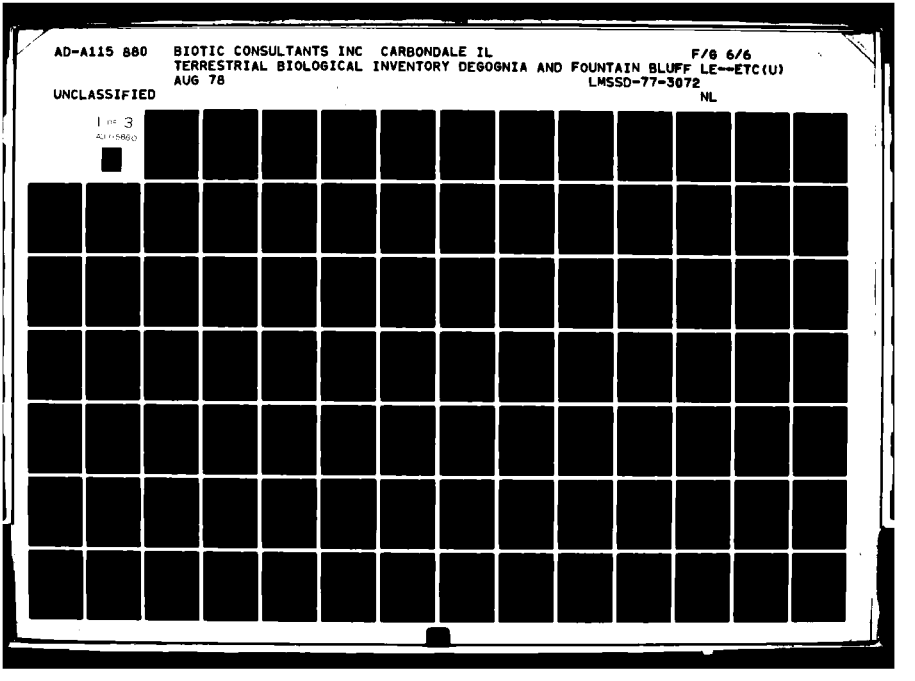

TERRESTRIAL BIOLOGICAL INVENTORY
DEGOGNIA AND FOUNTAIN BLUFF
LEVEE AND DRAINAGE DISTRICT
AND
GRAND TOWER DRAINAGE AND LEVEE DISTRICT
JACKSON COUNTY, ILLINOIS

A Report Submitted to the U. S. Army Corps of Engineers
St. Louis District
Under Contract No. LMSSD 77-3072

By
Biotic Consultants, Inc.

August, 1978

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report is the result of a nine-month inventory of the terrestrial biology of the Degognia and Fountain Bluff Levee and Drainage District and the Grand Tower Drainage and Levee District in southwestern Jackson County, Illinois.

The purpose of this inventory was to identify and quantify the terrestrial biological elements, and to provide a qualitative evaluation of the vegetation and wildlife habitats found in the study area. The inventory will serve as part

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of a planning document for the Degognia Project Area, providing environmental information to be considered in the identification of alternative solutions to water resource problems in the area.

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INTRODUCTION

This report is the result of a nine-month inventory of the terrestrial biology of the Degognia and Fountain Bluff Levee and Drainage District and the Grand Tower Drainage and Levee District in southwestern Jackson County, Illinois.

The purpose of this inventory was to identify and quantify the terrestrial biological elements, and to provide a qualitative evaluation of the vegetation and wildlife habitats found in the study area. The inventory will serve as part of a planning document for the Degognia Project Area, providing environmental information to be considered in the identification of alternative solutions to water resource problems in the area.

METHODS AND MATERIALS

Field Investigations

Vegetation

Field work was begun during the last week in September, 1977, and continued through the first week in June, 1978. Field reconnaissance was carried out initially to ascertain the exact location of every habitat in the study area.

Aerial photographs taken in 1969 and 1977 were used as a basis for the field reconnaissance. The area was mapped as a result of the field reconnaissance. Agricultural land and old fields were delineated. Every wooded tract and wetland, regardless of size, were field checked for dominant woody species.

Although few urban regions exist in the study area, those that do were studied for designation into city, suburban, and exurban areas.

Ten forested areas and four wetlands were selected by personnel from the Corps of Engineers and the Fish and Wildlife Service for intensive study.

In the forested areas, the point center quadrat method was employed. Three hundred meter long line transects were laid out randomly in each study site. At every twenty meters, the nearest tree to the point in each of four quadrants was recorded as to species, diameter breast height, and distance from the point. This information was later used to calculate % frequency, % dominance, % density, number of trees per acre, and Importance Value for each species. As the line transect was walked, each shrub or understory tree which fell within one meter on either side of the line was recorded. Plot size of 0.2 acre was laid out to ascertain the number of trees equal to or greater than 18 inches dbh. Determination of per cent of ground covered by the overstory was also made.

During May and June, 1978, one square meter quadrats were laid down every twenty meters along the transect line and the herbaceous vegetation was recorded to species and per cent of cover.

In the wetlands, the dominant aquatic macrophytes occurring in the various habitats were recorded as to species, relative abundance, and distribution. A meter-wide transect was placed randomly from the "center" deep water area to the shoreline until agriculture was encountered. Per cent cover was determined for each species.

Mammals

Mammals were recorded as a result of actual sightings and the identification of tracks and scats. In addition, small mammal traps

baited with rolled oats and peanut butter were set randomly in each of the ten forested types selected for detailed study. Traps were set for four to five days, and traps were checked once each day.

Avifauna

The bird population was surveyed throughout the entire nine-month study by use of binoculars. Some identification was made on calls. Raptor surveys were conducted periodically by driving slowly along the levees. An effort was made to locate rare or secretive species.

Amphibians and Reptiles

Observations of amphibians and reptiles were made during all of the field reconnaissances. Animals which had been killed along roads were examined and identified. Several amphibians were recorded from their choruses.

Pestiferous Plants and Animals

Plant and animal (particularly invertebrate) species were carefully noted which may prove to be a hazard to public health.

Threatened, Rare, or Endangered Species

Special effort was made to seek out any threatened, rare, or endangered species which occurred in the study area.

Mapping

Biological habitats were mapped on a base map at a scale of 1:33,000. Fifty-one distinct habitats and special areas were delineated. The ten forested areas and the four wetlands selected for intensive study were identified on the map. A second map depicting the major habitat types by groups was prepared.

Information Review

Review of Literature

Review of literature on the flora and fauna utilized 39 periodicals and numerous miscellaneous materials, including theses and dissertations, on file at Southern Illinois University, Carbondale. The literature review material was incorporated into the Information Review.

Personal Communication

Various persons knowledgeable about the area, including many local land owners, were interviewed. Their comments have been consolidated in the Information Review.

Location and Description of the Study Area

The study area is located in Jackson County, Illinois, and Perry County, Missouri, on the left bank of the Mississippi River between River Miles 75 and 100 above the mouth of the Ohio River. The study area includes about 52,500 acres of bottomlands protected by existing levees, and approximately 14,700 acres of hillside lands where runoff is drained through the levee's gravity drains. The principal streams and drainageways include Jones Pond Ditch, Reed's Creek, Big Lake Drainage Ditch, Worthen Bayou, and Hay Glade Ditch. Significant bodies of water within the study area include the 266-acre Tower Island Chute and the 9-acre Half Moon Lake. Two incorporated municipalities (Grand Tower and Gorham) are located within the study area, as are several unincorporated hamlets (Cora, Grimsby, Howardton, Jacob, Jones Ridge, Neunert, Raddle, and Sand Ridge). The total population of the study area is approximately 2,100.

Two special areas of unusual natural significance (Greentree Reservoir and Fountain Bluff) are discussed in considerable detail.

The study area is bounded on the west by the Mississippi River and on the east and south by the Big Muddy River. The northern boundary is the conspicuous range of sandstone bluffs known as the Kinkaid Hills.

Except for the monolithic Fountain Bluff, the rest of the project area is bottomland. An extensive levee system along the Mississippi River to the west and the Big Muddy River to the east and south provides protection for much of the bottomland. The narrow strips of land between the levees and the rivers are unprotected.

Although the protected bottomland apparently was forested in the past, much of it is now in cultivation. An extensive wooded area does exist between Illinois Route 3 and the Big Muddy River, and several small isolated bottomland woods occur west and south of Illinois Route 3.

Results

The entire project area was transversed to ascertain the biological composition of the area. Ten forested regions, four wetlands, and the unique Fountain Bluff were studied in detail. The remainder of the study area was examined for dominant woody species composition and fauna.

A total of 51 habitat types (including the 14 areas studied in detail) were delineated, in addition to urban habitat types.

Each of the fourteen areas will be considered first, followed by a description of the other habitat types.

Study Area A--Worthen Bayou

Worthen Bayou is a drainage area which arises north of the village of Gorham and follows a route approximately northwest to southeast until it empties into the Big Muddy River in Section 27, T9S, R3W. During the first few miles of its course, it flows through agricultural fields, but for its last four miles, it traverses heavily forested regions.

Two areas were selected for intensive study in Section 28, T9S, R3W, immediately north and west of the levee road. One area, known here as Worthen Bayou East, extends from the bayou east for approximately 1000 meters. The other area, Worthen Bayou South, extends from the bayou south for approximately 1000 meters.

Since the two areas are rather different in their vegetational composition and nature of their understory, they are discussed separately.

Worthen Bayou East is a heavily wooded region of second-growth forest. Lumbering has not occurred during the last thirty years. Several low areas of standing water exist during the wetter portions of each year.

The trees are densely spaced and form a 100% canopy cover during the growing season. Several of the trees in the 90-acre study area are of relatively large stature. Eight pin oaks, five kingnut hickories, four shingle oaks, and three common hackberries exceed a dbh of 18".

Pin oak (Quercus palustris) is the most important tree species, with an Importance Value of 121.18. Following this, with nearly equal importance to each other are kingnut hickory (Carya laciniosa) and shingle oak (Quercus imbricaria), with Importance Values of 80.16 and 70.26, respectively. Next, in order of importance, are bur oak (Quercus macrocarpa), American elm (Ulmus americana), white ash (Fraxinus americana), common hackberry (Celtis occidentalis), swamp white oak (Quercus bicolor), sweet gum (Liquidambar styraciflua), persimmon (Diospyros virginiana), honey locust (Gleditsia triacanthos), overcup oak (Quercus lyrata), yellow chestnut oak (Quercus muhlenbergii), and red haw (Crataegus mollis). Table 1 gives % Density, % Dominance, % Frequency, Importance Value, and number of large trees for Worthen Bayou East.

The shrub layer is dense with several species of shrubs and many saplings of the overstory trees. In some areas, the shrubby growth is so dense that it is almost impenetrable. Swamp holly (Ilex decidua) is the most abundant shrub, occurring in 40% of the sample plots. Of

second greatest importance among the shrubs is red haw (Crataegus mollis). Numerous 1, 2, and 3" saplings of common hackberry (Celtis occidentalis), white ash (Fraxinus americana), and kingnut hickory (Carya laciniosa) occur, although there is a paucity of young growth pin oak (Quercus palustris). Cover in the shrub layer is 5%. Table 1 gives understory data.

The herbaceous cover in Worthen Bayou East is 33%. The composition is a mixture of mesic woodland species, such as red trillium (Trillium recurvatum), spring beauty (Claytonia virginia), blue phlox (Phlox divaricata), and woolly blue violet (Viola sororia), with floodplain forest species, such as white cress (Cardamine bulbosa), spotted touch-me-not (Impatiens biflora), yellow buttercup (Ranunculus septentrionalis), smartweed (Polygonum pensylvanicum), and sedge (Carex hyalinolepis).

Greatest frequency among the ground cover species is poison ivy (Toxicodendron radicans), which occurred in 83% of the sample plots. Red trillium (Trillium recurvatum) and small crowfoot (Ranunculus abortivus) occurred in 67% of the quadrats. In 50% of the quadrats was white cress (Cardamine bulbosa), woolly blue violet (Viola sororia), sedge (Carex hyalinolepis), spring avens (Geum vernum), and yellow buttercup (Ranunculus septentrionalis).

Poison ivy (Toxicodendron radicans) provides the greatest amount of ground cover, with 16.7% of the ground in Worthen Bayou East covered by this species. Other species with major cover are yellow buttercup (Ranunculus septentrionalis) with 13.3%, red trillium (Trillium recurvatum) and sedge (Carex hyalinolepis) with 8.3%, and small crowfoot (Ranunculus abortivus) and woolly blue violet (Viola sororia) with 6.7%.

Many other species occur sporadically in Worthen Bayou East. Of special significance are a few small colonies of the rare sedge, Carex socialis. Herbaceous data may be found in Table 2.

Worthen Bayou South is an area of secondary forest which has developed after cutting of the timber within the last twenty years. Most of the trees are relatively small, with only three specimens of pin oak (Quercus palustris) found with a dbh of 18" or more. Species diversity is much less in Worthen Bayou South than in Worthen Bayou East. Pin oak (Quercus palustris), kingnut hickory (Carya laciniosa), and bur oak (Quercus macrocarpa) are the leading species, with Importance Values of 140.57, 115.13, and 81.56, respectively. Of less importance are shingle oak (Quercus imbricaria), persimmon (Diospyros virginiana), American elm (Ulmus americana), and white ash (Fraxinus americana).

The overstory canopy is relatively sparse, forming only a 30% cover.

Common species in the shrub layer are swamp holly (Ilex decidua), rough-leaved dogwood (Cornus drummondii), and hawthorn (Crataegus mollis).

Tree saplings which occur include kingnut hickory (Carya laciniosa), white ash (Fraxinus americana), pin oak (Quercus palustris), bur oak (Quercus macrocarpa), and common hackberry (Celtis occidentalis). Per cent cover in the shrub layer is 3.8.

Herbaceous vegetation is dense, forming a cover of 75%. Manna grass (Glyceria striata) and yellow buttercup (Ranunculus septentrionalis) are most frequent, with a frequency of 67%. Next frequent, at 50%, are smartweed (Polygonum pensylvanicum), cinquefoil (Potentilla simplex), and poison ivy (Toxicodendron radicans).

Providing the greatest percenzage of ground cover are manna grass (Glyceria striata) with 16.7%, cinquefoil (Potentilla simplex) with 14.2%, munro grass (Panicum agrostoides) with 10.0%, and smartweed (Polygonum pensylvanicum) and poison ivy (Toxicodendron radicans), each with 7.5%.

Table 1

Woody Plant Data
Worthen Bayou (East)

Overstory

Species	% Density	% Dominance	% Frequency	I. V.	Trees Over 18"
Pin Oak Quercus palustris	28.8	32.38	60	121.18	2
Kingnut Hickory Carya laciniosa	16.3	13.86	50	80.16	1
Shingle Oak Quercus imbricaria	15	15.26	40	70.26	1
Bur Oak Quercus macrocarpa	11.3	8.80	35	55.10	
American Elm Ulmus americana	5	4.55	20	29.55	
White Ash Fraxinus americana	5	4.41	20	29.41	
Common Hackberry Celtis occidentalis	5	8.02	15	28.02	1
Swamp White Oak Quercus bicolor	2.5	3.91	10	16.41	
Sweet Gum Liquidambar styraciflua	2.5	3.19	10	15.69	
Persimmon Diospyros virginiana	2.5	1.49	10	13.99	
Honey Locust Gleditsia triacanthos	2.5	1.12	10	13.62	
Overcup Oak Quercus lyrata	1.3	1.26	5	7.56	
Yellow Chestnut Oak Quercus muhlenbergii	1.3	0.87	5	7.17	
Red Haw Crataegus mollis	1.3	0.87	5	7.17	

Understory

Species	% Dominance	% Cover
Swamp Holly Ilex decidua	28.2	2.1
Red Haw Crataegus mollis	20.6	0.9
Common Hackberry Celtis occidentalis	20.6	0.7

Understory (Cont'd.)

Species	% Dominance	% Cover
White Ash Fraxinus americana	18.8	0.6
Kingnut Hickory Carya laciniosa	9.8	0.6
Pin Oak Quercus palustris	2.0	0.1

Woody Plant Data
Worthen Bayou (South)

Overstory

Species	% Density	% Dominance	% Frequency	I. V.	Trees Over 18"
Pin Oak Quercus palustris	37.5	38.07	65	140.57	1
Kingnut Hickory Carya laciniosa	27.5	22.63	65	115.13	
Bur Oak Quercus macrocarpa	18.75	17.81	45	81.56	
Shingle Oak Quercus imbricaria	7.5	12.26	20	39.76	
Persimmon Diospyros virginiana	5.0	3.22	20	28.22	
American Elm Ulmus americana	2.5	2.69	10	15.19	
White Ash Fraxinus americana	1.25	3.31	5	9.56	

Understory

Species	% Dominance	% Cover
Swamp Holly Ilex decidua	35.3	1.7
Rough-leaved Dogwood Cornus drummondii	19.6	0.8
Red Haw Crataegus mollis	15.5	0.6
Kingnut Hickory Carya laciniosa	10.2	0.3
White Ash Fraxinus americana	6.8	0.1

Understory (Cont'd.)

Species	% Dominance	% Cover
Pin Oak *Quercus palustris*	4.6	0.1
Bur Oak *Quercus macrocarpa*	4.0	0.1
Common Hackberry *Celtis occidentalis*	4.0	0.1

Table 2

Herbaceous (and Seedling) Data
Worthen Bayou (East)

Species	% Cover	% Frequency
Poison Ivy Toxicodendron radicans	16.7	83
Marsh Buttercup Ranunculus septentrionalis	13.3	50
Red Trillium Trillium recurvatum	8.3	67
Sedge Carex hyalinolepis	8.3	50
Small Crowfoot Ranunculus abortivus	6.7	67
Woolly Blue Violet Viola sororia	6.7	50
Bulbous Cress Cardamine bulbosa	5.8	50
Common Blue Phlox Phlox divaricata	5.0	33
White Avens Geum vernum	5.0	50
Spotted Touch-me-not Impatiens biflora	3.3	33
Spring Beauty Claytonia virginica	3.3	33
Smartweed Polygonum pensylvanicum	3.3	17
Bedstraw Galium aparine	2.5	33
Kingnut Hickory Carya laciniosa	2.5	17
Panic Grass Panicum lanuginosum	2.5	17
Wahoo Euonymus atropurpureus	1.7	17
Yellow Loosestrife Lysimachia ciliata	1.7	17
Red Haw Crataegus mollis	1.7	17

Table 2

Herbaceous (and Seedling) Data
Worthen Bayou (South)

Species	% Cover	% Frequency
Bulbous Cress Cardamine bulbosa	4.2	33
Marsh Buttercup Ranunculus septentrionalis	10.0	67
Blackberry Rubus allegheniensis	3.3	33
Smartweed Polygonum pensylvanicum	7.5	50
Cinquefoil Potentilla simplex	14.2	50
Poison Ivy Toxicodendron radicans	7.5	50
Manna Grass Glyceria striata	16.7	67
Small Crowfoot Ranunculus abortivus	1.7	17
Mountain Mint Pycnanthemum pycnanthemoides	3.3	33
Sedge Carex hyalinolepis	5.8	33
Fleabane Erigeron annuus	3.3	33
Woolly Blue Violet Viola sororia	0.8	17
Yellow Loosestrife Lysimachia ciliata	0.8	17
Common Blue Phlox Phlox divaricata	0.8	17
Spring Beauty Claytonia virginica	0.8	17
False Garlic Nothoscordum bivalve	1.7	17
Tall Goldenrod Solidago altissima	1.7	17
Sedge Carex scoparia	1.7	17
Munro Grass Panicum agrostoides	10.0	17
Water Parsley Sium suave	4.2	17

Study Area B--South Woods

South Woods occurs immediately south of Half Moon Lake in Section 32, T10S, R3W. It is found on both sides of a 30-foot wide drainage area running in a northwest to southeast direction. It is an area of approximately 35 acres.

The area shows signs of severe disturbance by man, and an abandoned roadway can barely be made out through the center of the area.

The canopy is closed with a 95% cover of the overstory. Several very large trees which survived earlier lumbering occur. Trees 18" in diameter or larger, together with the number of specimens, are cottonwood (Populus deltoides) - 11, silver maple (Acer saccharinum) - 6, American elm (Ulmus americana) - 5, pecan (Carya illinoensis) - 2, and overcup oak (Quercus lyrata) - 2.

The tree with the greatest Importance Value is silver maple (Acer saccharinum), with an Importance Value of 125.48. Also playing a dominant role in South Woods are pecan (Carya illinoensis), with an Importance Value of 89.38, American elm (Ulmus americana), with 70.13, overcup oak (Quercus lyrata), with 54.94, and cottonwood (Populus deltoides), with 52.93. Table 3 lists the major tree species in South Woods.

The shrub layer is dominated by coarse, shrubby poison ivy (Toxicodendron radicans), catbrier (Smilax rotundifolia), swamp holly (Ilex decidua), and many saplings of the major tree species. Per cent cover of the shrub layer is 5.9. Table 3 gives understory data.

The average ground cover provided by herbs, vines, and woody plant seedlings is 40%. Although the South Woods is fairly uniform throughout most of its area, one extensive colony of scouring rush (Equisetum hyemale) occurs.

Poison ivy (Toxicodendron radicans) and rough bedstraw (Galium aparine) are the most frequently encountered herbs and they provide the greatest per cent of ground cover. Each species occurred in every one of the sample plots. Rough bedstraw averaged 31.5% of the total ground cover, with poison ivy providing 28.0% of the cover.

Other herbs which play a major role in the understory are chervil (Chaerophyllum procumbens), spotted touch-me-not (Impatiens biflora), moonseed (Menispermum canadense), wild garlic (Allium vineale), and scouring rush (Equisetum hyemale). Herbaceous data are given in Table 4.

Table 3

Woody Plant Data
South Woods

Overstory

Species	% Density	% Dominance	% Frequency	I. V.	Trees Over 18"
Silver Maple Acer saccharinum	29.17	29.64	66.67	125.48	1
Pecan Carya illinoensis	16.67	14.38	58.33	89.38	1
American Elm Ulmus americana	12.50	15.96	41.67	70.13	1
Overcup Oak Quercus lyrata	12.50	9.11	33.33	54.94	1
Cottonwood Populus deltoides	8.33	19.60	25.00	52.93	2
Common Hackberry Celtis occidentalis	6.25	2.87	25.00	34.12	
Sweet Gum Liquidambar styraciflua	6.25	4.75	16.67	27.67	
Honey Locust Gleditsia triacanthos	4.17	2.43	16.67	23.27	
Pin Oak Quercus palustris	2.08	1.26	8.33	11.67	

Understory

Species	% Dominance	% Cover
Poison Ivy Toxicodendron radicans	60.6	3.9
Catbrier Smilax rotundifolium	15.8	1.1
Swamp Holly Ilex decidua	12.2	0.5
Silver Maple Acer saccharinum	6.1	0.2
Pecan Carya illinoensis	3.0	0.1
American Elm Ulmus americana	2.3	0.1

Table 4

Herbaceous (and Seedling) Data
South Woods

Species	% Cover	% Frequency
Bedstraw Galium aparine	31.5	100
Poison Ivy Toxicodendron radicans	28.0	100
Chervil Chaerophyllum procumbens	5.5	30
Moonseed Menispermum canadense	4.5	30
Spotted touch-me-not Impatiens biflora	2.5	30
Wild Garlic Allium vineale	4.5	20
False Buckwheat Polygonum convolvulus	3.5	20
Smartweed Polygonum pensylvanicum	3.5	20
White Ash Fraxinus americana	2.0	20
Scouring Rush Equisetum hyemale	6.0	10
Missouri Violet Viola missouriensis	3.0	10
Fleabane Erigeron annuus	1.0	10
Pokeweed Phytolacca americana	1.0	10
Silver Maple Acer saccharinum	1.0	10
Summer Grape Vitis aestivalis	1.0	10
Yellow Loosestrife Lysimachia ciliata	1.0	10
Spring Avens Geum vernum	0.5	10

Study Area C--Greentree Reservoir

An area known as the Oakwood Bottoms forms an extensive forest cover in a region generally bordered by Worthen Bayou on the north, the junction of Big Bayou and the Big Muddy River on the south, Illinois Route 3 on the west, and the Big Muddy River on the east. Some of the forest cover is broken by agricultural practice, notably immediately adjacent to Illinois Route 3.

The precise area included in the Oakwood Bottoms is parts or all of Sections 28, 29, 32, 33, and 34 of T9S, R3W, in Sections 2, 3, 4, 5, 8, 9, 10, 11, 14, 15, 16, 17, 19, 20, 21, 22, 27, 28, 29, 30 of T10S, R3W. It covers approximately 11,000 acres.

Although the area appears flat, there is a gradual rise in elevation of 2 feet per mile from south to north and from east to west.

The Shawnee National Forest, which acquired most of the land between 1933 and 1938, constructed much of the area as a Greentree Reservoir in 1964. The reservoir provides a public hunting facility and commercial timber stands of pin oak and cherrybark oak (McIlwain, 1967). The reservoir is flooded during the fall, usually in November, and is drained before the next growing season begins.

Although several plant communities exist in the Greentree Reservoir, the predominant one is the pin oak community. Detailed sampling of the vegetation was made only in the pin oak community, but the other communities are described in the special section of this report devoted to the Greentree Reservoir.

The pin oak community sampled in this study was located in Section 9, T10S, R3W. The sample area was 300 acres. In this particular plot, the canopy provided by the overstory is 100%.

Pin oak (Quercus palustris) is a complete dominant in the community, showing an Importance Value of 216.08. Next in importance is silver maple (Acer saccharinum), with a value of 57.15, followed by green ash (Fraxinus lanceolata) with 43.14, bald cypress (Taxodium distichum) with 33.65, slippery elm (Ulmus rubra) with 31.55, and honey locust (Gleditsia triacanthos) with 22.96.

Several trees in the 300-acre plot reached dbh of 18" or greater. There were 104 pin oaks in this size class, 7 bald cypresses, 5 slippery elms, 3 green ashes, 2 silver maples, and 2 cherrybark oaks.

The shrub layer in this community is composed almost entirely of saplings of the major tree species. Slippery elm and green ash saplings are particularly abundant. An occasional hawthorn (Crataegus sp.) and swamp holly (Ilex decidua) may be found. Per cent cover in the shrub layer is 6.3. Tree and shrub data are given in Table 5.

The herbaceous zone is rather dense, with an average cover of 60.6%. Many species are present, with the dominant ones being beggar's-lice (Bidens aristosa), lizard's-tail (Saururus cernuus), moneywort (Lysimachia nummularia), sedge (Carex hyalinolepis), and smartweed (Polygonum pensylvanicum).

Several plants of unusual occurrence grow in this community. These include the parsley haw (Crataegus marshallii), green haw (Crataegus viridis), sponge plant (Limnobium spongia), swamp manna grass (Glyceria septentrionalis), bishop's weed (Ptilimnium costatum), and cynosciadium (Cynosciadium digitatum). Table 6 gives the herbaceous data.

Table 5

Woody Plant Data
Greentree Reservoir

Overstory

Species	% Density	% Dominance	% Frequency	I. V.	Trees Over 18"
Pin Oak Quercus palustris	47.78	70.80	97.5	216.08	11
Silver Maple Acer saccharinum	16.63	5.52	35.0	57.15	1
Green Ash Fraxinus lanceolata	8.13	5.01	30.0	43.14	1
Bald Cypress Taxodium distichum	6.25	7.40	20.0	33.65	2
Slippery Elm Ulmus rubra	5.63	3.42	22.5	31.55	1
Honey Locust Gleditsia triacanthos	3.75	1.71	17.5	22.96	
Black Willow Salix nigra	2.50	1.41	10.0	13.91	
Persimmon Diospyros virginiana	2.50	1.35	10.0	13.85	
Cherrybark Oak Quercus pagodaefolia	1.25	1.69	5.0	7.94	1
Cottonwood Populus deltoides	1.25	0.68	5.0	6.93	
Shingle Oak Quercus imbricaria	0.63	0.47	2.5	3.60	
Sugarberry Celtis laevigata	0.63	0.33	2.5	3.46	
Sycamore Platanus occidentalis	0.63	0.21	2.5	3.34	

Understory

Species	% Dominance	% Cover
Slippery Elm Ulmus rubra	40.5	3.1
Green Ash Fraxinus lanceolata	40.5	2.6
Swamp Holly Ilex decidua	9.5	0.3
Hawthorn Crataegus sp.	9.5	0.3

Table 6

Herbaceous (and Seedling) Data
Greentree Reservoir

Species	% Cover	% Frequency
Sedge		
Carex hyalinolepis	21.88	50.0
Moneywort		
Lysimachia nummularia	15.63	50.0
Beggar's-tick		
Bidens aristosa	29.38	37.5
Smartweed		
Polygonum pensylvanicum	8.13	37.5
Water Parsley		
Sium suave	5.00	37.5
Verticillate Dock		
Rumex verticillata	3.13	37.5
Lizard's-tail		
Saururus cernuus	8.75	12.5
Pin Oak		
Quercus palustris	2.50	12.5
Blue Iris		
Iris shrevei	1.25	12.5
Marsh Buttercup		
Ranunculus septentrionalis	1.25	12.5
Dewberry		
Rubus flagellaris	1.25	12.5
Water Plantain		
Alisma subcordatum	1.25	12.5
Smooth Bedstraw		
Galium obtusum	0.63	12.5

Study Area D--Grand Tower Island

Grand Tower Island comprises approximately 1260 acres of land located between 266-acre Grand Tower Chute and the levee road. It occupies parts of Section 31, T10S, R3W, Section 36, T10S, R4W, Section 6 and 7, T11S, R3W, and Section 1 and 12, T11S, R4W. Grand Tower Chute was at one time a channel of the Mississippi River. Consequently, Grand Tower Island, despite its location east of the current channel of the Mississippi River, is in Perry County, Missouri.

The island is comprised of loess and has several low ridges and swales. Although forested in the past, all but the peripheral zone bordering Grand Tower Chute is under cultivation. There are now only about 120 acres of woods.

The woods that do occur show great signs of disturbance by man, although a part of the woods in Section 6 has a unique assemblage of herbaceous plants. Where the woods occur, there is an 85% closure of the canopy.

Several large trees occur along the periphery of Grand Tower Island adjacent to the Grand Tower Chute. Twenty-four cottonwoods (Populus deltoides) have a diameter of 18" or greater, while there are 3 sycamores (Platanus occidentalis) in this size range, 2 honey locusts (Gleditsia triacanthos), and one each of common hackberry (Celtis occidentalis), black willow (Salix nigra), silver maple (Acer saccharinum), and osage orange (Maclura pomifera).

Although not attaining sizes in excess of 12 inches dbh, box elder (Acer negundo) is the most important tree with an Importance Value of 129.88. Next in importance are sycamore (Platanus occidentalis) and cottonwood (Populus deltoides), with Importance Values of 74.85 and 64.55, respectively. Other common trees are common hackberry (Celtis occidentalis), black willow (Salix nigra), osage orange (Maclura pomifera), and silver maple (Acer saccharinum).

The shrub layer is dominated by saplings of the major tree species. Great entanglements of grape (Vitis aestivalis) often form impenetrable thickets. Per cent cover in the shrub layer is 5.9. Table 7 gives tree and shrub data.

The herbaceous layer is very diverse and provides an average cover of 69%. The dominant herb is yellow corydalis (Corydalis flavula), which occurs in 85.7% of the sample plots and has an average cover of 19.64%. Other common herbs are false nettle (Boehmeria cylindrica), rough bedstraw (Galium aparine), and spotted touch-me-not (Impatiens biflora).

A remarkable assemblage of unusual herbs occurs in the center of the main wooded area of Section 6. The dominant herbs in this community

are the round-leaved stinging nettle (Urtica chamaedryoides), smooth rock cress (Arabis glabra), small waterleaf (Phacelia ranunculacea), and onion mustard (Alliaria officinalis). The first three of these are rare for this region and represent the first reports of them for Perry County, Missouri. The onion mustard was heretofore unknown from Missouri. Herbaceous data are given in Table 8.

Table 7

Woody Plant Data
Grand Tower Island

Overstory

Species	% Density	% Dominance	% Frequency	I. V.	Trees Over 18"
Box Elder Acer negundo	36.25	18.63	75.0	129.88	
Sycamore Plantanus occidentalis	17.50	17.35	40.0	74.85	1
Cottonwood Populus deltoides	11.25	28.30	25.0	64.55	3
Common Hackberry Celtis occidentalis	8.75	7.74	25.0	41.49	1
Black Willow Salix nigra	7.50	6.97	20.0	34.47	1
Osage Orange Maclura pomifera	6.25	6.90	20.0	33.15	1
Silver Maple Acer saccharinum	5.00	6.37	20.0	31.37	1
Honey Locust Gleditsia triacanthos	2.50	4.74	10.0	17.24	2
White Ash Fraxinus americana	2.50	1.50	10.0	14.00	
Sweet Gum Liquidambar styraciflua	1.25	0.91	5.0	7.16	
American Elm Ulmus americana	1.25	0.58	5.0	6.83	

Understory

Species	% Dominance	% Cover
Grape Vitis aestivalis	80.0	5.1
Box Elder Acer negundo	10.2	0.5
Sycamore Platanus occidentalis	4.1	0.1
Common Hackberry Celtis occidentalis	4.1	0.1
Silver Maple Acer saccharinum	1.6	0.1

Table 8

Herbaceous (and Seedling) Data
Grand Tower Island

Species	% Cover	% Frequency
Yellow Corydalis Corydalis flavula	19.64	85.71
Stinging Nettle Urtica chamaedryoides	8.21	42.85
Bedstraw Galium aparine	7.14	35.71
Purple Dead Nettle Lamium purpureum	5.36	35.71
False Nettle Boehmeria cylindrica	9.28	28.57
Spotted Touch-me-not Impatiens biflora	7.14	21.43
Sweet Cicely Osmorhiza longistylis	6.79	21.43
Woodland Smartweed Polygonum virginianum	0.71	21.43
Garlic Mustard Alliaria officinalis	7.14	14.29
Elderberry Sambucus canadensis	3.93	14.29
Sedge Carex cephalophora	2.14	14.29
Poison Ivy Toxicodendron radicans	1.42	14.29
Woolly Blue Violet Viola sororia	1.07	14.29
Virginia Creeper Parthenocissus quinquefolia	0.71	14.29
Miami Mist Phacelia purshii	5.00	7.14
Pennyroyal Hedeoma pulegioides	4.29	7.14
Marsh Buttercup Ranunculus septentrionalis	1.07	7.14
Honeysuckle Lonicera japonica	1.07	7.14
Small Crowfoot Ranunculus abortivus	0.71	7.14
Henbit Lamium amplexicaule	0.71	7.14
Bristly Catbrier Smilax hispida	0.36	7.14
Spring Avens Geum vernum	0.36	7.14

Table 8 (Cont'd.)

Species	% Cover	% Frequency
Smooth Bedstraw		
Galium obtusum	0.36	7.14
Common Hackberry		
Celtis occidentalis	0.36	7.14
Missouri Violet		
Viola missouriensis	0.36	7.14
Blackberry		
Rubus allegheniensis	0.36	7.14
Johnny-jump-up		
Viola rafinesquii	0.36	7.14

Study Area E--Lewis Woods

Lewis Woods is located in Section 25, T9S, R4W, approximately 1/2 mile west of Gorham. The area may be described as a low, bottomland woods with occasional pools of standing water in the lowest areas. Some of these pools remain with water throughout the entire year. The size of the woods is approximately 320 acres.

Red maple (Acer rubrum) is the dominant tree, with an Importance Value of 136.09. Green ash (Fraxinus lanceolata) is also a major component of Lewis Woods, with an Importance Value of 99.05. Of next major significance are pin oak (Quercus palustris) with an Importance Value of 65.99, swamp cottonwood (Populus heterophylla) with 58.83, American elm (Ulmus americana) with 52.58, sweet gum (Liquidambar styraciflua) with 34.30, common hackberry (Celtis occidentalis) with 29.05, and black willow (Salix nigra) with 28.52. Of less importance are honey locust (Gleditsia triacanthos), water locust (Gleditsia aquatica), pecan (Carya illinoensis), Shumard oak (Quercus shumardii), bur oak (Quercus macrocarpa), sycamore (Platanus occidentalis), and persimmon (Diospyros virginiana).

The canopy is dense in Lewis Woods, with an average cover of 90%. Several large trees with a dbh 18" or greater occur. In this size class are 29 red maples (Acer rubrum), 14 American elms (Ulmus americana), 8 black willows (Salix nigra), 7 green ashes (Fraxinus lanceolata), 5 pin oaks (Quercus palustris), 5 swamp cottonwoods (Populus heterophylla), 2 sweet gums (Liquidambar styraciflua), 2 pecans (Carya illinoensis), and 1 water locust (Gleditsia aquatica). Table 9 gives the woody plant data.

The only plants which occur in the shrub layer are saplings of the major tree species. They account for 4.8% cover. The shrub data may be found in Table 9.

The herbaceous cover is typical of floodplain woods, except for a small area of mesophytic woodland herbs which grow on a slightly elevated ridge. The mesophytic species include red trillium (Trillium recurvatum), woolly blue violet (Viola sororia), and green dragon (Arisaema dracontium).

The floodplain herbs are dominated by yellow buttercup (Ranunculus septentrionalis), smartweed (Polygonum pensylvanicum), rough bedstraw (Galium aparine), chervil (Chaerophyllum procumbens), spotted touch-me-not (Impatiens biflora), and poison ivy (Toxicodendron radicans).

The average cover of the herbs in Lewis Woods is 60%. See Table 10 for the herbaceous composition.

Table 9

Woody Plant Data
Lewis Woods

Overstory

Species	% Density	% Dominance	% Frequency	I. V.	Trees Over 18"
Red Maple Acer rubrum	26.25	34.84	75.0	136.09	4
Green Ash Fraxinus lanceolata	21.25	15.30	62.5	99.05	1
Pin Oak Quercus palustris	15.00	10.99	40.0	65.99	1
Swamp Cottonwood Populus heterophylla	10.71	8.12	40.0	58.83	1
American Elm Ulmus americana	9.29	10.79	32.5	52.58	2
Sweet Gum Liquidambar styraciflua	6.43	5.37	22.5	34.30	1
Common Hackberry Celtis occidentalis	6.43	2.62	20.0	29.05	
Black Willow Salix nigra	5.00	6.02	17.5	28.52	1
Honey Locust Gleditsia triacanthos	2.14	1.92	7.5	11.56	
Water Locust Gleditsia aquatica	0.71	1.06	2.5	4.27	1
Pecan Carya illinoensis	0.71	1.06	2.5	4.27	1
Shumard Oak Quercus shumardii	0.71	0.74	2.5	3.95	
Bur Oak Quercus macrocarpa	0.71	0.64	2.5	3.85	
Sycamore Platanus occidentalis	0.71	0.33	2.5	3.54	
Persimmon Diospyros virginiana	0.71	0.21	2.5	3.42	

Understory

Species	% Dominance	% Cover
Green Ash Fraxinus lanceolata	33.3	1.7
Pin Oak Quercus palustris	33.3	1.5

Understory (Cont'd.)

Species	% Dominance	% Cover
American Elm Ulmus americana	16.7	0.8
Red Maple Acer rubrum	16.7	0.8

Table 10

Herbaceous (and Seedling) Data
Lewis Woods

Species	% Cover	% Frequency
Poison Ivy Toxicodendron radicans	13.0	80
Bedstraw Galium aparine	11.5	80
Spotted Touch-me-not Impatiens biflora	12.0	70
Marsh Buttercup Ranunculus septentrionalis	20.5	60
Chervil Chaerophyllum procumbens	9.0	60
Smartweed Polygonum pensylvanicum	14.5	40
Spring Avens Geum vernum	4.5	30
Missouri Violet Viola missouriensis	1.5	20
Red Trillium Trillium recurvatum	4.0	10
Red Maple Acer rubrum	3.5	10
False Nettle Boehmeria cylindrica	1.0	10
Honewort Cryptotaenia canadensis	1.0	10
Woolly Blue Violet Viola sororia	1.0	10
Moonseed Menispermum canadense	1.0	10
Sedge Carex tribuloides	1.0	10
Green Dragon Arisaema dracontium	0.5	10
Fescue Festuca pratensis	0.5	10

Study Area F--Rathjen Woods

Rathjen Woods is located in Section 26, T9S, R4W, two miles west of Gorham. Big Lake Ditch forms the western boundary of the woods. The vegetation is floodplain forest. Lowest areas have standing water throughout much of the year. The 95-acre tract of woods has an overstory cover of 85%. The forest is of relatively recent secondary growth, with few large trees present. The only trees with a dbh of 18" or greater are two American elms (Ulmus americana).

Dominating the Rathjen woods is silver maple (Acer saccharinum), whose Importance Value of 119.19 is nearly twice that of its nearest competitor, white ash (Fraxinus americana), which has an Importance Value of 72.48. Pecan (Carya illinoensis) is a co-dominant species with an Importance Value of 66.68. American elm (Ulmus americana) and common hackberry (Celtis occidentalis) are also significant woody species. Table 11 indicates the woody species composition.

In addition to numerous saplings of the major woody species in the shrub layer are pruinose haw (Crataegus pruinosa), swamp holly (Ilex decidua), and entanglements of bristly catbrier (Smilax hispida) and summer grape (Vitis aestivalis). Total per cent cover of the shrub layer is 11.0. Table 11 gives the shrub data.

Seedlings of silver maple (Acer saccharinum) are abundant in the ground cover, but manna grass (Glyceria striata) is the predominant herb. Other herbs occurring rather frequently are hairy rye grass (Elymus villosus), sedges (Carex hyalinolepis and C. gracilescens), and yellow buttercup (Ranunculus septentrionalis). A complete list of the ground cover species found in the study plots at Rathjen Woods is in Table 12.

The average ground cover for the woods is 35%.

Table 11

Woody Plant Data
Rathjen Woods

Overstory

Species	% Density	% Dominance	% Frequency	I. V.	Trees Over 18"
Silver Maple Acer saccharinum	30.56	16.41	72.22	119.19	
White Ash Fraxinus americana	15.28	18.31	38.89	72.48	
Pecan Carya illinoensis	11.11	16.24	33.33	66.68	
American Elm Ulmus americana	11.11	15.83	27.78	54.72	2
Common Hackberry Celtis occidentalis	11.11	6.88	33.33	51.32	
Sweet Gum Liquidambar styraciflua	5.56	8.87	22.22	36.65	
Honey Locust Gleditsia triacanthos	5.56	7.57	22.22	35.35	
Sycamore Platanus occidentalis	4.17	4.61	16.67	25.45	
Bur Oak Quercus macrocarpa	1.39	2.89	5.56	9.84	
Swamp Cottonwood Populus heterophylla	1.39	1.20	5.56	8.15	
Persimmon Diospyros virginiana	1.39	1.20	5.56	8.15	

Understory

Species	% Dominance	% Cover
Pruinose Haw Crataegus pruinosa	15.0	1.7
Swamp Holly Ilex decidua	15.0	1.5
Bristly Catbrier Smilax hispida	20.0	2.8
Summer Grape Vitis aestivalis	20.0	2.4
Silver Maple Acer saccharinum	10.0	1.1
White Ash Fraxinus americana	10.0	0.7

Understory (Cont'd.)

Species	% Dominance	% Cover
American Elm Ulmus americana	5.0	0.4
Common Hackberry Celtis occidentalis	5.0	0.4

Table 12

Herbaceous (and Seedling) Data
Rathjen Woods

Species	% Cover	% Frequency
Silver Maple Acer saccharinum	9.0	60
Manna Grass Glyceria striata	24.5	50
Marsh Buttercup Ranunculus septentrionalis	9.5	40
Sedge Carex gracilescens	9.5	30
Box Elder Acer negundo	7.0	30
Sedge Carex hyalinolepis	4.0	30
Rye Grass Elymus villosus	11.0	20
Smartweed Polygonum pensylvanicum	5.0	20
Beggar's-tick Bidens aristosa	2.5	20
Tall Dock Rumex altissima	3.0	20
Summer Grape Vitis aestivalis	2.0	20
White Ash Fraxinus americana	2.0	20
Small Crowfoot Ranunculus abortivus	2.0	20
Bedstraw Galium aparine	4.0	10
American Elm Ulmus americana	1.0	10
Swamp Holly Ilex decidua	1.0	10
Wood Sage Teucrium canadense	1.0	10
Sedge Carex flaccosperma	0.5	10
Fireweed Erechtites hieracifolia	0.5	10

Study Area G--Jacob Park Woods

Jacob Park Woods is a 15-acre tract of woods lying along the section line between Sections 14 and 15, T9S, R4W, approximately 1/4 mile southeast of the Jacob Community Park.

A drainage area flows through the center of the woods from north to south, providing a continuously wet swale. On either side of the swale is slightly elevated land which provides habitat for a floodplain woods. About one-half of the woods is in the early stages of secondary succession with the result that few trees of large stature occur. Trees 18" dbh or greater in the Jacob Park Woods are three water locusts (Gleditsia aquatica), three silver maples (Acer saccharinum), one pecan (Carya illinoensis), and two sweet gums (Liquidambar styraciflua). The canopy has about a 70% enclosure.

Pecan (Carya illinoensis) totally dominates the Jacob Park Woods, with a 100% Frequency and an Importance Value of 234.55. Water locust (Gleditsia aquatica) attains unusual dominance in southern Illinois with an Importance Value of 60.29. Other trees, with their Importance Values, are silver maple (Acer saccharinum) with 47.32, sweet gum (Liquidambar styraciflua) with 26.94, black willow (Salix nigra) with 11.18, swamp cottonwood (Populus heterophylla) with 10.49, and common hackberry (Celtis occidentalis) with 9.18. Table 13 gives the woody plant data.

The shrub layer in Jacob Park Woods has a good diversity of species. Those most frequent are pruinose hawthorn (Crataegus pruinosa), swamp holly (Ilex decidua), rough-leaved dogwood (Cornus drummondii), bristly catbrier (Smilax hispida), poison ivy (Toxicodendron radicans), and abundant saplings of silver maple (Acer saccharinum), common hackberry (Celtis occidentalis), and slippery elm (Ulmus rubra). Per cent cover of the shrubs is 6.5. Shrub data are given in Table 13.

Herbaceous vegetation provides an average ground cover of 60%. Dominant species in the woods are smartweed (Polygonum pensylvanicum), yellow buttercup (Ranunculus septentrionalis), white avens (Geum canadense), sedge (Carex muskingumensis), and Missouri violet (Viola missouriensis). In the swale that bisects the woods, the leading herbs are sedge (Carex hyalinolepis), water parsley (Sium suave), and spotted touch-me-not (Impatiens biflora).

The complete herbaceous plant list for the study sites is in Table 14.

Table 13

Woody Plant Data
Jacob Park Woods

Overstory

Species	% Density	% Dominance	% Frequency	I. V.	Trees Over 18"
Pecan					
Carya illinoensis	69.64	64.91	100.00	234.55	1
Water Locust					
Gleditsia aquatica	10.71	13.87	35.71	60.29	1
Silver Maple					
Acer saccharinum	10.71	8.04	28.57	47.32	1
Sweet Gum					
Liquidambar styraciflua	3.57	9.08	14.29	26.94	1
Black Willow					
Salix nigra	1.79	2.25	7.14	11.18	
Swamp Cottonwood					
Populus heterophylla	1.79	1.56	7.14	10.49	
Common Hackberry					
Celtis occidentalis	1.79	0.25	7.14	9.18	

Understory

Species	% Dominance	% Cover
Pruinose Hawthorn		
Crataegus pruinosa	20.0	1.4
Swamp Holly		
Ilex decidua	10.0	1.0
Rough-leaved Dogwood		
Cornus drummondii	10.0	0.8
Bristly Catbrier		
Smilax hispida	5.0	0.6
Poison Ivy		
Toxicodendron radicans	5.0	0.6
Silver Maple		
Acer saccharinum	40.0	1.8
Common Hackberry		
Celtis occidentalis	5.0	0.2
Slippery Elm		
Ulmus rubra	5.0	0.1

Table 14

Herbaceous (and Seedling) Data
Jacob Park Woods

Species	% Cover	% Frequency
Smartweed Polygonum pensylvanicum	20.5	80
Marsh Buttercup Ranunculus septentrionalis	15.0	50
Poison Ivy Toxicodendron radicans	8.0	50
Missouri Violet Viola missouriensis	8.0	50
White Avens Geum canadense	5.5	50
Bedstraw Galium aparine	5.0	50
Sedge Carex muskingumensis	10.0	40
Water Parsley Sium suave	9.5	30
Sedge Carex hyalinolepis	8.0	30
Rough-leaved Dogwood Cornus drummondii	1.5	20
Small Crowfoot Ranunculus abortivus	1.0	20
Tall Goldenrod Solidago canadensis	1.0	10
Manna Grass Glyceria striata	1.0	10
Sedge Carex gracilescens	1.0	10
American Elm Ulmus americana	1.0	10
Chervil Chaerophyllum procumbens	0.5	10
Curly Dock Rumex crispus	0.5	10
Blackberry Rubus allegheniensis	0.5	10
Spotted Touch-me-not Impatiens biflora	0.5	10
Water Primrose Jussiaea repens	0.5	10
Red Maple Acer rubrum	0.5	10

Study Area H--Hound Woods

Hound Woods is located in Section 1, T9S, R5W, one mile west of Raddle and one-half mile south of the Missouri Pacific Railroad. It is a low swampy woods with standing water during much of the year. One small pond near the center of the 25-acre woods has been impounded. The canopy provides 95% cover during the growing season.

Several large trees grow in these woods, with black willows (Salix nigra) obtaining the greatest size. In the size class of 18" dbh or greater, there are 25 black willows, 9 silver maples (Acer saccharinum), 4 cottonwoods (Populus deltoides), 3 white ashes (Fraxinus americana), and 3 box elders (Acer negundo).

The trees are dominated by three species. White ash (Fraxinus americana) is very abundant, occurring with 70% frequency and with an Importance Value of 150.15. Nearly as prominent is black willow (Salix nigra), also with a frequency of 70% but with an Importance Value of 137.91. Silver maple (Acer saccharinum), with an Importance Value of 78.91, is nonetheless a significant member of the community. Other trees, in order of descending importance, are water locust (Gleditsia aquatica), common hackberry (Celtis occidentalis), box elder (Acer negundo), cottonwood (Populus deltoides), American elm (Ulmus americana), and swamp cottonwood (Populus heterophylla).

Table 15 provides data for the woody species in Hound Woods.

The shrub layer in Hound Woods is sparse, with only saplings of the major tree species present. Cover of the shrub layer is 2.7. See Table 15 for data.

Ground cover provided by the herbaceous species averages 42.5%. The predominant herbs are marsh aster (Aster ontarionis) and sedge (Carex hyalinolepis), together forming nearly 25% of the total ground cover. Other prominent herbs are spotted touch-me-not (Impatiens biflora), wood sage (Teucrium canadense), lizard's-tail (Saururus cernuus), and smartweed (Polygonum pensylvanicum).

Many weedy herbs are present in Hound Woods, primarily because the present landowner runs cows and pigs in the woods during some seasons.

Table 16 gives the herbaceous data for Hound Woods.

Table 15

Woody Plant Data
Hound Woods

Overstory

Species	% Density	% Dominance	% Frequency	I.V.	Trees Over 18"
White Ash Fraxinus americana	41.67	38.48	70.00	150.15	1
Black Willow Salix nigra	30.83	37.08	70.00	137.91	3
Silver Maple Acer saccharinum	18.33	17.25	43.33	78.91	2
Water Locust Gleditsia aquatica	3.33	1.95	13.33	18.61	
Common Hackberry Celtis occidentalis	2.50	0.58	10.00	13.08	
Box Elder Acer negundo	0.83	2.07	3.33	6.23	1
Cottonwood Populus deltoides	0.83	1.71	3.33	5.87	1
American Elm Ulmus americana	0.83	0.61	3.33	4.77	
Swamp Cottonwood Populus heterophylla	0.83	0.27	3.33	4.43	

Understory

Species	% Dominance	% Cover
Black Willow Salix nigra	33.3	1.3
White Ash Fraxinus americana	16.7	0.6
Silver Maple Acer saccharinum	16.7	0.4
Common Hackberry Celtis occidentalis	16.7	0.2
American Elm Ulmus americana	16.7	0.2

Table 16

Herbaceous (and Seedling) Data
Hound Woods

Species	% Cover	% Frequency
Sedge Carex hyalinolepis	11.67	50.0
Lizard's-tail Saururus cernuus	6.25	41.7
Wood Sage Teucrium canadense	4.17	33.3
Marsh Aster Aster ontarionis	12.08	25.0
Spotted Touch-me-not Impatiens biflora	6.67	25.0
Wood Rush Cinna arundinacea	5.83	25.0
Sedge Carex tribuloides	10.00	16.7
Smartweed Polygonum pensylvanicum	8.75	16.7
Verticillate Dock Rumex verticillatus	4.17	16.7
Moneywort Lysimachia nummularia	3.33	16.7
Water Parsley Sium suave	2.50	16.7
Butterweed Senecio glabellus	2.50	16.7
Morning-glory Ipomoea hederacea	2.08	16.7
Water Hyssop Lycopus rubellus	0.83	16.7
Marsh Buttercup Ranunculus septentrionalis	6.67	8.3
Manna Grass Glyceria septentrionalis	4.17	8.3
Velvet-leaf Abutilon theophrastii	2.08	8.3
False Buckwheat Polygonum convolvulus	2.08	8.3
Tall Dock Rumex altissimus	0.83	8.3
Bedstraw Galium aparine	0.83	8.3
Giant Ragweed Ambrosia trifida	0.83	8.3
Curly Dock Rumex crispus	0.83	8.3
Buttercup Ranunculus sceleratus	0.42	8.3
Bulbous Cress Cardamine bulbosa	0.42	8.3

Study Area I--Korando Woods

Korando Woods is located in Section 36, T8S, R5W, approximately one mile west of Raddle. The seventy-acre woodland is bisected by Matusky Creek which flows through the area. During wetter seasons of the year, much of Korando Woods is under some water. An open water area near the south end of the woods provides an excellent area for deer and other wildlife.

Except for the open water area, the canopy is closed during the growing season with nearly 100% cover.

The Korando Woods has a more diverse flora than most of the woods west of the Oakwood Bottoms. Nineteen different species of trees fell at points along the transect.

Shagbark hickory (Carya ovata) and common hackberry (Celtis occidentalis) are nearly equal co-dominants. Shagbark hickory has an Importance Value of 71.74, while common hackberry has an Importance Value of 71.63. Nearly as significant is swamp white oak (Quercus bicolor) with an Importance Value of 66.06, American elm (Ulmus americana) with 52.41, and shingle oak (Quercus imbricaria) with 49.39.

Many large trees occur in the woods. Those 18" dbh or greater are 22 shagbark hickories (Carya ovata), 17 common hackberries (Celtis occidentalis), 14 American elms (Ulmus americana), 10 swamp white oaks (Quercus bicolor), 9 bur oaks (Quercus macrocarpa), 7 Shumard oaks (Quercus shumardii), 5 sugar maples (Acer saccharum), 4 white ashes (Fraxinus americana), 3 shingle oaks (Quercus imbricaria), and 1 pin oak (Quercus palustris). The woody plant data may be found in Table 17.

The shrub layer in Korando Woods is also dense. Abundant shrubs are pawpaw (Asimina triloba), swamp holly (Ilex decidua), rusty nannyberry (Viburnum rufidulum), red haw (Crataegus mollis), and spicebush (Lindera benzoin). Many saplings of the major trees occupy the shrub zone as well. Per cent cover for the shrub layer is 9.4. Shrub data are given in Table 17.

There are two types of herbaceous plant communities. The community in the lower, wetter areas is composed of typical floodplain species such as bulbous cress (Cardamine bulbosa), blue iris (Iris shrevei), spotted touch-me-not (Impatiens biflora), moneywort (Lysimachia nummularia), yellow buttercup (Ranunculus septentrionalis), marsh aster (Aster ontarionis), wood reed (Cinna arundinacea), and sedge (Carex hyalinolepis).

On slightly higher elevations are communities of more mesophytic herbs. These include red trillium (Trillium recurvatum), common blue phlox (Phlox divaricata), yellow violet (Viola eriocarpa), harbinger-of-spring (Erigenia bulbosa), woolly blue violet (Viola sororia), and green dragon (Arisaema dracontium).

The average per cent cover of the herbaceous vegetation in Korando Woods is 55%. Table 18 gives the herbaceous plant data.

Table 17

Woody Plant Data
Korando Woods

Overstory

Species	% Density	% Dominance	% Frequency	I.V.	Trees Over 18"
Shagbark Hickory Carya ovata	12.14	16.74	42.86	71.74	3
Common Hackberry Celtis occidentalis	12.86	15.91	42.86	71.63	2
Swamp White Oak Quercus bicolor	13.57	15.35	37.14	66.06	1
American Elm Ulmus americana	10.71	10.27	31.43	52.41	2
Shingle Oak Quercus imbricaria	10.00	7.96	31.43	49.39	1
White Ash Fraxinus americana	7.86	7.03	22.86	37.75	1
Sugar Maple Acer saccharum	6.42	3.28	20.00	29.70	1
Pin Oak Quercus palustris	5.00	3.03	20.00	28.03	1
Pumpkin Ash Fraxinus tomentosa	7.14	3.74	14.29	25.17	
Bur Oak Quercus macrocarpa	2.86	4.27	11.43	18.56	2
Shumard Oak Quercus shumardii	2.14	4.17	8.57	14.88	1
Red Maple Acer rubrum	2.14	1.44	8.57	12.15	
Blue Beech Carpinus caroliniana	2.14	0.49	8.57	11.20	
Honey Locust Gleditsia triacanthos	3.06	0.65	5.71	9.52	
Pecan Carya illinoensis	0.71	1.96	2.86	5.53	
Cottonwood Populus deltoides	0.71	1.31	2.86	4.88	
Yellow Chestnut Oak Quercus muhlenbergii	0.71	1.31	2.86	4.88	
Coffee Tree Gymnocladus dioica	0.71	0.58	2.86	4.15	
Bitternut Hickory Carya cordiformis	0.71	0.40	2.86	3.97	

Understory

Species	% Dominance	% Cover
Pawpaw Asimina triloba	24.2	2.3
Swamp Holly Ilex decidua	18.2	1.9
Rusty Nannyberry Viburnum rufidulum	12.1	1.4
Red Haw Crataegus mollis	12.1	1.2
Spicebush Lindera benzoin	9.1	0.8
American Elm Ulmus americana	9.1	0.8
Common Hackberry Celtis occidentalis	6.1	0.5
Shagbark Hickory Carya ovata	6.1	0.3
Shingle Oak Quercus imbricaria	3.0	0.2

Table 18

Herbaceous (and Seedling) Data
Korando Woods

Species	% Cover	% Frequency
Poison Ivy *Toxicodendron radicans*	21.33	53.3
Marsh Buttercup *Ranunculus septentrionalis*	15.67	53.3
Moneywort *Lysimachia nummularia*	16.00	46.7
Wild Onion *Allium canadense*	7.33	40.0
Bedstraw *Galium aparine*	3.67	33.0
Marsh Aster *Aster ontarionis*	4.00	26.7
Bulbous Cress *Cardamine bulbosa*	2.67	20.0
Sedge *Carex rosea*	2.00	13.3
Spotted Touch-me-not *Impatiens biflora*	2.00	13.3
Common Blue Phlox *Phlox divaricata*	2.00	13.3
Shagbark Hickory *Carya ovata*	1.00	13.3
Yellow Violet *Viola eriocarpa*	1.00	13.3
Woolly Blue Violet *Viola sororia*	0.33	13.3
Harbinger-of-spring *Erigenia bulbosa*	3.33	6.7
Wild Garlic *Allium vineale*	2.00	6.7
Blue Iris *Iris shrevei*	2.00	6.7
Virginia Creeper *Parthenocissus quinquefolia*	0.67	6.7
Low Dogwood *Cornus racemosa*	0.67	6.7
Red Trillium *Trillium recurvatum*	0.67	6.7
Wood Reed *Cinna arundinacea*	0.67	6.7
Spring Avens *Geum vernum*	0.67	6.7
Swamp White Oak *Quercus bicolor*	0.33	6.7

Species	% Cover	% Frequency
Pawpaw		
Asimina triloba	0.33	6.7
Spicebush		
Lindera benzoin	0.33	6.7
Green Dragon		
Arisaema dracontium	0.33	6.7
Speedwell		
Veronica arvensis	0.33	6.7
Pin Oak		
Quercus palustris	0.33	6.7
Trumpet Creeper		
Campsis radicans	0.33	6.7

Study Area J--Kessel Woods

Kessel Woods, 30 acres in size, is located in Section 32, T8S, R4W, approximately one mile northeast of Raddle. It is a low, wet woods bisected by a drainage creek. The lowest areas are usually wet throughout the year, particularly on the west side of the creek.

The trees provide a 90% cover and are some of the largest in the area. Trees 18" dbh or greater are 26 swamp cottonwoods (Populus heterophylla), 15 pumpkin ashes (Fraxinus tomentosa), 9 black willows (Salix nigra), 4 water locusts (Gleditsia aquatica), 4 silver maples (Acer saccharinum), 3 red maples (Acer rubrum), 2 pin oaks (Quercus palustris), 1 pecan (Carya illinoensis), and 1 American elm (Ulmus americana).

Three species nearly totally dominate Kessel Woods. They are pumpkin ash (Fraxinus tomentosa), with an Importance Value of 161.06, swamp cottonwood (Populus heterophylla), with 120.95, and water locust (Gleditsia aquatica), with 74.15. Red maple (Acer rubrum) is moderately important, with an Importance Value of 46.15. Woody plant data appear in Table 19.

In the wettest area of the woods, buttonbush (Cephalanthus occidentalis) is frequent in the shrub zone. Other plants in the shrub layer are saplings of the major tree species. The shrubs form a cover of 4.6%. Data for the shrubs are in Table 19.

The herbaceous plants provide an average cover of 45%. The understory composition is characteristic of swampy woods and indicates that Kessel Woods is the wettest of all the woodlands examined west of the Oakwood Bottoms. Typical of the swampy woods are the verticillate dock (Rumex verticillatus), arrow arum (Peltandra virginica), lizard's-tail (Saururus cernuus), water parsley (Sium suave), manna grass (Glyceria septentrionalis), marsh crowfoot (Ranunculus sceleratus), swamp buttercup (Ranunculus flabellaris), and lake cress (Armoracia aquatica).

Table 20 provides data for the herbaceous vegetation.

Table 19

Woody Plant Data
Kessel Woods

Overstory

Species	% Density	% Dominance	% Frequency	I. V.	Trees Over 18"
Pumpkin Ash					
Fraxinus tomentosa	39.58	33.98	87.50	161.06	2
Cottonwood					
Populus deltoides	25.00	33.45	62.50	120.95	4
Water Locust					
Gleditsia aquatica	15.63	12.69	45.83	74.15	1
Red Maple					
Acer rubrum	10.42	6.56	29.17	46.15	1
Black Willow					
Salix nigra	3.13	6.42	12.50	22.05	1
Silver Maple					
Acer saccharinum	3.13	3.06	12.50	18.69	1
Pin Oak					
Quercus palustris	1.04	1.57	4.17	6.78	1
Pecan					
Carya illinoensis	1.04	1.24	4.17	6.45	1
American Elm					
Ulmus americana	1.04	1.09	4.17	6.30	1

Understory

Species	% Dominance	% Cover
Buttonbush		
Cephalanthus occidentalis	70.0	4.1
Pumpkin Ash		
Fraxinus tomentosa	20.0	0.3
Red Maple		
Acer rubrum	5.0	0.1
Silver Maple		
Acer saccharinum	5.0	0.1

Table 20

Herbaceous (and Seedling) Data
Kessel Woods

Species	% Cover	% Frequency
Verticillate Dock Rumex verticillatus	16.0	90
Lizard's-tail Saururus cernuus	18.5	60
Marsh Aster Aster ontarionis	15.0	40
Arrow Arum Peltandra virginica	6.5	40
Water Parsley Sium suave	6.0	40
Beggar's-ticks Bidens aristosa	5.5	40
Manna Grass Glyceria septentrionalis	4.0	30
Water Hyssop Stachys palustris	3.0	30
False Aster Boltonia asteroides	4.0	20
Butterweed Senecio glabellus	2.5	20
Small Crowfoot Ranunculus micranthus	2.5	20
Buttercup Ranunculus sceleratus	2.5	20
Sedge Carex hyalinolepis	2.0	20
Spotted Touch-me-not Impatiens biflora	1.5	20
Blue Iris Iris shrevei	2.0	10
Buttonbush Cephalanthus occidentalis	2.0	10
Slippery Elm Ulmus rubra	1.0	10
Sedge Carex stipata	1.0	10
Bulbous Cress Cardamine bulbosa	1.0	10
Speedwell Veronica arvensis	1.0	10
Bedstraw Galium aparine	0.5	10
Chervil Chaerophyllum procumbens	0.5	10
Blackberry Rubus allegheniensis	0.5	10
Dewberry Ranunculus flabellaris	0.5	10
Water Mustard Armoracia aquatica	0.5	10

Study Area K--Lovett's Pond

Lovett's Pond is a wetland habitat which qualities as an Inland Deep Fresh Marsh as defined in Circular 39 of the United States Department of the Interior Fish and Wildlife Service. It is located in Section 33, T8S, R4W, approximately one mile west of the junction of Illinois Routes 3 and 151. The central 40-acre area of Lovett's Pond is continuously inundated with up to 3 1/2 feet of water. No trees occupy this large area of open, deep water. As the water level becomes less toward the periphery, more vegetation is encountered. Where the water level does not exceed one foot in depth throughout the year, a woody plant community exists. This community is composed of pumpkin ash (Fraxinus tomentosa), water locust (Gleditsia aquatica), swamp cottonwood (Populus heterophylla), silver maple (Acer saccharinum), black willow (Salix nigra), and buttonbush (Cephalanthus occidentalis).

The central treeless area has a surface nearly covered by duckweeds (Lemna minor, Spirodela oligorhiza, and Wolffia columbiana). Mats of coontail (Ceratophyllum demersum) choke much of the open water. Pondweeds (Potamogeton diversifolius and P. nodosus) are common. Arrowleaf (Sagittaria latifolia) is the most abundant emergent herb in the open water.

A one-meter wide transect was laid out from the area of deepest water (about 3 1/2 feet) until that part of the bottomland forest was reached where there was no longer standing water.

At every place along the transect in the open water, submerged and floating vegetation of duckweeds (Lemna minor, Spirodela polyrhiza, and Wolffia columbiana), coontail (Ceratophyllum demersum), and pondweeds (Potamogeton diversifolius and P. nodosus) were encountered. The first emergent vegetation was encountered at about the 3-foot level with arrowleaf (Sagittaria latifolia) present. Arrowleaf remained the only emergent herb until about the 1 1/2 foot level. At this depth, several rooted herbs were encountered. These included water plantain (Alisma subcordatum), verticillate dock (Rumex verticillatus), and water smartweed (Polygonum amphibium var. stipulaceum).

At approximately the one-foot water depth, woody vegetation became common. Buttonbush (Cephalanthus occidentalis) was the first woody plant encountered, soon followed by pumpkin ash (Fraxinus tomentosa) and water locust (Gleditsia aquatica). Herbaceous plants growing in the 1-foot deep or less zone included lizard's-tail (Saururus cernuus), verticillate dock (Rumex verticillatus), water parsley (Sium suave), sedge (Carex stipata), and false aster (Boltonia asteroides).

The low, adjacent floodplain woods, where inundation is only seasonal, is dominated in the herbaceous layer by white cress (Cardamine bulbosa), spotted touch-me-not (Impatiens biflora), smartweed (Polygonum pensylvanicum), yellow buttercup (Ranunculus septentrionalis), and manna grass (Glyceria striata). The canopy species which predominate are black willow (Salix nigra), silver maple (Acer saccharinum), and swamp cottonwood (Populus heterophylla).

Table 21 gives the herbaceous data.

Table 21

Herbaceous Plant Data
Lovett's Pond

Species	% Cover	% Frequency
Duckweeds (Lemna, Spirodela, Wolffia)	17.14	50
Coontail Ceratophyllum demersum	14.29	50
Pondweeds Potamogeton spp.	14.29	40
Arrowleaf Sagittaria latifolia	11.42	40
Water Plantain Alisma subcordatum	10.00	40
Verticillate Dock Rumex verticillatus	8.57	40
Water Parsley Sium suave	8.57	30
Sedge Carex stipata	5.71	30
False Aster Boltonia asteroides	4.29	30
Lizard's-tail Saururus cernuus	2.86	20
Smartweed Polygonum pensylvanicum	1.43	20
Water Smartweed Polygonum amphibium	1.43	10

Study Areas L and M--Cottonwood Slough

Study Areas L and M actually represent the same body of open water, but are separated physically by an elevated strip of land used by the landowner for access to his cropland.

Nonetheless, samples were taken in each area by running a 1.0 meter wide transect from the area of deepest water to the shoreline until agriculture was encountered.

Both areas qualify as Inland Deep Fresh Marshes as defined by Circular 39 of the Department of the Interior Fish and Wildlife Service. They contain up to three feet of standing water during the wettest seasons of the year, but unlike Lovett's Pond (Study Area K), the water level diminishes during the drier seasons. Both areas are filled sloughs and are bordered partly by bottomland forest and partly by cropland.

The westernmost area has been designated as Study Area L. It has generally a shallower water level than Study Area M.

Area L is located in Section 20, T9W, R4W.

The deepest water during the sampling period was approximately 2 feet. There was a notable absence of duckweeds, pondweeds, and coontail. Emergent vegetation is sparse in the deeper water, with only a few specimens of water parsley (Sium suave), false aster (Boltonia asteroides), and verticillate dock (Rumex verticillatus).

At 12-inch to 6-inch water depth, the dominant herbs are verticillate dock (Rumex verticillatus), water parsley (Sium suave), manna grass (Glyceria striata), false aster (Boltonia asteroides), and sedges (Carex stipata and C. muskingumensis).

From the 6-inch depth to the area which is not inundated, the prevailing herbaceous species, in addition to those listed above, are butterweed (Senecio glabellus) and yellow cress (Rorippa sessiliflora).

The wooded tract which surrounds the west section of Cottonwood Slough is composed of cottonwood (Populus deltoides), black willow (Salix nigra), common hackberry (Celtis occidentalis), and white ash (Fraxinus americana). The shrubs are primarily swamp holly (Ilex decidua) and swamp privet (Forestiera acuminata).

The east portion of Cottonwood Slough, referred to here as Study Area M, occupies approximately 8 acres. It is mostly in Section 21, T9S, R4W, with a small extension into Section 20.

The water is deeper in this area than in the western slough, reading a maximum depth of about three feet. A transect 1.0 meter wide was run from this area of deeper water to the shoreline.

At the deepest water level, only duckweed (Lemna minor) and an occa-

sional water lotus (Nelumbo lutea) grows. As the water depth lessened to about 18 inches, the duckweed and water lotus became more abundant and were joined at about the 24-inch level by manna grass (Glyceria striata), false aster (Boltonia asteroides), verticillate dock (Rumex verticillatus), and sedge (Carex stipata).

In the water depth zone of 4" to 18", many species become common. In decreasing order of per cent cover are manna grass (Glyceria striata), water parsley (Sium suave), verticillate dock (Rumex verticillatus), curly dock (Rumex crispus), pondweed (Potamogeton nodosus), creeping water primrose (Jussiaea repens), sedge (Carex normalis), and foxtail (Alopecurus aequalis).

A part of the eastern end of Cottonwood Slough is bordered by cropland, while the remainder of the slough border is woodland. The woods is dominated by black willow (Salix nigra), with somewhat less important species being cottonwood (Populus deltoides) and common hackberry (Celtis occidentalis).

Herbaceous data for Cottonwood Slough are in Table 22.

Table 22

Herbaceous Plant Data
Cottonwood Slough

Species	% Cover	% Frequency
Verticillate Dock Rumex verticillata	15.56	80
Water Parsley Sium suave	13.33	70
False Aster Boltonia asteroides	12.22	60
Manna Grass Glyceria striata	12.22	60
Sedges (Carex spp.)	11.11	60
Curly Dock Rumex crispus	7.77	40
Water Primrose Jussiaea repens	5.55	30
Butterweed Senecio glabellus	5.55	30
Foxtail Alopecurus aequalis	5.55	20
Yellow Cress Rorippa sessiliflora	4.44	20
Pondweed Potamogeton nodosus	2.22	20
Water Lotus Nelumbo lutea	2.22	10
Duckweed Lemna minor	2.22	10

Study Area N--Cypress Slough

Cypress Slough lies in parts of Sections 16 and 21, T9S, R4W, approximately 1 1/4 miles southwest of Jacob. It is an inland shallow fresh marsh, as defined by Circular 39 of the United States Department of the Interior Fish and Wildlife Service. The slough, which is in the shape of an elongated curve, is approximately 50 feet wide at its widest part. The eastern border is paralleled by a paved county road, while the other borders are either adjacent to cropland or to stands of small black willows (Salix nigra). At the southern extremity are two large, planted, 70-year-old bald cypresses (Taxodium distichum).

Since the water level varies in depth only from 0 to about 12", there is no difference in the herbaceous vegetation encountered. Instead of running a transect from the center deep water to the shoreline, a series of one meter square quadrats were laid out along a compass line along the length of the slough.

The average cover exhibited by the herbaceous plants is 55%. The most frequently occurring species are burhead (Sparganium eurycarpum), common smartweed (Polygonum pensylvanicum), and beggar's-tick (Bidens aristosa). The beggar's-tick and common smartweed account for 66.5% of the total herbaceous cover.

Table 23 gives the data for the herbaceous species.

In one area where the water depth reached 24 inches at the time of the study, duckweed (Lemna minor) and pondweed (Potamogeton nodosus) occur.

Table 23

Herbaceous Plant Data
Cypress Slough

Species	% Cover	% Frequency
Burhead		
Sparganium eurycarpum	17.5	60
Beggar's-ticks		
Bidens aristosa	34.0	50
Smartweed		
Polygonum pensylvanicum	32.5	50
White Smartweed		
Polygonum lapathifolium	5.0	20
Manna Grass		
Glyceria striata	3.5	20
Hibiscus		
Hibiscus lasiocarpos	3.0	20
Verticillate Dock		
Rumex verticillatus	2.0	20
Dogbane		
Apocynum cannabinum	1.0	10
Cocklebur		
Xanthium commune	1.0	10
False Aster		
Boltonia asteroides	0.5	10

Other Habitats in the Project Area

In addition to the ten forested areas and four wetlands studied in detail, a field reconnaissance was made in the remainder of the project area. A total of 54 additional plant association types and special areas were determined to be present, in addition to urban and exurban areas in the major communities. These 54 areas are described briefly below. The number given to these plant association types and special areas corresponds to the numbers on the map of the project area.

Type 1--Agricultural Land

The greatest land mass in the project area is in cropland, with the major crops, in order of total importance, being soybeans, corn, and wheat. Approximately 34,600 acres in the project area at the time of this study are devoted to agriculture.

Type 2--Kinkaid Hills Woods

The Kinkaid Hills, in essence, form the northern boundary of the project area, occurring as a nearly continuous range of bluffs from Cora on the west to Little Kinkaid Creek on the east. The Kinkaid Hills is a range of sandstone escarpments, facing south, and rising to an elevation rarely greater than 100 feet above the valley below.

The woods below the bluff are dominated by red oak (Quercus rubra), white oak (Quercus alba), American elm (Ulmus americana), and white ash (Fraxinus americana). Other trees present are slippery elm (Ulmus rubra), box elder (Acer negundo), and cottonwood (Populus deltoides) on the lowest ground, and redbud (Cercis canadensis), bitternut hickory (Carya cordiformis), shumard oak (Quercus shumardii), yellow chestnut oak (Quercus muhlenbergii), and black haw (Viburnum prunifolium) above.

Slope woods are dominated by shagbark hickory (Carya ovata), shingle oak (Quercus imbricaria), white oak (Quercus alba), and sugar maple (Acer saccharum). Other woody plants present on the slope include swamp holly (Ilex decidua), false shagbark hickory (Carya ovalis), common hackberry (Celtis occidentalis), wild black cherry (Prunus serotina), red haw (Crataegus mollis), wahoo (Euonymus atropurpurea), and red mulberry (Morus rubra).

On the drier but seldom completely exposed bluffs are red oak (Quercus rubra), yellow chestnut oak (Quercus muhlenbergii), white ash (Fraxinus americana), and sugar maple (Acer saccharum).

The approximate acreage of the Kinkaid Hills in the project area, from Illinois Route 3 to a distance one mile north to the west of the hills, is approximately 8320 acres.

Type 3--Pasture Land

Type 3 areas are pasture lands with scattered trees primarily of red cedar (Juniperus virginiana), American elm (Ulmus americana), and, in the lower areas, black willow (Salix nigra). This habitat is located several places near the base of the Kinkaid Hills and north of Illinois Route 3. There are approximately 126 acres of Type 3.

Type 4--Miscellaneous Garden Patches

A few miscellaneous garden patches are of sufficient size to justify mapping. They total approximately two acres.

Type 5--Black Willow-Cottonwood

This is a wet habitat, subjected to standing water throughout most of the year. It is characterized by nearly exclusive stands of black willow (Salix nigra) and cottonwood (Populus deltoides). Most areas with Type 5 vegetation are in the unprotected floodplain between the levee and the Mississippi River, primarily from Cora to Wagner's Landing.

In the protected floodplain, Type 5 occurs as an isolated stand in Section 27, T8S, R5W, and along some drainageways, primarily in Section 34, T8S, R5W. The total acreage for Type 5 in the protected floodplain is approximately 46.

Type 6--Cottonwood

Type 6 is a small isolated stand of nearly pure cottonwood (Populus deltoides). This area is wet throughout much of the year. It is found in Section 13, T8S, R5W, and covers approximately 9 acres.

Type 7--Black Willow-Cottonwood-Silver Maple

Floodplain forests of Type 7 are found entirely in the unprotected floodplain along the Mississippi River from Wagner's Landing south to the mouth of the Big Muddy River. They also parallel the Big Muddy River along its southernmost course. A vast amount of Type 7 occurs, although some of it is punctuated by attempts at cultivation.

Type 8--Lovett's Pond

This is a swampy woods surrounding open water known as Lovett's Pond. It is discussed in detail as Study Area K. The approximate total acreage for Type 8, including the open water, is 185 acres.

Type 9--Abandoned Fields

Abandoned fields are cleared lands which have lain idle for one growing season or more. They are in various stages of old field succession, depending on the length of time they have been abandoned. The fields display a wide diversity of weedy herbs, followed by shrubs and small trees.

Common among the herbs are penny cress (Thlaspi arvense), fleabane (Erigeron annuus), goldenrods (Solidago canadensis and S. nemoralis), and white aster (Aster pilosus). Woody encroachment is made by smooth sumac (Rhus glabra), sassafras (Sassafras albidum), and persimmon (Diospyros virginiana).

Abandoned fields are found in Section 28, T9S, R3W, in Section 29, T10S, R3W, in Section 8, T10S, R3W, and in Sections 34 and 35, T8S, R4W. Type 9 covers approximately 150 acres.

Type 10--Kessel Woods

This is a swamp forest known as Kessel Woods. It is discussed in detail as Study Area J.

Type 11--Silver Maple-Black Willow-Peach-leaved Willow

These are low, wooded areas. They differ from other wet woods in the area by the presence of peach-leaved willow (Salix amygdaloides), along with silver maple (Acer saccharinum) and black willow (Salix nigra). This type of woods is located in Sections 31, 32, and 33, T8S, R4W, and in Sections 5 and 6, T9S, R4W. The total acreage is 135.

Type 12--Cat-tail Marsh

One small, treeless marshy area of 2 acres occurs in the project area where cat-tail (Typha latifolia) is the predominant plant. This marsh is located in Section 5, T9S, R4W.

Type 13--Hound Woods

This is a swamp forest designated in this study as Hound Woods. It is discussed in detail as Study Area H.

Type 14--Korando Woods

This swampy forest is known as Korando Woods. It is discussed in detail as Study Area I.

Type 15--Pin Oak-Shagbark Hickory-Winged Elm

Type 15 is a mesic woods which is wet in the winter, but dries out in the summer. The dominant trees are pin oak (Quercus palustris), shagbark hickory (Carya ovata), and winged elm (Ulmus alata). The understory is covered with poison ivy (Toxicodendron radicans). This woods is located in Section 8, T9S, R3W. It covers approximately 25 acres.

Type 16--Pin Oak-Overcup Oak

Type 16 is along the northern edge of the Oakwood Bottoms. It is bisected by Worthen Bayou. This type is very similar to the Oakwood Bottoms (Type 39), but has overcup oak (Quercus lyrata) growing in greater numbers than in Type 39. Pin oak (Quercus palustris) is the dominant tree, while swamp holly (Ilex decidua) is significant in the shrub layer.

Areas determined to be of the pin oak-overcup oak type are located in Sections 9, 16, 17, 18, 19, and 20, T9S, R3W.

The total acreage for Type 16 is approximately 770 acres.

Type 17--Pin Oak-Honey Locust-Red Maple

This is a wet woods type, probably representing a rather recently cut-over Oakwoods Bottom forest type. Pin oak (Quercus palustris) is still the dominant tree, but the associated species are primarily honey locust (Gleditsia triacanthos), red maple (Acer rubrum), silver maple (Acer saccharinum), and green hawthorn (Crataegus viridis). In the wetter areas, cottonwood (Populus deltoides) and black willow (Salix nigra) are important species.

There are several scattered patches of Type 17. They occur in Sections 1 and 2, T9S, R4W, and in Sections 18, 19, 24, and 30, T10S, R3W. The total acreage is approximately 145.

Type 18--Diversified Wet Woods

This is a wet woodland type in which pin oak (Quercus palustris) is the dominant species, but there is a more diversified woody flora than in Type 17. It is also similar to the Oakwood Bottoms (Type 39), but lacks such woody plants as cherrybark oak (Quercus pagodaefolia). The herbaceous understory lacks the diversity found in the understory of the Oakwood Bottoms. In addition to pin oak, other frequent trees are red maple (Acer rubrum), honey locust (Gleditsia triacanthos), white ash (Fraxinus americana), swamp cottonwood (Populus heterophylla), shingle oak (Quercus imbricaria), slippery elm (Ulmus rubra), red oak (Quercus rubra), and sweet gum (Liquidambar styraciflua). Swamp privet (Forestiera acuminata) dominates the shrub layer.

Type 18 is located in Sections 9 and 10, T9S, R4W. It totals approximately 75 acres.

Type 19--Black Willow-Cottonwood-Slippery Elm

This is a wet woods type with standing water throughout much of the year. The co-dominant trees are black willow (Salix nigra) and cottonwood (Populus deltoides), with slippery elm (Ulmus rubra) playing an important role. Honey locust (Gleditsia triacanthos) is another frequent species. This type is composed of approximately 20 acres.

Type 20--Lucy Pond

Known locally as Lucy Pond, this is a standing water swamp, located in Section 9, T9S, R4W. The swamp is inundated with up to 2 feet of water in some portions throughout the year. Duckweeds (Lemna minor, Spirodela oligorhiza, and Wolffia columbiana) cover much of the water surface. Trees which grow in the swamp include water locust (Gleditsia aquatica), swamp cottonwood (Populus heterophylla), pecan (Carya illinoensis), black willow (Salix nigra), silver maple (Acer saccharinum), common hackberry (Celtis occidentalis), and red maple (Acer rubrum). Buttonbush (Cephalanthus occidentalis) is the common shrub in the standing water. This is the only station in the project area for water hickory (Carya aquatica).

Lucy Pond occupies approximately 45 acres.

Type 21--Rathjen Woods

Details of this woods may be found described under Study Area F of this report.

Type 22--Pecan

Although many isolated pecans (Carya illinoensis) occur throughout the bottomlands in the project area, they are rarely found in natural groves. A small stand of approximately 5 acres of nearly pure pecans is located in Section 5, T9S, R4W.

Type 23--Pin Oak-Pecan

This is a wet woods type in which the co-dominant woody species are pin oak (Quercus palustris) and pecan (Carya illinoensis). There are several woodland patches of this type located in Section 1, T9S, R5W, and Section 17, T9S, R4W. There are approximately 70 acres of this type in the project area.

Type 24--Pecan-Black Willow-Cottonwood

This is another wet woods vegetation type which forms a rather sparse forest in Section 18, T9S, R4W. The dominant trees are pecan (Carya illinoensis), black willow (Salix nigra), and cottonwood (Populus deltoides). Sycamore (Platanus occidentalis) is found occasionally. This woods occupies approximately 4 acres.

Type 25--Silver Maple-Pecan

Type 25 is an 8-acre woodland dominated by silver maple (Acer saccharinum) and pecan (Carya illinoensis). It is located in Section 18, T9S, R4W.

Type 26--Honey Locust-Pecan-Black Willow

This area, slightly wetter than Type 25, is dominated by honey locust (Gleditsia triacanthos), pecan (Carya illinoensis), and black willow (Salix nigra). It is found in Section 18, T9S, R4W, and is comprised of about 5 acres.

Type 27--Silver Maple-Cottonwood

This is one of the woodland types in the bottomlands in which silver maple (Acer saccharinum) and cottonwood (Populus deltoides) are the dominant canopy species. It is found primarily in the protected floodplain south of Cora. It is found in Sections 12, T9S, R5W, and in Section 18, T9S, R4W. There are approximately 18 acres of this forest type.

Type 28--Water Locust-Pecan

This is another wet woods type in which the dominant trees are water locust (Gleditsia aquatica) and pecan (Carya illinoensis). Other frequently occurring trees are white ash (Fraxinus americana) and black willow (Salix nigra). Swamp holly (Ilex decidua) dominates the shrub layer.

The water locust-pecan forest is located in Section 21, T9S, R4W. It consists of approximately 20 acres.

Type 29--Hackberry-Pecan

This wet woodland type is dominated by common hackberry (Celtis occidentalis) and pecan (Carya illinoensis). Trees of secondary importance are water locust (Gleditsia aquatica), silver maple (Acer saccharinum), and cottonwood (Populus deltoides).

This forest type is found in Sections 25, 26, and 27, T9S, R4W, west of Gorham. It is comprised of approximately 90 acres.

Type 30--Bald Cypress

This type is in a very wet area where the bald cypress (Taxodium distichum) has been planted and forms a closed community. It is located in Section 26, T9S, R4W. There are approximately 5 acres.

Type 31--Silver Maple-Pin Oak-Hackberry

This wet woods community is dominated by silver maple (Acer saccharinum), pin oak (Quercus palustris), and common hackberry (Celtis occidentalis). Pecan (Carya illinoensis) is scattered throughout the woods.

Type 31 is located in Sections 13 and 14, T9S, R4W. There are approximately 35 acres.

Type 32--Lewis Woods

Details of Lewis Woods may be found described under Study Area E of this report.

Type 33--Jacob Park Woods

Jacob Park Woods represents vegetation Type 33 in the project area. It was designated Study Area G. The detailed description of this type may be found under Study Area G.

In addition to the Jacob Park Woods, this type is found in several areas of Sections 15, 22, and 23, T9S, R4W. The total acreage for Type 33 is 175.

Type 34--Black Willow

A nearly pure stand of black willow (Salix nigra) follows a drainage area in Section 8, T11S, R3W. It covers approximately 4 acres.

Type 35--Black Willow-Silver Maple-American Elm

This is a bottomland forest which has and does receive considerable disturbance. It has been cut over in the past and is used today to run cattle. The dominant woody plants are black willow (Salix nigra), silver maple (Acer saccharinum), and American elm (Ulmus americana). Other

trees which occur with at least a 25% frequency are honey locust (Gleditsia triacanthos) and white ash (Fraxinus americana). In the wetter areas of the forest, cottonwood (Populus deltoides) becomes an important species.

Type 35 is located in Section 5, T11S, R3W. It is composed of approximately 70 acres.

Type 36--Black Willow-Silver Maple-Cottonwood-Pecan

Type 36 is a wet woods with four dominant woody species. These are black willow (Salix nigra), silver maple (Acer saccharinum), cottonwood (Populus deltoides), and pecan (Carya illinoensis).

This woods occurs as a narrow strip in Section 6, T11S, R3W, between Grand Tower Chute and Illinois Route 3. It covers approximately 25 acres.

Type 37--Black Willow-Honey Locust-Silver Maple

This forest type surrounds Half Moon Lake in Section 32, T10S, R3W. It is a narrow strip of woods, totalling approximately 3 acres. The dominant trees are black willow (Salix nigra), honey locust (Gleditsia triacanthos), and silver maple (Acer saccharinum). There is a dense entanglement of woody vines in the understory.

Type 38--Sweet Gum-Basket Oak-Pin Oak

Type 38 is reminiscent of the Oakwood Bottoms in that pin oak (Quercus palustris) is a dominant species, but secondary dominance among the trees is somewhat different. In Type 38, the secondary dominants are sweet gum (Liquidambar styraciflua), basket oak (Quercus michauxii), honey locust (Gleditsia triacanthos), black willow (Salix nigra), and silver maple (Acer saccharinum). This woods covers approximately 20 acres at the south end of Half Moon Lake in Section 32, T10S, R3W.

Type 39--Oakwood Bottoms

The Oakwood Bottoms is a vast area of bottomland forest located between the Big Muddy River and Illinois Route 3. A portion of it was selected for detailed study as Study Area C. A description of the study area is found elsewhere in the report.

A large part of the Oakwood Bottoms is being specially managed as a Greentree Reservoir. Because of the unique biological communities in

the Greentree Reservoir, it is described in detail following this section of the report.

Type 40--Silver Maple-Black Willow

This is a small (1-acre) woods in standing water throughout most of the year. Two woody species are the co-dominants. They are silver maple (Acer saccharinum) and black willow (Salix nigra). The area is located in Section 29, T10S, R3W.

Type 41--Floodplain Forest

This type is similar to the Oakwood Bottoms (Type 39), except that cottonwood (Populus deltoides) and silver maple (Acer saccharinum) play a more prominent role. The area, located in Section 32, T10S, R3W, immediately northeast of Half Moon Lake, covers approximately 20 acres.

Type 42--Open Water Swamp

This type is an open water swamp surrounded by the Oakwood Bottoms. The surface of the water usually has a cover of duckweeds (Lemna minor, Spirodela polyrhiza, and Wolffia columbiana). Water plantain (Alisma plantago-aquatica), arrowleaf (Sagittaria latifolia), verticillate dock (Rumex verticillatus), manna grass (Glyceria striata), and sedges (Carex stipata, C. tribuloides) are common herbs.

The swamp covers about 4 acres and is located in Section 28, T10S, R3W.

Type 43--Pin Oak-American Elm

The pin oak-American elm vegetation type is found in Sections 29 and 30, T10S, R3W, surrounded on all sides by cropland. The dominant tree is pin oak (Quercus palustris), with American elm (Ulmus americana) present in good numbers.

This type covers approximately 15 acres.

Type 44--Silver Maple-Cottonwood-Pin Oak

The silver maple-cottonwood-pin oak floodplain forest occurs adjacent to the Big Muddy River from Sand Ridge to the confluence with the Mississippi River. Although several woody species comprise the forest, the major ones are silver maple (Acer saccharinum), cottonwood (Populus deltoides), and pin oak (Quercus palustris). This entire type is in the unprotected bottomlands.

Types 45 and 46--Cottonwood Slough

Types 45 and 46 served as Study Areas L and M and are described in detail elsewhere in this report.

Type 47--Worthen Bayou

Worthen Bayou was one of the forested areas selected for detailed study. The description of this area may be found under Study Area A.

Type 48--South Woods

This type served as Study Area B. The detailed description of this area may be found elsewhere in this report.

Type 49--Grand Tower Island

The wooded portion of Grand Tower Island served as Study Area D. The results of the study are described elsewhere in this report.

Type 50--Fountain Bluff

Because of the unique biota of this monolithic formation, it is discussed more fully following this section of the report.

Type 51--Devil's Backbone

Devil's Backbone and Devil's Bake Oven are two limestone escarpments of Devonian age which occur immediately north of Grand Tower in Section 23, T10S, R4W. The two areas comprise a total of approximately 55 acres.

The exposed limestone cliffs face westward and offer a xeric habitat for plants. Major woody species on the more exposed cliffs are red cedar (Juniperus virginiana), dwarf hackberry (Celtis pumila), yellow chestnut oak (Quercus muhlenbergii), and scarlet oak (Quercus coccinea).

More shaded areas have white oak (Quercus alba), red oak (Quercus rubra), pignut hickory (Carya glabra), and Carolina buckthorn (Rhamnus caroliniana).

Typical calciphilic herbs grow in association with the limestone. They include purple cliffbrake (Pellaea atropurpurea), baby lip fern (Chilanthes feei), wild verbena (Verbena canadensis), dutchman's pipevine (Aristolochia tomentosa), cleft phlox (Phlox bifida), and Drummond's

goldenrod (Solidago drummondii). Prickly pear cactus (Opuntia compressa) is common.

Type 52--Half Moon Lake

Half Moon Lake is a lunate-shaped body of water in Section 32, T10S, R3W, covering approximately 9 acres. It is permanently filled with water. Its depth prevents growth of most rooted herbs.

Type 53--Sand Bars and Mud Flats

Sand bars and mud flats are numerous along the Mississippi River in the unprotected floodplain from Cora to the mouth of the Big Muddy River. Evans (1971) has studied these sand bars and mud flats and found that 187 taxa of vascular plants occur on them. He further found that composition and distribution of river flat flora are greatly influenced by proximity of seed source, site habitat diversity, frequency and season of flooding, and chance dispersal of disseminules by water.

These flats become available for plant habitation as water recedes from the banks during late summer and early fall. Normal river fluctuations regularly disturb and eliminate entire plant communities, while at the same time dispersing seed that will establish those plant communities to follow (Evans, 1978).

Type 54--Grand Tower Chute

Grand Tower Chute is the name given to 266 acres of water which was at one time a channel of the Mississippi River. The Chute is blocked at its northern end by a levee, but it has an outlet beneath the levee at the south end.

Urban Habitats

Urban habitats in 1978 in the project area total 420 acres. These may be divided into the following units: (1) City, defined as habitat associated with biological communities located within an urban setting, which have at least 80% of the area devoid of vegetative cover; (2) Suburban, defined as habitat associated with biological communities located within an urban setting, which have 20% to 79% of the area devoid of vegetative cover; (3) Exurban, defined as habitat associated with biological communities located within an urban setting, which have from 0% to 19% of the area devoid of vegetative cover.

Great variation was noted among the urban habitats. The amount of vegetative cover ranged from nearly a complete lack of vegetation to small wooded tracts. The exurban areas encroached primarily on adjacent agricultural areas. Although some continued encroachment is to be expected, there is little evidence that urban expansion will play a major role in the project area in the near future.

In the project area, 55 acres have been designated City, 270 acres have been determined as Suburban, and 95 have been called Exurban. The details of the biology of these urban habitats is found in the section on Major Habitat Summary in this report.

Greentree Reservoir

Of special interest is a large portion of the Oakwood Bottoms which is operated by the United States Forest Service as a Greentree Reservoir. The area is managed to provide a desirable habitat for migrating and wintering waterfowl. Thousands of ducks use the Mississippi Flyway to visit the Greentree Reservoir for food and rest. Abundant forage is provided by pin oak acorns which drop into the water during the winter.

The Greentree Reservoir is a hardwood area that is flooded during the dormant season and drained during the growing season. Flooding in the Oakwood Bottoms begins around October 1, with draining commencing about February 15.

This saturated soil serves to improve tree growth during spring and summer. Wells are used to flood the various compartments to a depth of six to eighteen inches. The compartments are formed by miles of levees and cross levees.

The area now occupied by the Greentree Reservoir was farmed prior to the acquisition of the land by the federal government as part of the Shawnee National Forest between 1933 and 1938. The Greentree Reservoir was constructed in 1964. McIlwain (1967), Thomson (1971), and Thomson and Anderson (1976) have discussed the management and ecology of the area.

The topographic features of the Oakwood Bottoms consist of ridges and terraces of second bottoms. Thomson and Anderson (1976) consider first bottoms to include those portions of the present drainage system subjected to frequent inundations, while second bottoms are those formed by previous drainage systems and are flooded only at superflood stages. The ridge-terrace system was formed by alluvium deposit during the era of glaciation (Weller, 1926).

Throughout the Greentree Reservoir, the dominant tree species is pin oak (Quercus palustris). Although there is a poor development of a shrub layer, the herbaceous cover is dense and floristically interesting. Slight depressions in the extremely tight soil collect rainwater and give the area a "marshy" appearance.

Thomson and Anderson (1976) designated five vegetational communities in the Greentree Reservoir. The location of these communities is related to the terrain, i.e., ridges, flats, and depressions.

Shagbark Hickory Community. Those forested areas which are better drained support shagbark hickory (Carya ovata) as the dominant species. On a few of the best drained ridges, the shagbark hickory sometimes occurs in nearly pure stands. This is the most open of the five vegetational types. Absence of water marks on the trees indicates the dryness of the ridge. This community, which is not common, intergrades into the pin oak flats on adjacent lower ground.

Of secondary importance in this community are cherrybark oak (Quercus pagodaefolia) and American elm (Ulmus americana). Other woody plants in abundance are persimmon (Diospyros virginiana), winged elm (Ulmus alata), and common hackberry (Celtis occidentalis).

Thomson and Anderson (1976) attribute 30 herbaceous species to this community. The most frequent of these are marsh aster (Aster ontarionis), wood reed (Cinna arundinacea), sedges (Carex tribuloides and C. squarrosa), self-heal (Prunella vulgaris), and smooth bedstraw (Galium obtusum).

Pin Oak Community. This community is found on level alluvial flats. Pin oak (Quercus palustris) often occurs in nearly pure, even-aged stands. Other important trees are green ash (Fraxinus lanceolata), slippery elm (Ulmus rubra), and bur oak (Quercus macrocarpa).

The common herbs in this area are sedges (Carex tribuloides and C. squarrosa), smooth bedstraw (Galium obtusum), moneywort (Lysimachia nummularia), and skullcap (Scutellaria nervosa). Pockets of standing water frequently punctuate the forest. These openings contain water plantain (Alisma subcordatum), water hemlock (Cicuta maculata), and arrowleaf (Sagittaria latifolia).

This community is subjected to flooding during the non-growing season.

Black Willow Community. This is a rare community located in the deepest depressions. The pin oak community usually surrounds it.

Dominant species in the black willow community are black willow (Salix nigra) and swamp cottonwood (Populus heterophylla), with buttonbush (Cephalanthus occidentalis) predominant in the shrub layer.

A diverse cover of herbs occurs, dominated by swamp manna grass (Glyceria septentrionalis), water parsley (Cicuta maculata), sedge (Carex tribuloides), water horehound (Lycopus rubellus), verticillate dock (Rumex verticillatus), and skullcap (Scutellaria lateriflora).

Pin Oak-Cherrybark Oak Community. Thomson and Anderson (1976) attribute this community to the most recently farmed areas prior to federal acquisition in the 1930's.

Although pin oak (Quercus palustris) and cherrybark oak (Quercus pagodaefolia) are the dominant species in this community, kingnut hickory (Carya laciniosa), persimmon (Diospyros virginiana), honey locust (Gleditsia triacanthos), shingle oak (Quercus imbricaria), shagbark hickory (Carya ovata), green ash (Fraxinus lanceolata), and American elm (Ulmus americana) are rather common.

The herbaceous plants which are most frequent in this community are marsh aster (Aster ontarionis), spotted touch-me-not (Impatiens biflora), wood reed (Cinna arundinacea), sorrel (Oxalis stricta), and sedges (Carex granularis, C. hyalinolepis, and C. tribuloides).

Pin Oak-Red Maple Community. Slight depressions give rise to communities dominated by pin oak (Quercus palustris) and Drummond's red maple (Acer rubrum var. drummondii). Thomson and Anderson (1976) report this community to have the highest density of trees of the five types. Other trees in this type are slippery elm (Ulmus rubra), silver maple (Acer saccharinum), and green ash (Fraxinus lanceolata).

The most frequent herbaceous plants in this community are manna grass (Glyceria striata), white grass (Leersia virginica), moneywort (Lysimachia nummularia), lizard's-tail (Saururus cernuus), white aster (Aster vimineus), and sedges (Carex tribuloides and C. hyalinolepis).

Waterfowl are attracted to this area in great numbers. Common birds are mallard (Anas platyrhynchos), wood duck (Aix sponsa), blue-winged teal (Anas discors), and American widgeon (Anas americana). Less frequent are the northern shoveler (Anas clypeata), black duck (Anas rubripes), lesser scaup (Aythya affinis), goldeneye (Bucephala clangula), hooded merganser (Lophodytes cucullatus), and common merganser (Mergus merganser).

Many other birds are found in the Greentree Reservoir, including the wild turkey (Meleagris gallopavo silvestris). Numerous mammals, amphibians, and reptiles live in the Greentree Reservoir. They are discussed in detail under the major discussion of the floodplain forests.

Fountain Bluff

Fountain Bluff is a massive escarpment of approximately 3730 acres, with its northern extremity located about 3/4 mile south of Gorham and its southern extremity about 1 1/2 miles north-northeast of Grand Tower. Its western boundary is the Mississippi River and its eastern limits coincide generally with Illinois Route 3. It is located in all or part of Section 31, T9S, R3W, Section 36, T9S, R4W, Sections 6, 7, and 18, T10S, R3W, and Sections 1, 11, 12, 13, and 14, T10S, R4W.

Most of the area is administered as part of the Shawnee National Forest. A few private tracts occur, mostly along the southern end of the bluff.

The area receives part of its name from natural springs which emanate within the bluffs.

Much of the exposed rock is sandstone, some of it towering up to 200 feet above the floodplain below. The west-facing bluffs are sheer in many places and harbor vegetation only in crevices and upon ledges. Numerous deep ravines penetrate into the bluff.

At the southwestern extremity of Fountain Bluff, limestone rock outcrops. Above the limestone are patches of hill prairies.

Fountain Bluff is noted for areas of early Indian petroglyphs.

The area is rich in diversity of vascular plants. Approximately 870 taxa have been discovered at Fountain Bluff.

The major habitats may be summarized as mesic woods, slope woods, bluff-top woods, and hill prairies.

Mesic Woods. The mesic ravines support a rich hardwood forest dominated by sugar maple (Acer saccharum) and beech (Fagus grandifolia). American elm (Ulmus americana), common hackberry (Celtis occidentalis), and blue beech (Carpinus caroliniana) are frequent associates. Shrubs and small trees of the mesic woods are bladdernut (Staphylea trifolia), spicebush (Lindera benzoin), pawpaw (Asimina triloba), flowering dogwood (Cornus florida), and red bud (Cercis canadensis).

Spring wildflowers abound in the mesic woods. Common species are spring beauty (Claytonia virginica), red trillium (Trillium recurvatum), jack-in-the-pulpit (Arisaema triphyllum), woolly blue violet (Viola sororia), wild ginger (Asarum canadense var. reflexum), dutchman's breeches (Dicentra cucullaria), wild geranium (Geranium maculatum), bloodroot (Sanguinaria canadensis), and many others.

Unusual flowering herbs in the mesic woods community are sessile trillium (Trillium sessile), wild leek (Allium tricoccum), and the delicate nodding pogonia orchid (Triphora trianthophora).

Slope woods are composed primarily of oaks and hickories. Major species are white oak (Quercus alba), black oak (Quercus velutina), red oak (Quercus rubra), yellow chestnut oak (Quercus muhlenbergii), shagbark hickory (Carya ovata), and pignut hickory (Carya glabra).

Herbaceous plants of the slope woods are plentiful, including many very common species. A very uncommon species of the wooded slopes is the crested coral-root orchid (Hexalectris spicata).

Bluff-top Woods. The bluff-tops support a very xeric flora, with scrubby trees of blackjack oak (Quercus marilandica), post oak (Quercus stellata), winged elm (Ulmus alata), and red cedar (Juniperus virginiana) common. Abundant shrubs are farkleberry (Vaccinium arboreum) and lowbush blueberry (Vaccinium vacillans).

Typical of the exposed bluff-tops are prickly pear cactus (Opuntia compressa) and Illinois agave (Polianthes virginica).

Hill Prairies. A few hill prairies lie above the limestone in the southwestern corner of Fountain Bluff. These small, essentially treeless areas contain plants typical of the prairie. Some of these are Indian grass (Sorghastrum nutans), big bluestem (Andropogon gerardii), little bluestem (Schizachyrium scoparium), side-oats grama (Bouteloua curtipendula), St. John's-wort (Hypericum sphaerocarpum), and false boneset (Brickellia eupatorioides).

Of very unusual interest are two extremely rare species which grow on moist, sandstone ledges. These are wild honeysuckle (Lonicera flava) and American barberry (Berberis canadensis).

Considerable animal life exists on Fountain Bluff. Perhaps most unusual is one of two areas in the state for the eastern wood rat (Neotoma floridana). Copperheads (Agkistrodon mokeson) and timber rattlesnakes (Crotalus horridus) are relatively common.

Major Habitats

In the following pages, the major habitats in the project area are described, including an account of the biota found within them.

The habitats are divided into urban and non-urban types. The habitats and their acreage appear in tabular form in Table 24. Although the original intent was to recognize three urban habitat types, only two were eventually listed, with City and Suburban being merged. Because the entire project area is in a rural setting, it was not feasible to separate the very small City habitat (with 80% or more of the area devoid of vegetative cover) from the Suburban habitat (with 20% to 79% of the area devoid of vegetative cover). In fact, the two grade into each other imperceptibly. The other urban habitat recognized is Exurban, where 0 to 19% of the area is devoid of cover.

The non-urban habitats recognized and described in this study are Agricultural, Old Field, Upland Forest, Floodplain Forest, Lakes and Ponds, Rivers and Streams, Sandbars and Mudflats, and Marshes and Wetlands.

City and Suburban. The city habitat comprises only 55 acres, or 0.09% of the project area. It is found in Grand Tower, Gorham, and Jacob. It is mostly in the area of the business districts of these communities.

Suburban habitats are found in Grand Tower, Gorham, Jacob, Sand Ridge, Neunert, and Raddle. Two hundred seventy acres, or 0.4% of the project area, is assigned to this habitat.

Since most of the city habitats are small and intergrade into suburban habitats, it is impossible to assign plant and animal species to one habitat over another.

The few trees that occur are mostly silver maple (Acer saccharinum), sugar maple (Acer saccharum), cottonwood (Populus deltoides), and box elder (Acer negundo). A few cultivated exotics, such as mimosa (Albizzia julibrissin), have been planted.

There are many features of the city and suburban habitats which are important to wildlife. Lights of the cities attract night-flying insects which in turn attract nighthawks. Bird feeders and gardens in the towns provide food for a great variety of birds during the winter months. Because of the availability of edible refuse left by man, house sparrows and rock doves have a continuous supply of food. These birds also nest in the city and suburban habitats. Chimneys provide roosting and nesting places for birds as well as at least three species of bats. Of the mammals, only the house mouse is abundant in city and suburban habitats.

Most terrestrial vertebrates find the city and suburban habitats unsuitable because of the scarcity of an adequate food supply, absence of suitable cover, and continued disturbance by man.

Although not distinguished in this study, the suburban habitats provide home for more species of vertebrates than does the city habitat. Particularly in the more spacious lawns of suburban homes, birds such as the robin, brown thrasher, cardinal, and starling, may become very common.

Thirty-five species of birds are recorded from city and suburban habitats. They include chimney swift (Chaetura pelagica), chuckwill's widow (Caprimulgus carolinensis), rock dove (Columba livia), mourning dove (Zenaida macroura carolinensis), house wren (Troglodytes aedon baldwini), house sparrow (Passer domesticus), robin (Turdus migratorius), and several woodpeckers and other songbirds. Table 26 lists all birds from the project area and the habitats where they live.

Eleven mammals were recorded from city and suburban habitats. They are the cottontail rabbit (Sylvilagus floridanus), opossum (Didelphis marsupialis), gray squirrel (Sciurus carolinensis), fox squirrel (Sciurus niger), mole (Scalopus aquaticus), short-tailed shrew (Blarina brevicauda), house mouse (Mus musculus), Norway rat (Rattus norvegicus), and three species of bats. Table 27 lists all mammals from the study area and their habitats.

Even fewer amphibians and reptiles are regularly found in city and suburban habitats, although several may pass through these habitats, particularly in areas adjacent to rivers. Garter snake (Thamnophis sirtalis), yellow-bellied racer (Coluber constrictor flaviventris), and eastern box turtle (Terrapene carolina) are exceptions to this. Amphibians and reptiles of the study area are listed in Table 28.

Exurban. Exurban habitats comprise only 95 acres, or 0.15% of the project area. These areas are found in Jones Ridge, Grimsby, Neunert, Howardton, and Sand Ridge, and are transitional between urban habitat and agricultural areas. The fauna, as a result, is also transitional, with animals representative of both urban and agricultural areas. In the fauna inventory (Tables 26, 27, and 28), 48 birds, 15 mammals, 2 amphibians, and 3 reptiles are listed from this habitat.

Because of the paucity of urban growth in the project area, there is slow expansion of the exurban habitat. The small percentage of this type in the project area means that it has little impact on the ecology of the area.

Agricultural. Agricultural land is the major land use in the project area with approximately 37,600 acres, or 58.2% of the study area. Major crops grown are corn, soybeans, and wheat. Corn is par-

ticularly attractive to wildlife and accounts for several birds and mammals listed for this habitat.

Because of the large acreage of some of the farms, many animals may not wander far from the protection of the cover provided by the forests.

Even in the best farmed fields, a typical weedy flora exists. Small plants occurring in most croplands are dandelion (Taraxacum officinale), bindweed (Convolvulus arvensis), sorrel (Oxalis stricta), goosegrass (Eleusine indica), spurge (Chamaesyce maculata), and prickly sida (Sida spinosa). Coarse herbs which are generally controlled by local landowners include cocklebur (Xanthium commune), giant and common ragweed (Ambrosia trifida and A. artemisiifolia), pigweeds (Amaranthus retroflexus, A. alba, A. spinosa, A. graecizans), curly dock (Rumex crispus), wild carrot (Daucus carota), and others.

Many birds visit the area, but often they are transient. Table 26 lists 25 birds characteristic of agricultural land. Several predatory species of birds were observed in agricultural habitats, presumably because of the abundance of rodents present. Often seen here are hawks and owls. Many other birds frequent agricultural fields because of the abundance of insects and seeds.

Thirteen mammals are regular inhabitants of croplands (Table 27), and six amphibians and reptiles live in this habitat (Table 28).

The mammals of the agricultural fields are represented by various species of field mice, along with raccoon, opossum, deer, and fox. Most of the activity of these mammals is nocturnal.

Although agricultural habitat provides adequate food for much wildlife, it has several drawbacks. Because agricultural crops are monocultures, there is no diversity of the plant life. Following fall plowing, agricultural habitat provides no cover for wildlife. Since nearly all tillable land is currently under cultivation, there will be little expansion of agricultural habitat.

Old Field. Because of intense cropland farming in the project area, few areas which have been cleared for agricultural purposes have been left idle. Those which are idle show various stages of secondary succession typical of old field habitats in southern Illinois. The primary factor in determining the stage of succession in the old fields is the length of time elapsed since abandonment of agricultural practices.

In the project area, there are 276 acres designated as Old Field. This represents 0.4% of the entire study area.

The initial stage of annual invaders is soon followed by the perennial herb stage. Many of these herbs are coarse and provide nearly

100% vegetation cover. Although the species list is long for the old field community, some of the more dominant herbs are common milkweed (Asclepias syriaca), fleabanes (Erigeron annuus and E. strigosus), ragweeds (Ambrosia trifida and A. artemisiifolia), wild carrot (Daucus carota), wild sweet potato vine (Ipomoea pandurata), asters (Aster pilosus and A. ericoides), and goldenrods (Solidago altissima and S. nemoralis).

The first shrubby species to invade generally are smooth sumac (Rhus glabra), shining sumac (Rhus copallina), sassafras (Sassafras albidum), persimmon (Diospyros virginiana), and blackberry (Rubus alleghenensis).

Old fields provide an unmatched source of food and cover during the winter when the agricultural fields are bare.

The animal life in the old field community is similar to that observed in land under cultivation, but with the addition of a few more species. Those added animals include goldfinch (Spinus tristis), mockingbird (Mimus polyglottis), brown thrasher (Taxostoma rufum), pine vole (Pitymys pinetorum), northern fence lizard (Sceloporus undulatus hyacinthinus), glass lizard (Ophisaurus attenuatus), prairie kingsnake (Lampropeltis calligaster), and garter snake (Thamnophis sirtalis).

In total, the old field community shows 26 birds, 14 mammals, and 10 amphibians and reptiles as regular inhabitants.

Upland Forest. Upland forest comprises 12,105 acres, or 16.7%, of the project area. It is found in three places. The most acreage is in the Kinkaid Hills, a range of sandstone bluffs extending in Jackson County from Cora to the Little Kinkaid Creek. There are 8,320 acres of the project area in these hills. The monolithic Fountain Bluff contains 3730 acres of upland forest. Immediately north of Grand Tower, adjacent to the Mississippi River, are limestone bluffs which support an upland forest. Known as Devil's Backbone and Devil's Bake Oven, these areas comprise approximately 55 acres.

The upland forests contain the greatest diversity of plants and animals of any of the habitats in the project area. In general, they display three major habitats--a mesophytic woods, a slope woods, and a bluff- or ridge-top woods.

The mesophytic woods are characterized by moist, shaded conditions, usually tall trees forming a dense canopy, and a predominance of early spring-flowering herbs. Major trees are sugar maple (Acer saccharum), beech (Fagus grandifolia), tulip tree (Liriodendron tulipifera), common hackberry (Celtis occidentalis), and American elm (Ulmus americana). Common shrubs are spicebush (Lindera benzoin) and bladdernut (Staphylea trifolia).

Slope woods are intermediate in their characteristics between the mesic woods and the bluff- and ridge-top woods and they intergrade with them. These woods generally are composed of smaller trees than the mesic woods with a resultant canopy which is more open. Available moisture is also less in the slope woods than in the mesic woods. Herbaceous flowering is at its peak during late spring and early summer. Because of the generally precipitous terrain of the upland forests, there will be little conversion of this habitat to agriculture.

Typical woody species of the slopes are white oak (Quercus alba), red oak (Quercus rubra), black oak (Quercus velutina), shagbark hickory (Carya ovata), and pignut hickory (Carya glabra). Wild rose (Rosa carolina) is abundant in the shrub layer.

Bluff- and ridge-top woods are very dry and open with the major woody growth composed of slow-growing, often stunted trees. The most frequent trees of this community are blackjack oak (Quercus marilandica), post oak (Quercus stellata), winged elm (Ulmus alata), and red cedar (Juniperus virginiana). Abundant shrubs are farkleberry (Vaccinium arboreum) and low-bush blueberry (Vaccinium vacillans). Woody vines, such as catbriers (Smilax bona-nox, S. glauca, S. hispida, S. rotundifolia), poison ivy (Toxicodendron radicans), Virginia creeper (Parthenocissus quinquefolia), summer grape (Vitis aestivalis), winter grape (Vitis cinerea), and fox grape (Vitis vulpina), are common.

Many birds live in upland woods. Red-tailed hawks (Buteo jamaicensis borealis) are frequently seen soaring overhead. Owls, woodpeckers, and a great variety of perching birds make their home in upland forests. (Table 26 lists all birds observed in this habitat.)

Twenty-seven species of mammals in the project area have been recorded from the upland forests, including five species of bats. Table 27 lists all species from this habitat.

Amphibians and reptiles are also common in the upland forests. Numbered here are four salamanders, three toads, three frogs, one turtle, one lizard, three skinks, one race runner, and eleven snakes (including two crotalids). A complete list of upland forest amphibians and reptiles can be found in Table 28.

Upland forests are important wildlife habitats. These forests, which are large in extent, provide ample range for the larger mammals. Since the predominant upland forest trees are oaks and hickories, the acorns and hickory nuts yield a great supply of food for several of the vertebrate species.

Of particular value to wildlife is the forest edge, the transitional zone between the replaced forest and agricultural land or old fields. The forest provides excellent cover, while the agricultural lands and old fields provide a great source of food.

Floodplain Woods. The floodplain, or bottomland, woods cover 13,848 acres in the protected part of the project area, or 21.4%. The bottomland forests may be assigned to one of two wetland types, as defined in the United States Fish and Wildlife Circular 39.

The typical floodplain forests correspond to type 1, the seasonally flooded basins or flats. In these forests, the soil is only covered with water for variable periods of time, but the area is usually well drained during the growing season.

Most of the floodplain woods occur along the Big Muddy and Mississippi Rivers, outside the boundaries of this study. Except for the Oakwood Bottoms, only isolated patches of floodplain forest occur in the protected floodplain because much of the original forest has been cleared for agriculture.

The flora of the floodplain forests is diverse, although several of the species occur only rarely. Floodplain forests provide an average cover of 85%.

Dominant trees are pin oak (Quercus palustris), silver maple (Acer saccharinum), cottonwood (Populus deltoides), black willow (Salix nigra), green ash (Fraxinus lanceolata), white ash (Fraxinus americana), pecan (Carya illinoensis), and honey locust (Gleditsia triacanthos).

Herbaceous plants in the floodplain forests are diverse. A complete list of them may be found in Table 25. The most common ones include manna grasses (Glyceria striata and G. septentrionalis), sedges (Carex muskingumensis, C. hyalinolepis, and C. tribuloides), and smartweed (Polygonum pensylvanicum).

Animal life abounds in the floodplain forests. One hundred two species of birds are recorded from this forest type, with 49 of them considered to be common in this study. Many woodpeckers inhabit the floodplain forests.

Birds of the floodplain forests which are uncommon include the American woodcock (Philohela minor), great crested flycatcher (Myiarchus crinitus boreus), Acadian flycatcher (Empidonax virescens), blue-gray gnatcatcher (Polioptila caerulea), and hooded warbler (Wilsonia citrina).

Twenty-seven mammals were observed in the floodplain forests, with a twenty-eighth one, the bobcat (Lynx rufus), to be expected. Sixteen of these were determined to be common (Table 27). Among the less frequently encountered are the silver-haired bat (Lasionycteris noctivagans), big brown bat (Eptesicus fuscus), and swamp rabbit (Sylvilagus aquaticus). Rare are the cotton mouse (Peromyscus gossypinus) and golden mouse (Peromyscus nuttallii), the latter considered threatened in Illinois.

The floodplain forests have a wide diversity of amphibians and reptiles, with 20 kinds of amphibians and 30 kinds of reptiles (Table 28).

Some of the bottomland forests have their surface covered with several inches of water throughout most or all of the year. These may be referred to as type 7 wetlands, the wooded swamps.

Most of the wooded swamps are found in the Oakwood Bottoms in the eastern portion of the project area. Other wooded swamps, such as Kessel and Korando Woods, are found in the eastern section.

The dominant trees in the wooded swamps still include pin oak (Quercus palustris), silver maple (Acer saccharinum), cottonwood (Populus deltoides), black willow (Salix nigra), and pecan (Carya illinoensis), but added to that are more water tolerant species such as swamp cottonwood (Populus heterophylla), pumpkin ash (Fraxinus tomentosa), and water locust (Gleditsia aquatica). The trees of the wooded swamp provide an average cover of 65%.

Among the herbs in the floodplain forest, the most common are verticillate dock (Rumex verticillatus), lizard's-tail (Saururus cernuus), and water parsley (Sium suave).

Fauna of the wooded swamps is similar to that of the floodplain forests except that the Greentree Reservoir is managed to attract many waterfowl. Most common are the mallard (Anas platyrhynchos), wood duck (Aix spinosa), American widgeon (Anas americana), pin-tail (Anas acuta), and blue-winged teal (Anas discors).

Floodplain forests and wooded swamps provide excellent habitat for wildlife. Water is plentiful, cover is optimum, and food from seeds and fruits is abundant. Several large den trees occur in the forests and are ideal for a wide variety of animals.

Lakes and Ponds. Lakes and Ponds are defined in this study as lentic habitats with open water in greater than 50% of the surface acreage. Two areas qualify for this type in the project area. They are the open water of Lovett's Pond, with 40 acres, and Half Moon Lake, with 9 acres. In addition, Grand Tower Chute, a body of water containing 266 acres, is an old oxbow of the Mississippi River, now blocked at its northern end by a levee. It may qualify as a lentic area. Ponds 2 acres in size or less are not considered in this study.

Including Grand Tower Chute, the lentic areas represent 0.48% of the project area.

Where the standing water is in excess of about 1.0-1.5 meters, there is little or no rooted vegetation, but duckweeds (Lemna minor, Spirodela polyrhiza, and Wolffia columbiana), pondweeds (Potamogeton diversifolius and P. nodosus), and coontail (Ceratophyllum demersum) are usually present. In shallower water, water plantain (Alisma subcordatum), arrowleaf (Sagittaria latifolia), and verticillate dock (Rumex verticillatus)

are common. Buttonbush (Cephalanthus occidentalis) is a frequent woody invader around the periphery of the ponds.

Most of the birds, mammals, amphibians, and reptiles associated with these lentic habitats also occur in the marshes. They are all combined in Tables 26, 27, and 28.

Rivers and Streams. The Big Muddy River and the Mississippi River form the eastern, southern, and western boundaries of the study area. Although these rivers lie outside the project area, their biology is considered in this study because of their influence upon the area. The Mississippi River serves as a major flyway for migrating birds. Hence, the list of avifauna (Table 26) for the river habitat is extensive.

Birds which were recorded only from the Mississippi River were the white-rumped sandpiper, the semipalmated sandpiper, and the western sandpiper (Calidris fuscicollis, C. pusilla, and C. mauri), the least tern (Sterna albifrons athilassos), and the black tern (Chlidonias niger). Bald eagle (Haliaeetus leucocephalus), osprey (Pandion haliaetus carolinensis), and the Mississippi kite (Ictinia mississippiensis) were rarely seen soaring over the Mississippi River.

Few vascular plants grow in the water of these major rivers. Plants of the adjacent sandbars and mud flats are discussed in the section following.

Numerous streams, their tributaries, and drainageways occur in the protected floodplain, forming a total of 121 linear miles. Black willow (Salix nigra) and cottonwood (Populus deltoides) line many of these streams. Many herbaceous vascular plants line the banks, but relatively few species actually grow in the running water. Table 25 lists all species of vascular plants associated with these lotic habitats.

Many birds may be seen in association with streams and tributaries in the area. Seventy species are listed from this habitat in Table 26. Perhaps the kind most restricted to streams is the bank swallow (Riparia riparia), but a few other species are also characteristic. Among these are the pied-billed grebe (Podilymbus podiceps), white-eyed vireo (Vireo griseus noveboracensis), yellow warbler (Dendroica petechia aestiva), yellow-breasted chat (Icteria virens), yellow-throated warbler (Dendroica dominica albiflora), and Louisiana waterthrush (Seiurus motacilla).

Using streams as a source of water, most mammals recorded from the entire project area were observed in streambank habitats.

Amphibians and reptiles are common in and near streams. American toad (Bufo americana), Fowler's toad (Bufo woodhousei fowleri), Blanchard's cricket frog (Acris crepitans blanchardi), and western chorus frog (Pseud-

acris triseriata) are abundant among the amphibians. Seven turtles and eleven snakes are listed in Table 28 as inhabitants of streams and their tributaries.

Sandbars and Mudflats. These communities are entirely in the unprotected floodplain and not an actual part of the project area. Evans' work (1971; 1978) in the sand and mud flats along the Mississippi River indicates these communities to be very temporary because of seasonal flooding. He found that the flora of river flats is composed of wide-spread elements that are characteristic of disturbed habitats as well as species which reflect specific on-site conditions and seed source. Water is an important factor in the distribution of plants along waterways.

Vascular plants which occur most frequently on the sand and mud flats are love grass (Eragrostis pectinacea), pony grass (Eragrostis hypnoides), amaranth (Amaranthus tamariscinus), and yellow cress (Rorippa sessiliflora). Sandbar willow (Salix interior) is the major woody species on the sand and mud flats.

The only animal found in this study which was restricted to the sand and mud flats was the eastern spadefoot toad (Scaphiopus holdrooki). Other animals characteristic of sand and mud flats are great blue heron (Ardea herodias wardi), spotted sandpiper (Actitis macularia), dunlin (Calidris alpina), American golden plover (Pluvialis dominica), ring-billed gull (Larus delawarensis), and spiny softshell turtle (Trionyx spinifer).

Marshes and Wetlands. Few localities in the project area qualify as marsh types in the United States Fish and Wildlife Circular 39. Cottonwood Slough and a portion of Lovett's Pond are inland deep fresh marshes (type 4), while Cypress Slough and a small cat-tail marsh in Section 5, T9S, R4W, are inland shallow fresh marshes (type 3).

In the deep marshes of type 4, the deepest waters contain duckweeds (Lemna minor, Spirodela oligorhiza, and Wolffia columbiana), coontail (Ceratophyllum demersum), and pondweeds (Potamogeton diversifolius and P. nodosus).

As the water becomes shallower, rooted species prevail. Most common are arrowleaf (Sagittaria latifolia), water plantain (Alisma subcordatum), verticillate dock (Rumex verticillatus), sium (Sium suave), and liazrd's tail (Saururus cernuus).

In the shallow marshes of type 3, the floating community of duckweeds and pondweeds is mostly absent. Rooted species are mostly cat-tail (Typha latifolia), bur-reed (Sparganium eurycarpum), common smartweed (Polygonum pensylvanicum), and beggar's-tick (Bidens aristosa).

Many animals live near or visit marshes. Wading birds of the Ardeidae are common, particularly the green heron (Butorides striatus), great blue heron (Ardea herodias wardi), great egret (Casmerodius albus egretta), and yellow-crowned night heron (Nycticorax violacea).

Nine mammals are listed in Table 27 from marshes. Muskrat (Ondatra zibethicus) is the most abundant mammal in this habitat. The rarest mammal is the threatened rice rat (Oryzomys palustris).

Amphibians and reptiles are well represented, with fifteen amphibians and sixteen reptiles. Of the reptiles, eight are turtles and eight are snakes.

The true inland deep fresh marshes (type 4) found in a part of Lovett's Pond and Cottonwood Slough occupy approximately 40 acres. The inland shallow fresh marshes (type 3) are represented by only 6 acres.

Type 1 wetlands are equivalent to the floodplain woods and type 7 wetlands are the wooded swamps. These are both discussed under the general heading of Floodplain Woods (pages 77-78), but they are mapped separately. Type 6 wetland, the shrub swamp, was not found to be present in the study area.

Table 24. Summary of Major Habitats in the Project Area

Habitat Type	Number of Acres	% of Project Area
City	55	0.09
Suburban	270	0.40
Exurban	95	0.15
Agricultural	37,600	58.20
Old Field	276	0.40
Upland Forest	12,105	16.70
Floodplain Woods	13,848	24.40
Lakes and Ponds	315	0.48
Marshes	47	0.07
	64,611	100.89

Summary and Notes on the Species

Avifauna. During the course of this study, 179 species of birds were observed or had been reported in the project area. These belong to 42 families.

The Anatidae are well represented with twenty-one species, due mostly to the development of the Greentree Reservoir and to the presence of the Mississippi River flyway.

Other common bird groups are the Fringillidae, with 20 species, the Parulidae, with 13 species, the Scolopacidae, with 11 species, the Accipitridae, with 9 species, and the Ardeidae, with 9 species.

Table 26 gives all species and the habitats in which they were found.

Hunting of waterfowl and wild turkey is a major recreation in the area and also contributes to the economy of Jackson County. This is particularly true in the Greentree Reservoir which is managed for waterfowl habitat. Data from the Greentree Reservoir show that the total duck kill for 1974, 1975, 1976, and 1977 was 5651, 8436, 3662, and 2098 ducks, respectively. During 1977, 4731 hunters visited the Greentree Reservoir. The hunting pressure at the Greentree Reservoir for 1977 was down 44%, with the duck harvest down 43%. Wild turkeys killed in Jackson County during 1978 number 11.

Mammals. A total of thirty-nine mammals are known to occur in the project area, and a fortieth, the bobcat (Lynx rufus), may live in the area.

The opossum (Didelphis marsupialis) is the only marsupial in the area, where it is common in almost all habitats. It occurs in open as well as forested situations. Opossum is hunted primarily for sport and secondarily for meat. Its fur has little commercial value.

Two rabbits of the Leporidae occur in the area. The eastern cottontail (Sylvilagus floridanus) is abundant in all habitats. It is an important game animal, and hundreds of them are taken each year from the project area. No records are available for harvest of these animals. The swamp rabbit (Sylvilagus aquaticus) is very rare and probably should be on the endangered species list in Illinois.

The Sciuridae are represented in Illinois by the eastern chipmunk (Tamias striatus), woodchuck (Marmota monax), eastern gray squirrel (Sciurus carolinensis), and eastern fox squirrel (Sciurus niger). Woodchuck is hunted for sport, while the two squirrels are hunted for meat.

Of the nine Cricetidae in Illinois, only the muskrat (Ondatra zibethicus) has any fur value. A few local trappers trap for muskrat.

Red Fox (Vulpes vulpes), gray fox (Urocyon cinereoargenteus), raccoon (Procyon lotor), striped skunk (Mephitis mephitis), and mink (Mustela frenata) are the chief species which are hunted and trapped for their furs. Populations of the Cricetidae are maintaining themselves at a satisfactory level. The abundance of forested regions in the Greentree Reservoir assure continued success of these animals.

White-tailed deer (Odocoileus virginiana), the only native ungulate, is abundant in all habitats. This is an extremely important game mammal whose population is continuously monitored and managed by the State Department of Conservation. During 1974, 1975, and 1976, the deer harvest for Jackson County was 360, 375, and 360, respectively.

A list of all mammals and their habitats appears in Table 27.

Amphibians. Twenty-one amphibians in eight families are known from the project area. These include five salamanders of the Ambystomatidae, one newt (Notophthalmus viridescens louisianensis), the mudpuppy (Necturus maculosus), the siren (Siren intermedia nettingi), the eastern spadefoot toad (Scaphiopus holbrooki), three toads of the Bufonidae, five frogs of the Hylidae, and four frogs of the Ranidae.

The life history of the amphibians requires them to be near or have access to aquatic and wetland habitats. The mudpuppy and siren are entirely aquatic. Some toads and frogs are found away from water but in damp situations.

Frogs are most noticed in the early spring when their choruses ring through the entire study area. During early summer toads are most conspicuous as they leave their water environment for a more terrestrial one. Table 28 gives all amphibians and their habitats.

Reptiles. Thirty-six reptiles in ten families occur in the project area. Of these, twelve are turtles, six are lizards and skinks, and eighteen are snakes. Three of the snakes are poisonous, belonging to the family Crotalidae.

Reptiles were found in all habitats, including suburban. Thirty-one are animals of the floodplain forests, twenty-five of rivers, streams, and their tributaries, and sixteen of marshes and ponds. Seventeen species are characteristic of upland forests.

Many turtles and snakes are killed each year along roadways. These accidents may well affect the overall population of some of the species.

All reptiles known from the study area, together with the habitats in which they occur, are given in Table 28.

Vascular Plants. The diversity of habitats and the uniqueness of certain areas, such as the Oakwood Bottoms and Fountain Bluff, account for the remarkable diversity of vascular plants in the project area.

A total of 1,099 taxa of vascular plants are known, representing 36.7% of all the flora known to occur in all of Illinois.

The entire list of vascular plants and their habitats is in Table 25.

Tables of the Biota in the Project Area

Tables 25, 26, 27, and 28 which follow list every taxon of vascular plants, avifauna, mammals, and amphibians and reptiles known to occur in the project area, along with the habitat in which each is found and its relative abundance.

An arbitrary system to determine abundance was devised. If a species was found in a habitat in at least 50% of the visits to that habitat, it was considered common (C). If a species was found on only one occasion in a habitat, it was considered rare (R). If a species was found more than once in a habitat but less than 50% of the time a particular habitat type was visited, it was considered uncommon (U).

Included in the lists are plants and animals observed during the field work in this study, reported in the literature, and unpublished research. All plants listed were actually observed during this study. An asterisk (*) indicates those animals not observed during this study.

The sequence and nomenclature for vascular plants follow Mohlenbrock (1975). Mammal nomenclature and common names generally follow that of Hall and Kelson (1959).

All winter residents and breeding birds are included in Table 26. Accidental species are listed only if they were observed during the field work for this study. Nomenclature and common names follow Bull and Farrand (1977). Smith (1961) was used for basic nomenclature of the amphibians and reptiles.

Table 25. Vascular Plants of the Project Area

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
EQUISETACEAE									
Equisetum arvense L. Common Horsetail		C				C	C		C
Equisetum hyemale L. var. *affine* (Engelm.) A. A. Eaton Scouring Rush		C				C	C	U	C
Equisetum laevigatum A. Br. Smooth Scouring Rush									U
LYCOPODIACEAE									
Lycopodium lucidulum Michx. Shining Clubmoss					R				
SELAGINELLACEAE									
Selaginella apoda (L.) Fern. Small Spikemoss					U				
OPHIOGLOSSACEAE									
Botrychium dissectum Spreng. Cut-leaved Grape Fern					C				
Botrychium obliquum Spreng. var. *obliquum* (Muhl.) Clute Grape Fern					C	U			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Botrychium virginianum (L.) Sw. Rattlesnake Fern					C	C			
Ophioglossum vulgatum L. var. pycnostichum Fern. Adder's-tongue Fern					U	U			
Ophioglossum vulgatum L. var. pseudopodum (Blake) Farw. Adder's-tongue Fern						C			
OSMUNDACEAE									
Osmunda regalis L. var. spectabilis (Willd.) Gray Royal Fern					U				
POLYPODIACEAE									
Adiantum pedatum (Tourn.) L. Maidenhair Fern			U		C	C			
Pteridium aquilinum (L.) Kuhn var. latiusculum (Desv.) Underw. Bracken Fern					U				
Pellaea atropurpurea (L.) Link Purple Cliffbrake					U				
Cheilanthes feei Moore Baby Lip Fern					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Cheilanthes lanosa (Michx.) D. C. Eaton Hairy Lip Fern					C				
Polypodium vulgare L. var. virginianum (L.) Eaton Common Polypody					C				
Polypodium polypodioides (L.) Watt var. michauxianum Weatherby Ray Polypody					U				
Polystichum acrostichoides (Michx.) Schott Christmas Fern					C				
Onoclea sensibilis L. Sensitive Fern					U	C	U		U
Thelypteris hexagonoptera (Michx.) Weatherby Broad Beech Fern					C	C			
Dryopteris carthusiana (Villars) H. P. Fuchs Spinulose Woodfern					U				
Dryopteris intermedia (Muhl.) Gray Common Woodfern					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Dryopteris goldiana (Hook.) Gray Goldie's Fern					R				
Dryopteris marginalis (L.) Gray Marginal Fern					C				
Athyrium pycnocarpon (Spreng.) Tidestrom Narrow-leaved Spleenwort					C	U			
Athyrium thelypterioides (Michx.) Desv. Silvery Spleenwort					C				
Athyrium filix-femina (L.) Roth var. rubellum Gilb. Lady Fern					C				
Athyrium filix-femina (L.) Roth var. asplenioides (Michx.) Farw. Southern Lady Fern					U				
Asplenium rhizophyllum L. Walking Fern					C				
Asplenium pinnatifidum Nutt. Pinnatifid Spleenwort					C				
Asplenium trichomanes L. Maidenhair Spleenwort					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Asplenium platyneuron (L.) Oakes Ebony Spleenwort					C				
Woodsia obtusa (Spreng.) Torr. Common Woodsia					C				
Cystopteris bulbifera (L.) Bernh. Bladder Fern					U				
Cystopteris fragilis (L.) Bernh. var. *protrusa* Weatherby Fragile Fern					C	U			U
PINACEAE									
Pinus strobus L. White Pine	Planted	Planted							
Pinus echinata Mill. Shortleaf Pine		Planted			Planted				
TAXODIACEAE									
Taxodium distichum (L.) Rich. Bald Cypress							Planted		
CUPRESSACEAE									
Juniperus virginiana L. Red Cedar		C	C	C	C	U			

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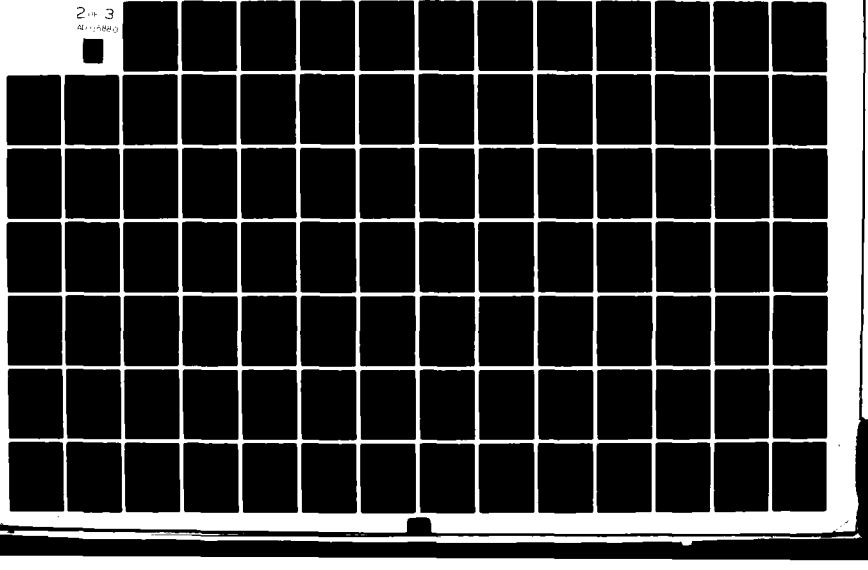

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
TYPHACEAE									
Typha latifolia L. Common Cat-tail						C	C	U	C
SPARGANIACEAE									
Sparganium eurycarpum Engelm. Bur-reed							U		
POTAMOGETONACEAE									
Potamogeton diversifolius Raf. Pondweed							C		
Potamogeton nodosus Poir. Pondweed							C		
ALISMACEAE									
Echinodorus berteroi (Spreng.) Fassett var. *lanceolatus* (Wats. & Coult.) Fassett Burhead						U	U		
Echinodorus cordifolius (L.) Griseb. Creeping Burhead						U	U		
Sagittaria latifolia Willd. Common Arrowleaf						C	C	U	

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Sagittaria calycina Engelm. Arrowleaf						C	C	U	
Sagittaria brevirostra Mack. & Bush Arrowleaf							R		
Alisma subcordatum Raf. Small-flowered Water Plantain						C	C		C
HYDROCHARITACEAE									
Limnobium spongia (Bosc) Steud. Sponge Plant						R			
POACEAE									
Bromus tectorum L. Downy Chess		C	C	C	U	U			
Bromus secalinus L. Chess			C	C					
Bromus racemosus L. Chess				C					
Bromus japonicus L. Japanese Chess				R					
Bromus inermis L. Awnless Brome Grass	U	U	C	C	C	C	U	U	U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Bromus pubescens Muhl. Canada Brome Grass					C	C			
Vulpia octoflora (Walt.) Rydb. Six-weeks Fescue				C	C				
Festuca rubra L. Red Fescue		U	U	U					
Festuca pratensis Huds. Meadow Fescue	C	C	C	C	C	C	C	C	C
Festuca obtusa Bieler Nodding Fescue					U	U			
Festuca paradoxa Desv. Fescue					U	U			
Lolium temulentum L. Darnel				R					
Lolium multiflorum Lam. Italian Rye Grass		U	U	U					
Lolium perenne L. English Rye Grass	C	C	C	C					
Poa annua L. Annual Bluegrass	C	C	C	C	C	C	C	U	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Poa chapmaniana Scribn. Annual Bluegrass				U	U				
Poa pratensis L. Kentucky Bluegrass	C	C	C	C	C	C	C	U	C
Poa compressa L. Canadian Bluegrass		U	C	C	C	U			
Poa sylvestris Gray Woodland Bluegrass					C				
Dactylis glomerata L. Orchard Grass	U	C	C	C	U	U			
Koeleria macrantha (Ledeb.) Spreng. June Grass					R				
Sphenopholis obtusata (Michx.) Scribn. Wedge Grass					C				
Sphenopholis obtusata (Michx.) Scribn. var. major (Torr.) Erdman Wedge Grass					C				
Sphenopholis nitida (Biehler) Scribn. Shining Wedge Grass					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Avena sativa L. Oats			U	U					
Holcus lanatus L. Velvet Grass				U					
Agrostis elliottiana Schult. Awned Bent Grass					U				
Agrostis hyemalis (Walt.) BSP. Tickle Grass		C	C	C	C	C	U		U
Agrostis perennans (Walt.) Tuckerm. Upland Bent Grass					C				
Agrostis alba L. Red Top		C	C	C					
Agrostis alba L. var. palustris (Huds.) Pers. Creeping Bent Grass						C	C		U
Cinna arundinacea L. Stout Wood Reed						C	U		U
Alopecurus aequalis Sobol Foxtail						U	U		
Alopecurus carolinianus Walt. Common Foxtail				C		C	C		C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Phleum pratense L. Timothy		C	C	C					
Elymus hystrix L. Bottlebrush Grass					C				
Elymus virginicus L. Virginia Wild Rye		U	U	C	C	C		C	U
Elymus villosus Muhl. Slender Wild Rye				U	C	C			
Elymus canadensis L. Nodding Wild Rye		U	U	U	C	U		C	
Hordeum pusillum Nutt. Little Barley		U	C	C					
Hordeum jubatum L. Squirrel-tail Grass				U					
Hordeum vulgare L. Common Barley			U	U					
Triticum aestivum L. Wheat			U	U					
Melica nitens (Scribn.) Nutt. Three-flowered Melic Grass					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Glyceria septentrionalis Hitchc. Manna Grass						C	C		U
Glyceria striata (Lam.) Hitchc. Fowl Manna Grass					C	C	C		C
Brachyelytrum erectum (Schreb.) Beauv. Brachyelytrum					C	C			
Diarrhena americana Beauv. var. obovata Gleason Diarrhena					C				
Digitaria sanguinalis (L.) Scop. Crab Grass	C	C	C	C	U	U	U	C	U
Digitaria ischaemum (Schreb.) Muhl. Smooth Crab Grass		U	U	C					
Eriochloa contracta Hitchcock Prairie Cup Grass								Levees	
Paspalum fluitans (Ell.) Kunth Swamp Bead Grass						U	U	C	C
Paspalum pubiflorum Rupr. var. glabrum (Vasey) Vasey Bead Grass						U	C	U	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Paspalum floridanum Michx. Giant Bead Grass						R			
Paspalum laeve Michx. Bead Grass			U	C		U			U
Paspalum ciliatifolium Michx. Bead Grass					C	C			
Panicum dichotomiflorum Michx. Fall Panicum		C	C	C	U	U			
Panicum flexile (Gattinger) Scribn. Slender Panic Grass								U	
Panicum gattingeri Nash Gattinger's Panic Grass				U	U				
Panicum philadelphicum Berrh. Panic Grass					C				
Panicum capillare L. Witch Grass			C	C					
Panicum virgatum L. Switch Grass		U	C	C	U	U			
Panicum rigidulum Bosc Munro Grass				U	U	C	C	U	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Panicum anceps Michx. Panic Grass	U	U	U	C	C	C	C	U	C
Panicum depauperatum Muhl. Panic Grass			U	C	C				
Panicum linearifolium Scribn. Panic Grass					C				
Panicum laxiflorum Lam. Panic Grass					C				
Panicum microcarpon Muhl. Panic Grass				U	C	C	U		U
Panicum nitidum Lam. Shining Panic Grass					R				
Panicum dichotomum L. Panic Grass				C	C			U	
Panicum lanuginosum Ell. Panic Grass		C	C	C	C	C	C	U	C
Panicum lanuginosum Ell. var. implicatum (Scribn.) Fern. Panic Grass					U	U			
Panicum lanuginosum Ell. var. lindheimeri (Nash) Fern. Panic Grass					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Panicum praecocius Hitchc. & Chase Panic Grass					U				
Panicum villosissimum Nash Hairy Panic Grass					C				
Panicum sphaerocarpon Ell. Panic Grass				C	C	U			
Panicum polyanthes Schult. Panic Grass				U	C	C	U		U
Panicum malacophyllum Nash Panic Grass					R				
Panicum oligosanthes Schult. Panic Grass					C	U			
Panicum commutatum Schult. Panic Grass					C				
Panicum clandestinum L. Broad-leaved Panic Grass		U	U	U		C	C		C
Panicum latifolium L. Broad-leaved Panic Grass				U	C				
Panicum boscii Poir. Large-fruited Panic Grass				U	C	C			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Echinochloa walteri (Pursh) Heller Swamp Barnyard Grass							R		
Eragrostis pungens (Poir.) Rydb. Barnyard Grass		U	C	C		C	C	C	C
Echinochloa pungens (Poir.) Rydb. var. wiegandii Fassett Barnyard Grass							U		
Setaria lutescens (Weigel) Hubb. Yellow Foxtail	C	C	C	C	C	C	C	C	C
Setaria faberi Herrm. Giant Foxtail	C	C	C	C	C	C	C	C	C
Setaria viridis (L.) Beauv. Green Foxtail	C	C	C	C	C	C	C	C	C
Cenchrus longispinus (Hack.) Fern. Sand Bur								U	
Erianthus alopecuroides (L.) Ell. Plume Grass					C				
Sorghum halepense (L.) Pers. Johnson Grass			C	C					
Sorghum bicolor (L.) Moench. Sorghum			U	U					

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Sorghastrum nutans (L.) Nash Indian Grass					Hill prairie				
Andropogon gerardii Vitman Big Bluestem					Hill prairie				
Andropogon virginicus L. Broom Sedge			U	C					
Andropogon elliottii Chapm. Elliott's Broom Sedge				U					
Schizachyrium scoparium (Michx.) Nash Little Bluestem					C				
Zea mays L. Corn		C	C	C					
Eragrostis hypnoides (Lam.) BSP. Pony Grass						C	C	C	C
Eragrostis cilianensis (All.) Mosher Stinking Love Grass	C	C	C	C				C	
Eragrostis poaeoides Beauv. Love Grass	C	C	U	U				U	

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Eragrostis spectabilis (Pursh) Steud Tumble-grass			C	C	C				
Eragrostis pectinacea (Michx.) Nees Love Grass	C	C	C	C	C	C	C	C	C
Eragrostis capillaris (L.) Nees Lace Grass					U				
Eragrostis pilosa (L.) Beauv. Love Grass				U					
Tridens flavus (L.) Hitchc. Purple-top	U	C	C	C	C	U	U	C	U
Muhlenbergia capillaris (Lam.) Trin. Hair Grass					R				
Muhlenbergia schreberi J. F. Gmel. Nimble Will	C	C	C	C	C	U	U	U	U
Muhlenbergia sobolifera (Muhl.) Trin. Muhly					C				
Muhlenbergia bushii Pohl Muhly					U	U			
Muhlenbergia frondosa (Poir.) Fern. Muhly	U	C	C	C	C	C	C	C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Muhlenbergia glabrifloris Scribn. Muhly					U				
Muhlenbergia tenuiflora (Willd.) BSP. Slender Muhly					U				
Muhlenbergia sylvatica (Torr.) Torr. Muhly					U				
Muhlenbergia mexicana (L.) Trin. Muhly					U	U			
Sporobolus asper (Michx.) Kunth Dropseed					U				
Sporobolus vaginiflorus (Torr.) Wood Poverty Grass					U			U	
Sporobolus neglectus Nash Sheathed Dropseed				U	U				
Sporobolus cryptandrus (Torr.) Gray Sand Dropseed								C	
Eleusine indica (L.) Gaertn. Goose Grass	C	C	C	C				C	
Leptochloa filiformis (Lam.) Beauv. Red Sprangletop								C	U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Leptochloa attenuata (Nutt.) Steud. Sprangletop								C	
Leptochloa fascicularis (Lam.) Gray Salt Meadow Grass								U	
Cynodon dactylon (L.) Pers. Bermuda Grass	U	U	U	U					
Aristida oligantha Michx. Three Awn		U	U	C	C				
Aristida purpurascens Poir. Arrowfeather				U	U				
Aristida ramosissima Engelm. Slender Three Awn				U	U				
Aristida longespica Poir. Three Awn		U	U	C	U				
Aristida dichotoma Michx. Three Awn			U	C	U				
Arundinaria gigantea (Walt.) Chapm. Giant Cane					U	C	C	C	C
Leersia lenticularis Michx. Catchfly Grass						C	C	U	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Leersia oryzoides (L.) Swartz Rice Cutgrass						U	C	U	U
Leersia virginica Willd. White Grass						C	C	U	C
Danthonia spicata (L.) Beauv. Poverty Oat Grass					C				
Chasmanthium latifolium (Michx.) Yates Sea Oats				U	U	C	C	U	C
CYPERACEAE									
Cyperus flavescens L. Sedge							U		
Cyperus diandrus Torr. Sedge								R	
Cyperus rivularis Kunth Sedge								U	
Cyperus aristatus Rottb. Sedge							U	C	U
Cyperus acuminatus Torr. & Hook. Sedge							U		U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Cyperus ovularis (Michx.) Torr. Round-headed Sedge			U	C	C				
Cyperus erythrorhizos Muhl. Sedge						U	C	C	C
Cyperus esculentus L. Nut-grass	C	C	C	C	C	C	C	U	U
Cyperus ferruginescens Boeckl. Sedge						U	C	C	C
Cyperus strigosus L. Sedge		C	C	C	C	C	C	C	C
Dulichium arundinaceum (L.) Britt. Three-way Sedge						R			
Eleocharis palustris (L.) Roem. & Schultes Spike Rush						C	C		
Eleocharis obtusa (Willd.) Schultes Spike Rush						C	C	C	C
Eleocharis obtusa (Willd.) Schult. var. detonsa (Gray) Drap. & Mohlenbr. Engelmann's Spike Rush						U	U	U	U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Eleocharis obtusa (Willd.) Schult. var. ovata (Roth) Drap. & Mohlenbr. Spike Rush						R			
Eleocharis acicularis (L.) Roem. & Schultes Slender Spike Rush						U	C		
Eleocharis tenuis (Willd.) Schultes var. verrucosa (Svenson) Svenson Spike Rush					C	U			
Eleocharis elliptica Kunth Spike Rush							U		
Eleocharis elliptica Kunth var. compressa (Sull.) Drap. & Mohlenbr Spike Rush							U		
Bulbostylis capillaris (L.) C. B. Clarke Sedge					C	C			
Fimbristylis autumnalis (L.) Roem. & Schultes Sedge				U				C	
Scirpus micranthus Vahl Dwarf Bulrush								C	

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Scirpus georgianus Harper Bulrush						C	C		U
Scirpus atrovirens Willd. Bulrush		U	U	C		C	C		U
Scirpus pendulus Muhl. Sedge						C	C		C
Rhynchospora corniculata (Lam.) Gray Beaked Rush							U		
Carex retroflexa Muhl. Sedge					C				
Carex texensis (Torr.) Bailey Sedge	U								
Carex convoluta Mack. Sedge					U	U			
Carex rosea Schk. Sedge					C	C			
Carex socialis Mohlenbr. & Schwegm. Sedge						R			
Carex cephalophora Muhl. Sedge	C	C	U	C	C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Carex leavenworthii Dewey Sedge					U				
Carex muhlenbergii Schk. Sedge			U	U	C				
Carex vulpinoidea Michx. Sedge		U	U	U		C	C		C
Carex annectens Bickn. Sedge				U					
Carex annectens Bickn. var. xantho-carpa (Bickn.) Wieg. Sedge				C					
Carex stipata Muhl. Sedge						C	C		C
Carex crus-corvi Shuttlew. Sedge						C	U		
Carex muskingumensis Schwein. Sedge						C			
Carex scoparia Schk. Sedge						U	C		
Carex tribuloides Wahlenb. Sedge						C	C		

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Carex cristatella Britt. Sedge						U			
Carex normalis Mack. Sedge				U	C	C			
Carex festucacea Schk. Sedge						C			
Carex albolutescens Schw. Sedge							U		
Carex molesta Mack. Sedge							R		
Carex jamesii Schw. Sedge					C				
Carex artitecta Mack. Early Sedge					C				
Carex umbellata Schk. Sedge					U				
Carex hirtifolia Mack. Sedge					U				
Carex shortiana Dewey Sedge						C	C		C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Carex hirsutella Mack. Sedge		U	C	C	C				
Carex caroliniana Schw. Sedge							R		
Carex bushii Mack. Sedge			C	C	C				
Carex davisii Schw. & Torr. Sedge						U	U		
Carex granularis Muhl. Sedge						C	C		U
Carex grisea Wahlenb. Sedge					C	C			
Carex flaccosperma Dewey Sedge					C				
Carex glaucodea Tuckerm. Blue Sedge					C	C			
Carex oligocarpa Schk. Sedge						U			
Carex careyana Torr. Sedge					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Carex albursina Sheldon Sedge					C				
Carex blanda Dewey Sedge					C				
Carex gracilescens Steud. Sedge					U				
Carex frankii Kunth Sedge						C	C	U	C
Carex squarrosa L. Sedge						C	C	U	C
Carex typhina Michx. Sedge						C	C		U
Carex hyalinolepis Steud. Sedge						C	C	U	C
Carex comosa Boott Sedge						U			
Carex lurida Wahlenb. Sedge						U			
Carex grayi Carey Sedge						C	C		U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Carex lupulina Muhl. Sedge						C	C		
ARACEAE									
Peltandra virginica (L.) Kunth Arrow Arum						U			
Arisaema dracontium (L.) Schott Green Dragon					C	C			
Arisaema triphyllum (L.) Schott Jack-in-the-Pulpit					C	C			
LEMNACEAE									
Spirodela polyrhiza (L.) Schleiden Duckweed							U		
Lemna minor L. Duckweed						C	C		
Lemna perpusilla Torr. Duckweed							R		
Wolffia columbiana Karst. Water Meal							C		

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
COMMELINACEAE									
Tradescantia subaspera Ker Spiderwort					C				
Tradescantia ohiensis Raf. Spiderwort					U				
Tradescantia virginiana L. Spiderwort				U	C	U			
Commelina communis L. Common Day Flower	U	U	C	C	U	U			
Commelina diffusa Burm. f. Day Flower			U	U	U				
Commelina virginica L. Day Flower						U			
JUNCACEAE									
Luzula multiflora (Retz.) Lejeune Wood Rush					C				
Luzula multiflora (Retz.) Lejeune var. echinata (Small) Mohlenbr. Wood Rush					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Juncus effusus L. var. solutus Fern. & Wieg. Soft Rush						C	C		U
Juncus biflorus Ell. Rush						C	C		
Juncus marginatus Rostk. Rush							U		
Juncus torreyi Coville Rush						U	C		U
Juncus nodatus Coville Rush							C		
Juncus acuminatus Michx. Rush						C	C		
Juncus brachycarpus Engelm. Rush						C	C		
Juncus secundus Beauv. Rush					R				
Juncus tenuis Willd. Path Rush	C	C	C	C	C	C	C	C	C
Juncus dudleyi Wieg. Rush				U		C	C		

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Juncus interior Wieg. Rush			C	C		C	C		C
LILIACEAE									
Lilium michiganense Farw. Turk's-cap Lily					U				
Hemerocallis fulva L. Orange Day Lily	C	C		C				U	
Ornithogalum umbellatum L. Star-of-Bethlehem	C	C	U	U					
Erythronium americanum Ker Yellow Dog-tooth Violet					U				
Erythronium albidum Nutt. White Dog-tooth Violet					C				
Uvularia grandiflora Sm. Yellow Bellwort					C				
Uvularia sessilifolia L. Sessile-leaved Bellwort					U				
Polygonatum commutatum (Schult.) A. Dietr. Solomon's Seal					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Polygonatum biflorum (Walt.) Ell. Small Solomon's Seal					U				
Smilacina racemosa (L.) Desf. False Solomon's Seal					C				
Asparagus officinalis L. Asparagus	C	C	C	C	U			U	
Allium tricoccum Ait. Wild Leek					U				
Allium canadense L. Wild Onion	C	C	C	C	C	U	U		
Allium vineale L. Field Garlic	C	C	C	C	C	C	U		U
Nothoscordum bivalve (L.) Britt. False Garlic				U	C				
Trillium recurvatum Beck Wild Trillium					C	C			
Trillium sessile L. Sessile Trillium					U				
Trillium flexipes Rat. White Trillium					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Yucca filamentosa L. var. smalliana (Fern.) Ahles Yucca	C	U		U					
Narcissus pseudo-narcissus L. Daffodil	C	C		U					
Narcissus poeticus L. Poet's Narcissus	U	U							
Hypoxis hirsuta (L.) Coville Yellow Star Grass					C				
Polianthes virginica (L.) Shinners American Agave					C				
SMILACACEAE									
Smilax glauca Walt. Catbrier			U	C	C				
Smilax bona-nox L. Catbrier			U	C	C			U	
Smilax rotundifolia L. Catbrier				C	C	U			
Smilax hispida Muhl. Bristly Catbrier			C	C	C	C			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Smilax lasioneuron Hook. Carrion Flower			U	C	C	C	U		
Smilax pulverulenta Michx. Carrion Flower			U	C	C	C	U		
DIOSCOREACEAE									
Dioscorea villosa L. Wild Yam					C	C			
Dioscorea quaternata (Walt.) J. F. Gmel. Wild Yam					U	U			
IRIDACEAE									
Iris fulva Ker Swamp Red Iris						R			
Iris shrevei Small Wild Blue Iris						C	C		
Sisyrinchium angustifolium Mill. Blue-eyed Grass				U	U	C			
Sisyrinchium albidum Raf. Blue-eyed Grass			U	C	C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
ORCHIDACEAE									
Cypripedium calceolus L. var. parviflorum (Salisb.) Fern. Yellow Lady's-slipper Orchid					R				
Orchis spectabilis L. Showy Orchis					U				
Habenaria peramoena Gray Purple Fringeless Orchid						U	U		
Liparis liliifolia (L.) Rich. Twayblade Orchid					U				
Spiranthes ovalis Lindl. Ladies' Tresses					R				
Spiranthes cernua (L.) Rich. Nodding Ladies' Tresses				U	U	U			
Spiranthes gracilis (Bigel.) Beck Slender Ladies' Tresses					R				
Spiranthes tuberosa Raf. Little Ladies' Tresses					U				
Triphora trianthophora (Sw.) Rydb. Nodding Pogonia					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Corallorhiza wisteriana Conrad Wister's Coral-root Orchid					U				
Corallorhiza odontorrhiza (Willd.) Nutt. Fall Coral-root Orchid					U				
Helalectris spicata (Walt.) Barnh. Crested Coral-root Orchid					R				
Aplectrum hyemale (Muhl.) Torr. Putty-root Orchid					U				
SAURURACEAE									
Saururus cernuus L. Lizard's-tail						C	C		
SALICACEAE									
Salix nigra Marsh. Black Willow						C	C	C	C
Salix amygdaloides Anderss. Peach-leaved Willow						U			
Salix babylonica L. Weeping Willow	U								
Salix interior Rowlee Sandbar Willow						C		C	U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Salix caroliniana Michx. Ward's Willow								C	
Salix rigida Muhl. Heart-leaved Willow								C	U
Populus deltoides Marsh. Cottonwood	U	U				C	C	C	C
Populus heterophylla L. Swamp Cottonwood						C			
JUGLANDACEAE									
Juglans cinerea L. Butternut					R				
Juglans nigra L. Black Willow					C	U			
Carya illinoensis (Wang.) K. Koch Pecan						C			
Carya aquatica (Michx. f.) Nutt. Water Hickory						R			
Carya cordiformis (Wang.) K. Koch Bitternut Hickory					C	U			
Carya texana Buckl. Black Hickory					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Carya ovalis (Wang.) Sarg. Sweet Pignut Hickory					C	U			
Carya glabra (Mill.) Sweet Pignut Hickory					C	U			
Carya tomentosa (Poir.) Nutt. Mockernut Hickory					U	U			
Carya ovata (Mill.) K. Koch Shagbark Hickory					C	C			
Carya laciniosa (Michx.) Loud. Kingnut Hickory						C			
BETULACEAE									
Betula nigra L. River Birch						U		U	U
Corylus americana Walt. Hazelnut				C	C				
Ostrya virginiana (Mill.) K. Koch Hop Hornbeam					C	U			
Carpinus caroliniana Walt. Blue Beech					C	U			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
FAGACEAE									
Fagus grandifolia Ehrh. Beech					C				
Quercus imbricaria Michx. Shingle Oak				U	C	C			
Quercus marilandica Muenchh. Blackjack Oak					C				
Quercus falcata Michx. Spanish Oak					U	U			
Quercus pagodaefolia (Ell.) Ashe Cherrybark Oak						U			
Quercus velutina Lam. Black Oak					C				
Quercus rubra L. Red Oak					C				
Quercus palustris Muenchh. Pin Oak						C			C
Quercus shumardii Buckley Shumard's Oak						U			
Quercus coccinea Muenchh. Scarlet Oak					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Quercus bicolor Willd. Swamp White Oak						U			
Quercus michauxii Nutt. Basket Oak						R			
Quercus muhlenbergii Engelm. Yellow Chestnut Oak					C	U			
Quercus alba L. White Oak					C	U			
Quercus stellata Wangh. Post Oak					C				
Quercus macrocarpa Michx. Bur Oak						C			U
Quercus lyrata Walt. Overcup Oak						U			
ULMACEAE									
Ulmus rubra Muhl. Slippery Elm		U		U	C	C		C	U
Ulmus americana L. American Elm	C	C			C	C			U
Ulmus alata Michx. Winged Elm					C	U			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Ulmus pumila L. Siberian Elm	C	U							
Celtis occidentalis L. Hackberry		U		U	C	C			U
Celtis laevigata Willd. Sugarberry				U		C	U	U	U
Celtis tenuifolia Nutt. Dwarf Hackberry					U				
MORACEAE									
Morus rubra L. Red Mulberry	U	U		U	C	C		U	
Morus alba L. White Mulberry	U	U		U	U	U			
Maclura pomifera (Raf.) Schneider Osage Orange			U	U	U	U			
Humulus lupulus L. Common Hops					U				
URTICACEAE									
Urtica dioica L. Stinging Nettle						R		U	

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Urtica chamaedryoides Pursh Round-toothed Stinging Nettle						U		R	
Boehmeria cylindrica (L.) Sw. False Nettle						C	C		C
Pilea pumila (L.) Gray Clearweed						C	C		C
Laportea canadensis (L.) Wedd. False Stinging Nettle						C	C		C
Parietaria pensylvanica Muhl. Pellitory	R				C				
LORANTHACEAE									
Phoradendron flavescens (Pursh) Nutt. Mistletoe					U				
ARISTOLOCHIACEAE									
Asarum canadense L. var. *reflexum* (Bickn.) Robins. Wild Ginger					C				
Aristolochia serpentaria L. Virginia Snakeroot					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Aristolochia tomentosa Sims Dutchman's Pipe-vine					R				
POLYGONACEAE									
Rumex acetosella L. Sour Dock	U	C	C	C	U				
Rumex obtusifolius L. Bitter Dock				C		U	U		
Rumex crispus L. Curly Dock	U	C	C	C		U	U	U	U
Rumex altissimus Wood Pale Dock						C	C	U	U
Rumex orbiculatus Gray Water Dock						U	U		
Rumex verticillatus Meisn. Verticillate Dock						C	C	U	C
Polygonum sagittatum L. Tear Thumb						C			
Polygonum convolvulus L. Black Bindweed	U	U	U	C	C	C			
Polygonum cristatum Engelm. & Gray Crested Bindweed					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Polygonum scandens L. False Buckwheat	U	C	C	C	C	C	C	C	C
Polygonum tenue Michx. Slender Knotweed					U				
Polygonum aviculare L. Knotweed	C	C	C	C	U	U			U
Polygonum exsertum Small Long-fruited Knotweed								R	
Polygonum ramosissimum Michx. Knotweed					U				
Polygonum erectum L. Knotweed		U	U	C					
Polygonum virginianum L. Virginia Knotweed					C	C			
Polygonum punctatum L. Smartweed						C	C	U	U
Polygonum hydropiper L. Smartweed						U	U		U
Polygonum persicaria L. Lady's Thumb		U	C	C	U	U			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Polygonum cespitosum Blum var. longisetum (DeBruyn) Steward Creeping Smartweed	R								
Polygonum setaceum Baldw. var. interjectum Fern. Smartweed							U		
Polygonum hydropiperoides Michx. Mild Water Pepper				U		C	C	U	C
Polygonum opelousanum Riddell Water Pepper							R		
Polygonum amphibium L. var. stipulaceum (Coleman) Fern. Water Smartweed							R		
Polygonum coccineum Muhl. Water Smartweed						C	U	C	U
Polygonum lapathifolium L. Pale Smartweed				U		C	C	C	C
Polygonum pensylvanicum L. Common Smartweed	U	C	U	C	U	C	C	C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
CHENOPODIACEAE									
Cycloloma atriplicifolium (Spreng.) Coult. Winged Pigweed								U	
Chenopodium ambrosioides L. Mexican Tea			U	C				C	
Chenopodium bushianum Aellen Goosefoot				U					
Chenopodium album L. Lamb's Quarters	C	C	C	C	C	C	C	C	C
Chenopodium missouriense Aellen Goosefoot				U		U			
Chenopodium gigantospermum Aellen Maple-leaved Goosefoot					U				
Chenopodium standleyanum Aellen Goosefoot				U	C	U			
AMARANTHACEAE									
Amaranthus spinosus L. Spiny Pigweed			C	C					
Amaranthus albus L. Tumbleweed			C	C					

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Amaranthus graecizans L. Prostrate Amaranth		U	C	C				C	
Amaranthus retroflexus L. Rough Pigweed		C	C	C				U	
Amaranthus hybridus L. Green Amaranth		C	C	C					
Amaranthus torreyi (Gray) Benth. Torrey's Amaranth								C	
Amaranthus tuberculatus (Moq.) Sauer Water Hemp						U	U	C	U
Amaranthus tamariscinus Nutt. Water Hemp						U	U	C	U
Froelichia gracilis (Hook.) Moq. Cottonweed				Railroad					
NYCTAGINACEAE									
Mirabilis nyctaginea (Michx.) Mac.M. Wild Four-o'clock				Railroad					
PHYTOLACCACEAE									
Phytolacea americana L. Pokeweed	C	C	C	C	C	U	U	U	U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
AIZOACEAE									
Mollugo verticillatus L. Carpetweed	C	C	C	C	C	C	C	C	C
PORTULACACEAE									
Portulaca oleracea L. Purslane	C	C	C	C				C	
Claytonia virginica L. Spring Beauty					C	U			
CARYOPHYLLACEAE									
Paronychia canadensis (L.) Wood Forked Chickweed					C				
Paronychia fastigiata (Raf.) Fern. Forked Chickweed					C				
Sagina decumbens (Ell.) Torr. & Gray Pearlwort	C	U							
Holosteum umbellatum L. Jagged Chickweed				C					
Stellaria media (L.) Cyrillo Common Chickweed	C	C	C	C				U	

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Cerastium vulgatum L. Common Mouse-ear Chickweed	U	U	C	C					
Cerastium velutinum Raf. Field Mouse-ear Chickweed					U				
Cerastium nutans Raf. Nodding Mouse-ear Chickweed	C	C	C	C					
Dianthus armeria L. Deptford Pink				C	U				
Agrostemma githago L. Corn Cockle			U	C					
Silene stellata (L.) Ait. f. Starry Campion					C				
Silene antirrhina L. Sleepy Catchfly	U	U	U	C					
Saponaria officinalis L. Bouncing Bet	U	U							
CERATOPHYLLACEAE									
Ceratophyllum demersum L. Coontail							C		

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
NYMPHAEACEAE									
Nuphar luteum L. ssp. *macrophyllum* (Small) Beall Yellow Pond Lily							U		
RANUNCULACEAE									
Ranunculus laxicaulis (Torr. & Gray) Darby Spearwort						U			
Ranunculus pusillus Poir. Small Spearwort						U	U		
Ranunculus sceleratus L. Cursed Crowfoot						U	U	C	
Ranunculus abortivus L. Small-flowered Crowfoot	U	C	C	C	C	C	U	U	U
Ranunculus micranthus Nutt. Small-flowered Buttercup				U	C	C			
Ranunculus flabellaris Raf. Yellow Water-crowfoot						U			
Ranunculus recurvatus Poir. Recurved Buttercup					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Ranunculus hispidus Michx. Bristly Buttercup					C				
Ranunculus septentrionalis Poir. Swamp Buttercup						C	C	U	C
Ranunculus fascicularis Muhl. Early Buttercup					C				
Ranunculus sardous Crantz Buttercup				C					
Delphinium tricorne Michx. Dwarf Larkspur					C	U			
Thalictrum dasycarpum Fisch. & Lall. Purple Meadow Rue					U				
Thalictrum dioicum L. Early Meadow Rue					C				
Actaea pachypoda Ell. Doll's-eyes					C				
Hepatica nobilis Schreb. var. acuta (Pursh) Steyerm. Sharp-lobed Liverleaf					U				
Hydrastis canadensis L. Goldenseal					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Isopyrum biternatum (Raf.) Torr. & Gray False Rue Anemone					C				
Anemonella thalictroides (L.) Spach Rue Anemone					C	U			
Anemone virginiana L. Tall Anemone					C				
Myosurus minimus L. Mousetail		U	C	C	C	U			
Aquilegia canadensis L. Columbine					C				
Clematis virginiana L. Virgin's Bower					C	C			
BERBERIDACEAE									
Berberis canadensis Mill. American Barberry					R				
Podophyllum peltatum L. Mayapple		C	U	C	C	U			
Caulophyllum thalictroides (L.) Michx. Blue Cohosh					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
MENISPERMACEAE									
Calycocarpum lyonii (Pursh) Gray Cupseed						U			
Menispermum canadense L. Moonseed				U	C	C	U		
Cocculus carolinus (L.) DC. Snailseed					C	C			
MAGNOLIACEAE									
Liriodendron tulipifera L. Tulip Tree					C	U			
ANNONACEAE									
Asimina triloba (L.) Dunal Pawpaw					C	C			
LAURACEAE									
Sassafras albidum (Nutt.) Nees Sassafras		C	C	C	C	C			
Lindera benzoin (L.) Blume Spicebush					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
PAPAVERACEAE									
Sanguinaria canadensis L. Bloodroot					C				
Stylophorum diphyllum (Michx.) Nutt. Celandine Poppy					U				
Dicentra cucullaria (L.) Bernh. Dutchman's-breeches					C				
Dicentra canadensis (Goldie) Walp. Squirrel-corn					U				
Corydalis flavula (Raf.) DC. Pale Corydalis						C	U		U
CRUCIFERAE									
Dentaria laciniata Muhl. Toothwort					C				
Capsella bursa-pastoris (L.) Medic. Shepherd's-purse	C	C	C	C	U	U			
Arabis canadensis L. Sicklepod					C				
Arabis glabra (L.) Bernh. Tower Mustard						R			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Arabis laevigata (Muhl.) Poir. Smooth Rock Cress					C	U			
Arabis hirsuta (L.) Scop. var. pycnocarpa (M. Hopkins) Rollins Hairy Rock Cress					R				
Descurainia pinnata (Walt.) Britt. var. brachycarpa (Richards.) Fern. Tansy Mustard				C					
Cardamine bulbosa (Schreb.) BSP. Spring Cress						C	C		C
Cardamine hirsuta L. Spring Cress				C					
Cardamine pensylvanica Muhl. Bitter Cress						C	C		
Cardamine parviflora L. var. arenicola (Britt.) O. E. Schulz Small-flowered Bitter Cress						C	C		
Sibara virginica (L.) Rollins Cress			C	C	C				
Draba verna L. Vernal Whitlow Grass		U	U	U					

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Draba brachycarpa Nutt. Short-fruited Whitlow Grass	U	C	C	C	C	U			
Arabidopsis thaliana (L.) Heynh. Mouse-ear Cress			C	C					
Lepidium campestre (L.) R. Br. Field Peppergrass			C	C					
Lepidium virginicum L. Common Peppergrass	C	C	C	C	C	U	U	U	U
Lepidium densiflorum Schrad. Peppergrass			U	U					
Armoracia aquatica (Eat.) Wieg. Lake Cress						U			
Thlaspi arvense L. Field Penny Cress		C	C	C					
Alliaria officinalis Andrz. Onion Mustard						U			
Barbarea vulgaris R. Br. var. arcuata (Opiz) Fries Yellow Rocket		C	C	C		C	U	U	U
Erysimum repandum L. Treacle Mustard			U	C					

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Camelina microcarpa Andrz. False Flax				Railroad					
Brassica kaber (DC.) L. C. Wheeler var. pinnatifida (Stokes) L. C. Wheeler Charlock			U	U					
Brassica nigra (L.) Koch Black Mustard		U	U	U					
Brassica rapa L. Field Mustard		U	U	C					
Rorippa sessiliflora (Nutt.) Hitchc. Yellow Cress								C	
Rorippa islandica (Oeder) Borbas Yellow Cress								C	
Rorippa islandica (Oeder) Borbas var. fernaldiana Butt. & Abbe March Yellow Cress						C	C	U	C
CRASSULACEAE									
Sedum acre L. Mossy Stonecrop		C							
Sedum pulchellum Michx. Widow's-cross					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Sedum purpureum (L.) Link Live-forever	U								
SAXIFRAGACEAE									
Hydrangea arborescens L. Wild Hydrangea					C				
Heuchera parviflora Bartl. var. rugelii (Schuttlw.) Rosend., Butt. & Lak. Late Alumroot					U				
Heuchera hirsuticaulis (Wheelock) Rydberg Tall Alumroot					C				
Penthorum sedoides L. Ditch Stonecrop				U		U	C	C	C
HAMAMELIDACEAE									
Liquidambar styraciflua L. Sweet Gum	U	U				C			
PLATANACEAE									
Platanus occidentalis L. Sycamore	C	C				C		C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
ROSACEAE									
Prunus hortulana Bailey Wild Goose Plum				U	U				
Prunus americana Marsh. Wild Plum				C	C				
Prunus americana Marsh. var. lanata Sudw. Wild Plum				U	C				
Prunus serotina Ehrh. Wild Black Cherry		U			C	U			
Amelanchier arborea (Michx. f.) Fern. Shadbush					C				
Chaenomeles japonica L. Japanese Quince	C	C							
Pyrus communis L. Pear	C	C							
Malus pumila Mill. Apple	C	C							
Malus coronaria (L.) Mill. Wild Sweet Crab Apple					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Malus ioensis (Wood) Britt. Iowa Crab Apple		U			C				
Crataegus marshallii Egglest. Parsley Haw						R			
Crataegus punctata Jacq. Dotzed Thorn				U	U				
Crataegus crus-galli L. Cock-spur Thorn				U	C				
Crataegus engelmannii Sarg. Barberry-leaved Hawthorn					U				
Crataegus viridis L. Green Thorn						C			
Crataegus pruinosa (Wendl.) K. Koch Hawthorn				U	C	U			
Crataegus mollis (Torr. & Gray) Scheele Red Haw				U	C	C			
Rubus occidentalis L. Black Raspberry				C	C				
Rubus trivialis Michx. Southern Dewberry								C	

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Rubus flagellaris Willd. Dewberry		C	C	C	C				
Rubus allegheniensis Porter Common Blackberry		C	C	C	C	U			U
Rubus frondosus Bigel. Blackberry					U				
Rubus pensylvanicus Poir. Blackberry					C				
Rosa multiflora Thunb. Multiflora Rose	C	C	C	C					
Rosa setigera Michx. Prairie Rose				C	C				
Rosa carolina L. Pasture Rose		C	C	C	C				
Rosa wichuriana Crepin Memorial Rose				R					
Potentilla simplex Michx. Common Cinquefoil		C	C	C	C	U			
Potentilla recta L. Sulfur Cinquefoil			C	C					

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Potentilla norvegica L. Rough Cinquefoil			C	C		U	U	C	U
Potentilla paradoxa Nutt. Cinquefoil								C	
Fragaria virginiana Duchesne Wild Strawberry			C	C	U	U		C	
Aruncus dioicus (Walt.) Fern. Goat's-beard					U				
Gillenia stipulata (Muhl.) Baill. Indian Physic					C				
Geum canadense Jacq. White Avens					C	C	U		C
Geum vernum L. Spring Avens				U	U	C	C		C
Agrimonia parviflora Ait. Swamp Agrimony						C	C		C
Agrimonia pubescens Wallr. Soft Agrimony					C	C			
Agrimonia rostellata Wallr. Woodland Agrimony					C	U			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
LEGUMINOSAE									
Cercis canadensis L. Redbud	U	U			C	U			
Gymnocladus dioica (L.) K. Koch Kentucky Coffee-tree						U			
Gleditsia triacanthos L. Honey Locust	U	C		C	C	C	U	U	C
Gleditsia aquatica Marsh. Water Locust						C			
Desmanthus illinoensis (Michx.) Mac M. Illinois Mimosa				U		U		C	
Albizia julibrissin Duraz. Mimosa	C	C							
Amorpha fruticosa L. False Indigo								C	
Robinia pseudoacacia L. Black Locust	C	C		U	U	U			
Crotalaria sagittalis L. Rattlebox				U	U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Psoralea psoralioides (Walt.) Cory var. eglandulosa (Ell.) Freeman Sampson's Snakeroot					C				
Vicia villosa Roth Winter Vetch			C	C					
Vicia dasycarpa Ten. Hairy-fruited Vetch			U	C					
Vicia sativa L. Common Vetch				U					
Lathyrus odoratus L. Sweet Pea	C	C	U	U					
Cassia hebecarpa Fern. Wild Senna									U
Cassia marilandica L. Maryland Senna				U					
Cassia fasciculata Michx. Partridge Pea		C	C	C	C	U			
Cassia nictitans L. Wild Sensitive Plant			U	C	C	U			
Apios americana Medic. Groundnut			U	C	U	U	U		U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Petalostemum candidum (Willd.) Michx. White Prairie Clover					Prairie				
Coronilla varia L. Crown Vetch		U		C					
Dalea alopecuroides Willd. Foxtail Dalea								U	
Astragalus canadensis L. Canadian Milk Vetch					R				
Melilotus alba Desr. White Sweet Clover	U	C	C	C	C	U	U	U	U
Melilotus officinalis (L.) Lam. Yellow Sweet Clover	C	C	C	C	U	U			U
Trifolium campestre Schreb. Low Hop Clover	C	C	C	C	C	U	U	U	U
Trifolium pratense L. Red Clover	C	C	C	C	C	C	U	U	U
Trifolium repens L. White Clover	C	C	C	C	C	C	U	U	C
Trifolium hybridum L. Alsike Clover		U	C	C	U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Medicago sativa L. Alfalfa			C	C					
Medicago lupulina L. Black Medic		U	C	C	U	U			
Clitoria mariana L. Butterfly Pea					U				
Stylosanthes biflora (L.) BSP. Pencil-flower					C				
Lespedeza striata (Thunb.) Hook. & Arn. Japanese Lespedeza		C	C	C	U	U			
Lespedeza stipulacea Maxim. Korean Lespedeza		C	C	C	C	U			
Lespedeza procumbens Michx. Trailing Bush Clover					U				
Lespedeza repens (L.) Bart. Creeping Bush Clover					C				
Lespedeza hirta (L.) Hornem. Hairy Bush Clover					R				
Lespedeza capitata Michx. Round-headed Bush Clover					Prairie				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Lespedeza stuevei Nutt. Bush Clover					U				
Lespedeza cuneata (Dum.-Cours.) G. Don Sericea Lespedeza				C					
Lespedeza violacea (L.) Pers. Violet Bush Clover					C				
Lespedeza intermedia (S. Wats.) Britt. Bush Clover					U				
Lespedeza virginica (L.) Britt. Slender Bush Clover					C				
Phaseolus polystachios (L.) BSP. Wild Kidney Bean					U				
Desmodium nudiflorum (L.) DC. Bare-stemmed Tick Trefoil					C				
Desmodium glutinosum (Muhl.) Wood Pointed Tick Trefoil					C				
Desmodium pauciflorum (Nutz.) DC. White-flowered Tick Trefoil					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Desmodium sessilifolium (Torr.) Torr. & Gray Sessil-leaved Tick Trefoil					U				
Desmodium illinoense Gray Illinois Tick Trefoil			U	C	C	U			
Desmodium rotundifolium DC. Round-leaved Tick Trefoil					U				
Desmodium canescens (L.) DC. Hoary Tick Trefoil					U				
Desmodium cuspidatum (Muhl.) Loud. Tick Trefoil					C				
Desmodium cuspidatum (Muhl.) Loud. var. longifolium (Torr. & Gray) Schub. Tick Trefoil					U				
Desmodium laevigatum (Nutt.) DC. Glaucous Tick Trefoil					U				
Desmodium marilandicum (L.) DC. Small-leaved Tick Trefoil					R				
Desmodium ciliare (Muhl.) DC. Hairy Tick Trefoil					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Desmodium rigidum (Ell.) DC. Stiff Tick Trefoil					U				
Desmodium canadense (L.) DC. Showy Tick Trefoil				C	U				
Desmodium nuttallii (Schindl.) Schub. Nuttall's Tick Trefoil					U				
Desmodium dillenii Darl. Tick Trefoil					U				
Desmodium paniculatum (L.) DC. Panicled Tick Trefoil				U	C				
Glycine max (L.) Merr. Soybean			C	C					
Pueraria lobata (Willd.) Ohwi Kudzu-vine					U				
Strophostyles leiosperma (Torr. & Gray) Piper Wild Bean		U	C	C	C	U			
Strophostyles helvola (L.) Ell. Wild Bean		U	C	C	C	U	U	U	U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Strophostyles umbellata (Muhl.) Britt. Wild Bean					C	U			U
Galactia volubilis (L.) Britt. var. mississippiensis Vail Milk Pea					U				
Amphicarpa bracteata (L.) Fern. Hog Peanut			U	C	C	U			
Amphicarpa bracteata (L.) Fern. var. comosa (L.) Fern. Hog Peanut				U	U				
LINACEAE									
Linum medium (Planch.) Britt. var. texanum (Planch.) Fern. Wild Flax					C				
Linum striatum Walt. Wild Flax						U			
OXALIDACEAE									
Oxalis violacea L. Purple Oxalis					C				
Oxalis dillenii Jacq. Yellow Wood Sorrel		C	C	C	C	C	U	U	U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Oxalis stricta L. Yellow Wood Sorrel	C	C	C	C	C	U	U	U	U
Oxalis corniculata L. Creeping Wood Sorrel								U	
GERANIACEAE									
Geranium maculatum L. Wild Geranium					C	U			
Geranium carolinianum L. Wild Cranesbill	C	C	C	C	C	C	U	U	U
SIMAROUBACEAE									
Ailanthus altissima (Mill.) Swingle Tree-of-heaven		U							
POLYGALACEAE									
Polygala verticillata L. Whorled Milkwort					U				
Polygala sanguinea L. Field Milkwort			U	C	C				
EUPHORBIACEAE									
Phyllanthus caroliniensis Walz. Phyllanthus							R		

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Croton glandulosus L. var. septentrionalis Muell.-Arg. Sand Croton		U	U	C					
Croton capitatus Michx. Capitate Croton		U	U	U					
Croton monanthogynus Michx. Croton					C				
Acalypha ostryaefolia Riddell Three-seeded Mercury				U				U	
Acalypha rhomboidea Raf. Three-seeded Mercury	U	C	C	C	C	U	U	C	U
Acalypha virginica L. Three-seeded Mercury	C	C	C	C	C	C	C	C	C
Acalypha gracilens Gray Slender Three-seeded Mercury			U	C	C			U	
Euphorbia corollata L. Flowering Spurge		U	C	C	C				
Poinsettia cyanthophora (Murr.) Kl. & Garcke Wild Poinsettia		U	U	C	U			U	

able 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Poinsettia dentata (Michx.) Kl. & Garcke Wild Poinsettia	U	U	C	C	U			U	
Chamaesyce serpens (HBK.) Small Round-leaved Spurge								C	
Chamaesyce supina (Raf.) Moldenke Milk Spurge	C	C	C	C	C	U	U	C	U
Chamaesyce humistrata (Engelm.) Small Milk Spurge								U	
Chamaesyce maculata (L.) Small Nodding Spurge	C	C	C	C	C	C	C	C	C
CALLITRICHACEAE									
Callitriche heterophylla Pursh. Large Water Starwort						U	U		
Callitriche terrestris Raf. Terrestrial Starwort		C	C	C	C	C		C	C
ANACARDIACEAE									
Toxicodendron radicans (L.) Kuntze Poison Ivy	C	C	C	C	C	C	C	C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Rhus copallina L. Dwarf Sumac	C	C	C	C	C	U	U		U
Rhus glabra L. Smooth Sumac	C	C	C	C	C	C	C		C
Rhus aromatica Ait. Fragrant Sumac						C			
AQUIFOLIACEAE									
Ilex decidua Walt. Swamp Holly					U	C	C	U	C
CELASTRACEAE									
Euonymus obovatus Nutt. Running Strawberry-bush					U				
Euonymus atropurpureus Jacq. Wahoo					C	U			
Celastrus scandens L. Bittersweet					C	U			
STAPHYLEACEAE									
Staphylea trifolia L. Bladdernut					C	U			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
ACERACEAE									
Acer negundo L. Box Elder	C	C		U	C	C	C	C	C
Acer saccharum Marsh. Sugar Maple					C				
Acer saccharinum L. Silver Maple	C	C			C	C	C	C	C
Acer rubrum L. Red Maple	U	C			C	C			
Acer rubrum L. var. drummondii (H. & A.) Sarg. Drummond's Red Maple						C			
HIPPOCASTANACEAE									
Aesculus discolor Pursh Red Buckeye					U				
Aesculus glabra Willd. Ohio Buckeye					C	U			
SAPINDACEAE									
Cardiospermum halicacabum L. Balloon-vine								R	

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
BALSAMINACEAE									
Impatiens biflora Walt. Spotted Touch-me-not					C	C	C	U	
Impatiens pallida Nutt. Pale Touch-me-not					U	C	C		C
RHAMNACEAE									
Ceanothus americanus L. New Jersey Tea					C				
Rhamnus caroliniana Walt. Carolina Buckthorn					U				
VITACEAE									
Parthenocissus quinquefolia (L.) Planch. Virginia Creeper					C	U			
Ampelopsis cordata Michx. Raccoon Grape					C	C	U	C	U
Ampelopsis arborea (L.) Koehne Pepper-vine								C	
Vitis aestivalis Michx. Summer Grape					C	U			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Vitis cinerea Engelm. Winter Grape					U	C	C	U	C
Vitis vulpina L. Frost Grape						C	C		C
Vitis palmata Vahl Catbird Grape						U	U		
Vitis riparia Michx. Riverbank Grape						C	U	C	U
TILIACEAE									
Tilia americana L. Basswood					U				
MALVACEAE									
Malva neglecta Wallr. Common Mallow			U	U					
Hibiscus trionum L. Flower-of-an-hour				U				U	
Hibiscus syriacus L. Rose-of-Sharon	U								
Hibiscus lasiocarpos Cav. Hairy Rose Mallow						C	C		C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Althaea rosea (L.) Cav. Hollyhock	U								
Abutilon theophrastii Medic. Velvet-leaf		U	C	C					
Sida spinosa L. Prickly Sida		U	C	C	U			U	
HYPERICACEAE									
Ascyrum hypericoides L. var. multicaule (Michx.) Fern. St. Andrew's Cross					C				
Hypericum perforatum L. Common St. John's-wort		U	U	C					
Hypericum punctatum Lam. Spotted St. John's-wort		U	C	C	C				
Hypericum spathulatum (Spach) Steud. Shrubby St. John's-wort					C				
Hypericum sphaerocarpum Michx. Round-fruited St. John's-wort					U				
Hypericum mutilum L. Dwarf St. John's-wort						C	U	U	U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Hypericum gentianoides (L.) BSP. Pineweed					C				
Hypericum drummondii (Grev. & Hook.) Torr. & Gray Nits-and-lice			U	C	C				
CISTACEAE									
Lechea minor L. Pinweed					U				
Lechea tenuifolia Michx. Narrow-leaved Pinweed					C				
VIOLACEAE									
Hybanthus concolor (T. F. Forst.) Spreng. Green Violet					C				
Viola pedata L. Birdfoot Violet					U				
Viola pratincola Greene Common Blue Violet	C	C			C	C	C		C
Viola missouriensis Greene Missouri Violet						C			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Viola sororia Willd. Woolly Blue Violet	C	C			C	C	C		C
Viola sagittata Ait. Arrow-leaved Violet					U				
Viola pubescens Ait. var. eriocarpa (Schwein.) Russell Smooth Yellow Violet					C	C			
Viola striata Ait. Cream Violet						C	C		C
Viola rafinesquii Greene Johnny-jump up	C	C	C	C	C	C	U	U	U
PASSIFLORACEAE									
Passiflora lutea L. var. glabriflora Fern. Small Passion-flower				U	C	U			
Passiflora incarnata L. Large Passion-flower				U					
CACTACEAE									
Opuntia compressa (Salisb.) Macbr. Prickly-pear					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Opuntia macrorhiza Engelm. Prickly-pear					R				
LYTHRACEAE									
Cuphea petiolata (L.) Koehne Clammy Cuphea				U					U
Lythrum alatum Pursh Winged Loosestrife						C	C		C
Lythrum salicaria L. Purple Loosestrife							U		
Rotala ramosior (L.) Koehne Tooth-cup						C	C	C	C
Ammannia coccinea Rottb. Long-leaved Ammannia						C	C	C	C
ONAGRACEAE									
Circaea quadrisulcata (Maxim.) Franch. & Sav. var. canadensis (L.) Hara Enchanter's Nightshade					C	C			
Ludwigia palustris (L.) Ell. var. americana (DC.) Fern. & Grisc. Marsh Purslane						C	C	U	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Ludwigia polycarpa Short & Peter False Loosestrife							U		
Ludwigia glandulosa Walt. False Loosestrife						U	U		
Ludwigia alternifolia L. Seedbox						C	C	C	C
Jussiaea repens L. var. glabrescens Ktze. Creeping Primrose Willow						U	C	C	
Jussiaea leptocarpa Nutt. Hairy Primrose Willow								U	
Oenothera speciosa Nutz. Showy Evening Primrose				U					
Oenothera laciniata Hill Ragged Evening Primrose		U	U	C				U	
Oenothera biennis L. Evening Primrose	U	U	U	C	C	C	U	U	U
Oenothera linifolia Nutt. Thread-leaved Sundrops					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
ARALIACEAE									
Aralia spinosa L. Hercules' Club					C				
Aralia racemosa L. American Spikenard					U				
Panax quinquefolius L. American Ginseng					U	U			
UMBELLIFERAE									
Thaspium trifoliatum (L.) Gray Meadow Parsnip					C				
Sanicula gregaria Bickn. Common Snakeroot					C	C			
Sanicula canadensis L. Canadian Black Snakeroot					C	C			
Turilis japonica (Houtt.) DC. Hedge Parsley				C	C				
Daucus carota L. Queen-Anne's-Lace	C	C	C	C	C	C			
Cynosciadium digitatum DC. Cynosciadium						U			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Ptilimnium nuttallii (DC.) Britt. Mock Bishop's-weed						U			
Oxypolis rigidior (L.) Coulter & Rose Cowbane						U			
Cryptotaenia canadensis (L.) DC. Honewort					C	C	U		U
Sium suave Walt. Sium						C	C		U
Osmorhiza longistylis (Torr.) DC. Anise-root					C				
Osmorhiza claytonii (Michx.) Clarke Sweet Cicely					C				
Anethum graveolens L. Dill		U		U					
Erigenia bulbosa (Michx.) Nutt. Harbinger-of-spring					C	U			
Chaerophyllum procumbens (L.) Crantz Wild Chervil	U	C	C	C	C	C	C	U	C
Chaerophyllum tainturieri Hook. Wild Chervil				U					

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Cicuta maculata L. Water Hemlock						C	C		C
CORNACEAE									
Cornus florida L. Flowering Dogwood	C	C			C	C			
Cornus drummondii C. A. Mey. Rough-leaved Dogwood					C	C	C	C	C
Cornus racemosa Lam. Gray Dogwood						U	U		U
Cornus obliqua Raf. Pale Dogwood						C	U		U
Cornus foemina Mill. Stiff Dogwood						U	U		U
NYSSACEAE									
Nyssa sylvatica Marsh. Sour Gum						U			
Nyssa sylvatica (Marsh. var. caroliniana (Poir.) Fern. Sour Gum					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
ERICACEAE									
Monotropa hypopithys L. Pinesap					R				
Monotropa uniflora L. Indian Pipe					U				
Vaccinium arboreum Marsh. Farkleberry					C				
Vaccinium vacillans Torr. Low-bush Blueberry					C				
PRIMULACEAE									
Dodecatheon meadia L. Shooting-star					C				
Samolus parviflorus Raf. Brookweed					C	C	C		C
Lysimachia ciliata L. Fringed Loosestrife				U	C	C	C		C
Lysimachia lanceolata Walt. Loosestrife					U	C	C		C
Lysimachia lanceolata Walt. var. hybrida (Michx.) Gray Hybrid Loosestrife						U	U		

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Lysimachia nummularia L. Moneywort						C	C		C
Hottonia inflata Ell. Featherfoil						R			
EBENACEAE									
Diospyros virginiana L. Common Persimmon	U	C		C	C	U		U	
OLEACEAE									
Fraxinus pensylvanica Marsh. Red Ash						U			
Fraxinus lanceolata Borkh. Green Ash	U	U		U	C	C	U		U
Fraxinus americana L. White Ash	U	U		U	C	C	U		U
Fraxinus tomentosa Michx. f. Pumpkin Ash						U			
Forestiera acuminata (Michx.) Poir. Swamp Privet						C	U	C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
LOGANIACEAE									
Spigelia marilandica L. Indian Pink					C				
GENTIANACEAE									
Swertia caroliniensis (Walt.) Kuntze American Columbo					C				
Obolaria virginica L. Pennywort					U				
Sabatia angularis (L.) Pursh Marsh Pink				U			U		
APOCYNACEAE									
Amsonia tabernaemontana Walt. Blue Star					U		U		
Vinca minor L. Common Periwinkle	C	C							
Apocynum cannabinum L. Indian Hemp		U	U	C	C	U	U	C	U
Apocynum cannabinum L. var. *pubescens* (Mitchell) A. DC. Hairy Dogbane				C	U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Apocynum sibiricum Jacq. Indian Hemp				C					
ASCLEPIADACEAE									
Asclepias tuberosa L. var. interior (Woodson) Shinners Butterfly-weed				C					
Asclepias verticillata L. Horsetail Milkweed				U	C				
Asclepias syriaca L. Common Milkweed		C	C	C					
Asclepias quadrifolia Jacq. Whorled Milkweed					U				
Asclepias variegata L. Variegated Milkweed					U				
Asclepias incarnata L. Swamp Milkweed						C	C	U	C
Cynanchum laeve (Michx.) Pers. Blue Vine	U	C	U	C	C	C	C	C	C
CONVOLVULACEAE									
Convolvulus arvensis L. Field Bindweed			C	C					

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Calystegia sepium (L.) R. Br. var. americana (Sims) Mohlenbr. American Bindweed			C	C					
Ipomoea pandurata (L.) G. F. W. Mey. Wild Sweet Potato Vine			C	C	U	U			
Ipomoea hederacea (L.) Jacq. Ivy-leaved Morning-glory			C	C	U	C	U	U	U
Ipomoea lacunosa L. Small White Morning-glory			C	C	U	U		U	
Ipomoea purpurea (L.) Roth Common Morning-glory			U	C					
Cuscuta gronovii Willd. Dodder			C	C			C		C
Cuscuta pentagona Engelm. Dodder			C	C					
POLEMONIACEAE									
Polemonium reptans L. Jacob's-ladder					C	U			
Phlox bifida Beck Cleft Phlox					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Phlox divaricata L. Blue Phlox					C	C			
Phlox pilosa L. Downy Phlox					C				
Phlox paniculata L. Garden Phlox					U	U			
HYDROPHYLLACEAE									
Hydrophyllum appendiculatum Michx. Great Waterleaf					C				
Hydrophyllum canadense L. Broad-leaf Waterleaf					U				
Hydrophyllum virginianum L. Virginia Waterleaf					C				
Phacelia purshii Buckley Miami Mist				U		C	C		C
Phacelia ranunculacea (Nutt.) Constance Small Phacelia						R			
Phacelia bipinnatifida Michx. Phacelia					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
BORAGINACEAE									
Mertensia virginica (L.) Pers. Bluebells					C				
Heliotropium indicum L. Indian Heliotrope			U	U					
Cynoglossum virginianum L. Wild Comfrey					C				
Hackelia virginiana (L.) I.M. Johnston Stickseed					U	U			
Myosotis virginica (L.) BSP. Scorpion Grass		C	C	C	C	C			
Myosotis virginica (L.) BSP. var. macrosperma (Engelm.) Fern. Scorpion Grass				U	C	C			
Lithospermum arvense L. Corn Gromwell			C	C					
Lithospermum latifolium Michx. American Gromwell					U				
Onosmodium hispidissimum Mack. Marbleseed					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
VERBENACEAE									
Lippia lanceolata Michx. Fog-fruit						C	C	C	C
Verbena canadensis Britt. Rose Verbena					U				
Verbena bracteata Lag. & Rodr. Creeping Vervain			C	C	C				
Verbena simplex Lehm. Narrow-leaved Vervain			C	C	U				
Verbena stricta Vent. Hoary Vervain			C	C	C			U	
Verbena hastata L. Blue Vervain			C	C		C	C		C
Verbena urticifolia L. White Vervain		C	C	C	C	C	C	U	C
PHRYMACEAE									
Phryma leptostachya L. Lopseed					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
LABIATAE									
Isanthus brachiatus (L.) BSP. False Pennyroyal					U				
Lycopus americanus Muhl. Common Water Horehound						C	C	C	C
Lycopus virginicus L. Bugle Weed						C	C	U	C
Lycopus rubellus Moench. Stalked Water Horehound						U	U		U
Teucrium canadense L. var. *virginicum* (L.) Eat. American Germander				U		C	C	U	C
Scutellaria nervosa Pursh Veiny Skullcap						U	U		
Scutellaria parvula Michx. Small Skullcap					C				
Scutellaria parvula Michx. var. *australis* Fassett Small Skullcap					U				
Scutellaria parvula Michx. var. *leonardii* (Epling) Fern. Small Skullcap					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Scutellaria lateriflora L. Mad-dog Skullcap						C	C	C	C
Scutellaria ovata Hill Heart-leaved Skullcap					C				
Scutellaria elliptica Muhl. Hairy Skullcap					U				
Scutellaria incana Biehler Downy Skullcap					C				
Cunila origanoides (L.) Britt. Dittany					C				
Monarda bradburiana Beck Monarda				U	C				
Monarda fistulosa L. Wild Bergamot				C	C				
Blephilia ciliata (L.) Bernh. Pagoda Plant				C	C				
Blephilia hirsuta (Pursh) Benth. Pagoda Plant				C	C				
Hedeoma hispida Pursh Rough Pennyroyal					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Hedeoma pulegioides (L.) Pers. American Pennyroyal				C	C				
Salvia lyrata L. Cancer-weed					U				
Pycnanthemum pycnanthemoides (Leavenw.) Fern. Mountain Mint					C				
Pycnanthemum incanum (L.) Michx. Gray Mountain Mint					C				
Pycnanthemum tenuifolium Schrad. Slender Mountain Mint			C	C	C				
Agastache nepetoides (L.) Ktze. Yellow Giant Hyssop					U				
Nepeta cataria L. Catnip					U				
Glechoma hederacea L. var. micrantha Moricand Ground Ivy						C	U	U	U
Stachys palustris L. var. homotricha Fern. Woundwort						U	U		U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Stachys tenuifolia Willd. Smooth Hedge Nettle						C	C	C	C
Perilla frutescens L. Beefsteak Plant				U		C	C		
Prunella vulgaris L. Self-heal	U	U	C	C					
Prunella vulgaris L. var. lanceolata (Bart.) Fern. Self-heal			C	C	C	C	C		C
SOLANACEAE									
Solanum carolinense L. Horse-nettle		C	C	C	U	U	U	U	U
Solanum americanum Mill. Black Nightshade	C	C	C	C	C	C	C	C	C
Datura stramonium L. Jimsonweed	C	C	C	C				C	
Datura innoxia Mill. Jimsonweed	U								
Physalis pendula Rydb. Ground Cherry								C	

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Physalis subglabrata Mack. & Bush Smooth Ground Cherry			C	C					
Physalis pruinosa L. Ground Cherry			U	U					
Physalis virginiana Mill. Ground Cherry				C	C	U			
Physalis heterophylla Nees Ground Cherry				C	C				
Physalis pubescens L. Annual Ground Cherry				U				C	
SCROPHULARIACEAE									
Paulownia tomentosa (Thunb.) Steud. Princess Tree	C	C							
Veronicastrum virginicum (L.) Farw. Culver's-root					C				
Veronica peregrina L. White Speedwell	C	C	C	C	C	C	C	C	C
Veronica persica Poir. Bird's-eye Speedwell				U					
Veronica hederaefolia L. Ivy-leaved Speedwell				R					

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Veronica arvensis L. Corn Speedwell	C	C	C	C	C	C	C	C	C
Gratiola virginiana L. Round-fruited Hedge Hyssop						U	U		U
Gratiola neglecta Torr. Clammy Hedge Hyssop						C	C		C
Lindernia anagallidea (Michx.) Pennell Slender False Pimpernel						C	C	C	C
Lindernia dubia (L.) Pennell False Pimpernel						C	C	C	C
Penstemon digitalis Nutt. Foxglove Beard-tongue					C	C	U		U
Penstemon pallidus Small Pale Beard-tongue				C	C				
Conobea multifida (Michx.) Benth. Conobea						C	C	C	C
Gerardia flava L. Smooth False Foxglove					C				
Gerardia gattingeri Small Round-stemmed False Foxglove					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Gerardia skinneriana Wood Pale False Foxglove					U				
Gerardia tenuifolia Vahl Slender False Foxglove					C	C	C	C	C
Seymeria macrophylla Nutt. Mullein Foxglove					U				
Bacopa rotundifolia (Michx.) Wettst. Water Hyssop							U		
Mimulus alatus Ait. Winged Monkey-flower					U	C	C	U	C
Scrophularia marilandica L. Late Figwort					C			C	
Chaenorrhinum minus (L.) Lange Dwarf Snapdragon				Railroad					
Verbascum thapsus L. Woolly Mullein	U	C		C				C	
Verbascum blattaria L. Moth Mullein				U					
BIGNONIACEAE									
Campsis radicans (L.) Seem. Trumpet Creeper	U	C	C	C	C	C	C	C	C

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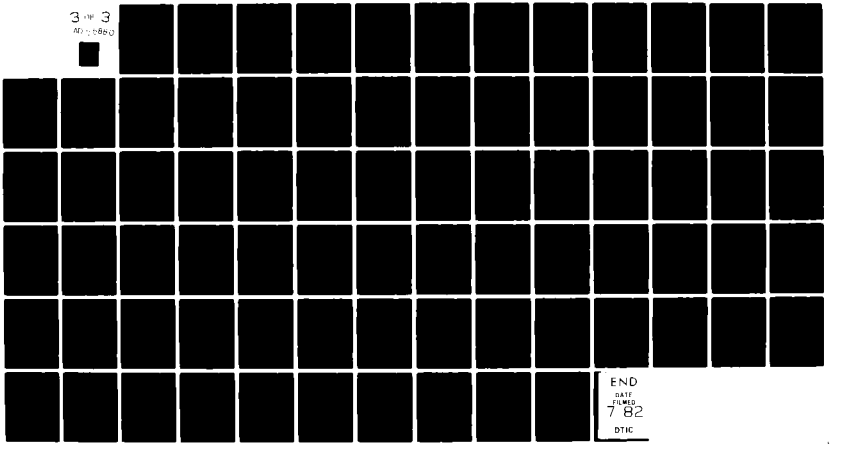

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
MARTYNIACEAE									
Proboscidea louisianica (Mill.) Thell. Unicorn-plant								R	
OROBANCHACEAE									
Epifagus virginiana (L.) Bart. Beech-drops					C				
ACANTHACEAE									
Ruellia humilis Nutt. Wild Petunia				C	C				
Ruellia pedunculata Torr. Wild Petunia					U				
Ruellia strepens L. Smooth Ruellia					C	C			
PLANTAGINACEAE									
Plantago aristata Michx. Bracted Plantain		U	C	C	C				
Plantago pusilla Nutt. Small Plantain			C	C	C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Plantago lanceolata L. Buckhorn	C	C	C	C	C	C	C	C	C
Plantago virginica L. Dwarf Plantain			C	C	C				
Plantago rugelii Dcne. Rugel's Plantain	C	C	C	C	C	C	C	C	C
RUBIACEAE									
Cephalanthus occidentalis L. Buttonbush						C	C	C	C
Galium circaezans Michx. Wild Licorice					C	U			
Galium pilosum Ait. Hairy Bedstraw					C				
Galium triflorum Michx. Sweet-scented Bedstraw						C	U		U
Galium aparine L. Goosegrass				U	C	C	U		C
Galium concinnum Torr. & Gray Shining Bedstraw					C				
Galium obtusum Bigel. Wild Madder				U	C	C	C	C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Diodia virginiana L. Large Buttonweed						U	C	U	U
Diodia teres Walt. Rough Buttonweed	C	C	C	C	C	C	C	C	C
Spermacoce glabra Michx. Smooth Buttonweed						C	C	C	C
Mitchella repens L. Partridge-berry					C				
Houstonia minima Beck Tiny Bluets				C	C				
Houstonia pusilla Schoepf Small Bluets				U	U				
Houstonia nigricans (Lam.) Fern. Narrow-leaved Bluets					Prairies				
Houstonia purpurea L. Broad-leaved Bluets					U				
Houstonia purpurea L. var. calycosa Gray Bluets					U				
Houstonia longifolia Gaertn. Long-leaved Bluets				U	U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Houstonia longifolia Gaertn. var. ciliolata (Torr.) Torr. Bluets				C	C				
Houstonia longifolia Gaertn. var. tenuifolia (Nutt.) Wood Bluets					C				
CAPRIFOLIACEAE									
Sambucus canadensis L. Elderberry		U	U	U	C	C	C	U	C
Lonicera flava Sims Yellow Honeysuckle					U				
Lonicera japonica Thunb. Japanese Honeysuckle	C	C	C	C	C	C	C	C	C
Symphoricarpos orbiculatus Moench. Coralberry				U	C				
Viburnum rufidulum Raf. Rusty Nannyberry					C			U	
Viburnum prunifolium L. Black Haw					U	U			
Viburnum dentatum L. var. deamii (Rehd.) Fern. Southern Arrowwood						U	U		U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Viburnum recognitum Fern. Smooth Arrowwood									U
Triosteum illinoense (Wieg.) Rydb. Illinois Horse Gentian					U				
VALERIANACEAE									
Valerianella radiata (L.) Dufr. Corn Salad			U	C		U	U	U	U
CUCURBITACEAE									
Sicyos angulatus L. Bur Cucumber				U		C	C	U	C
CAMPANULACEAE									
Specularia biflora (R. & P.) Fisch. & Mey. Venus' Looking-glass					R				
Specularia perfoliata (L.) A. DC. Venus' Looking-glass	U	C	C	C	C	C	C	C	C
Campanula rotundifolia L. Bellflower					R				
Campanula americana L. American Bellflower					C	C			

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Lobelia cardinalis L. Cardinal-flower						U	U		U
Lobelia siphilitica L. Blue Cardinal-flower						U	U	U	U
Lobelia puberula Michx. Downy Lobelia						U	U		
Lobelia inflata L. Indian Tobacco		U	C	C	C	C	C		U
Lobelia spicata Lam. Spiked Lobelia					C				
COMPOSITAE									
Polymnia canadensis L. Leafcup					C				
Polymnia uvedalia (L.) L. Bear's-foot					U				
Silphium perfoliatum L. Cup-plant				C			C		C
Silphium integrifolium Michx. Rosinweed					Prairie				
Parthenium integrifolium L. American Feverfew					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Iva annua L. Marsh-elder							C		C
Ambrosia bidentata Michx. Western Ragweed				C					
Ambrosia trifida L. Giant Ragweed	C	C	C	C					
Ambrosia artemisiifolia L. Common Ragweed	C	C	C	C	C	C	C	C	C
Xanthium commune Britt. Common Cocklebur		C	C	C		C	C	C	C
Heliopsis helianthoides (L.) Sweet False Sunflower					C				
Eclipta alba (L.) Hassk. Yerba de Tajo	U	U	C	C		C	C	C	C
Rudbeckia laciniata L. Goldenglow						U	U		
Rudbeckia triloba L. Brown-eyed Susan					U				
Rudbeckia subtomentosa Pursh Fragrant Coneflower						U	U		

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Rudbeckia hirta L. Black-eyed Susan			C	C	C				
Echinacea purpurea (L.) Moench. Purple Coneflower					Prairie				
Ratibida pinnata (Vent.) Barnh. Drooping Coneflower						U			
Helianthus annuus L. Common Sunflower	U	U	U	U					
Helianthus petiolaris Nutt. Petioled Sunflower				U					
Helianthus microcephalus Torr. & Gray Small Wood Sunflower					C				
Helianthus decapetalus L. Thin-leaved Sunflower					C				
Helianthus divaricatus L. Woodland Sunflower					C				
Helianthus strumosus L. Pale-leaved Sunflower					C				
Helianthus mollis Lam. Downy Sunflower					Prairie				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Helianthus tuberosus L. Jerusalem Artichoke						U	U		U
Helianthus hirsutus Raf. Bristly Sunflower					C				
Verbesina helianthoides Michx. Yellow Crownbeard					C				
Verbesina alternifolia (L.) Britt. Yellow Ironweed					C				
Coreopsis lanceolata L. Tickseed Coreopsis					U				
Coreopsis pubescens Ell. Star Tickseed					U				
Coreopsis tripteris Hogg Tall Tickseed					C				
Bidens cernua L. Sticktight						C	C	C	C
Bidens coronata (L.) Britt. Tall Swamp Marigold						U	U	U	U
Bidens aristosa L. Swamp Marigold						C	C	C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Bidens connata Muhl. Swamp Beggar-ticks						C	C	C	C
Bidens comosa (Gray) Wieg. Beggar-ticks						C	C	C	C
Bidens bipinnata L. Spanish Needles						C	C	U	C
Bidens frondosa L. Common Beggar-ticks						C	C	C	C
Bidens vulgata Greene Tall Beggar-ticks						U	U		U
Bidens discoidea (Torr. & Gray) Britt. Swamp Beggar-ticks						U	U		U
Galinsoga ciliata (Raf.) Blake Peruvian Daisy			C	C					
Helenium autumnale L. Autumn Sneezeweed						C	C	U	C
Helenium flexuosum Raf. Purple-headed Sneezeweed			U	U	U				
Gaillardia pulchella Foug. Blanket-flower		R							

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Solidago graminifolia (L.) Salisb. Grass-leaved Goldenrod						U	U		
Solidago rigida L. Rigid Goldenrod					Prairie				
Solidago caesia L. Woodland Goldenrod					C				
Solidago flexicaulis L. Broadleaf Goldenrod					U				
Solidago hispida Muhl. Hispid Goldenrod					U				
Solidago buckleyi Torr. & Gray Buckley's Goldenrod					U				
Solidago petiolaris Ait. Goldenrod					U				
Solidago missouriensis Nutt. Missouri Goldenrod					Prairie				
Solidago juncea Ait. Early Goldenrod				C	C			U	
Solidago speciosa Nutt. Showy Goldenrod					U				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Solidago patula Muhl. Spreading Goldenrod						U	U		
Solidago gigantea Ait. Late Goldenrod						U			
Solidago ulmifolia Muhl. Elm-leaved Goldenrod					C				
Solidago drummondii Torr. & Gray Drummond's Goldenrod					C				
Solidago canadensis L. Tall Goldenrod		C	C	C	C	C	C	U	C
Solidago nemoralis Ait. Field Goldenrod		U	C	C	C	U			
Solidago rugosa Mill. Rough-leaved Goldenrod						U			
Boltonia asteroides (L.) L'Her. False Aster						C	C		C
Boltonia diffusa Ell. False Aster					U	U			
Aster anomalus Engelm. Blue Aster					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Aster shortii Lindl. Short's Aster					C				
Aster azureus Lindl. Sky-blue Aster					U				
Aster cordifolius L. Blue Wood Aster					C				
Aster sagittifolius Wedem. Arrow-leaved Aster					C				
Aster sagittifolius Wedem. var. drummondii (Lindl.) Shinners Drummond's Aster					C				
Aster novae-angliae L. New England Aster						C	C		C
Aster oblongifolius Nutt. Aromatic Aster					U				
Aster patens Ait. Spreading Aster					C				
Aster laevis L. Smooth Aster						C	C		C
Aster pilosus Willd. Hairy Aster		U	C	C	C	C	C	C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Aster ericoides L. var. prostratus (Ktze.) Blake Health Aster				C				U	
Aster vimineus Lam. Aster						U	U		U
Aster praealtus Poir. Willow Aster						C	C	C	C
Aster turbinellus Lindl. Aster					U				
Aster ontarionis Wieg. Ontario Aster						C	C	C	C
Aster lateriflorus (L.) Britt. Side-flowered Aster					C	C			
Aster simplex Willd. Panicled Aster						C	C	C	C
Erigeron pulchellus Michx. Robin's Plantain					U				
Erigeron philadelphicus L. Marsh Fleabane	U	C	C	C	C	C	C	C	C
Erigeron annuus (L.) Pers. Daisy Fleabane	C	C	C	C	C	C	C	C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Erigeron strigosus Muhl. Daisy Fleabane	C	C	C	C	C	C	C	C	C
Erigeron divaricatus Michx. Dwarf Fleabane	U	U							
Erigeron canadensis L. Muleweed	C	C	C	C	C	C	C	C	C
Anthemis cotula L. Dogfennel				U					
Achillea millefolium L. Common Yarrow	C	C	C	C	C	C	C	C	C
Matricaria matricarioides (Less.) Porter Pineapple-weed	U	U							
Chrysanthemum leucanthemum L. Ox-eye Daisy	U	C	C	C					
Artemisia biennis Willd. Biennial Wormwood								C	
Pluchea camphorata (L.) DC. Camphorweed						U			
Antennaria plantaginifolia (L.) Pussytoes					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Gnaphalium purpureum L. Early Cudweed			C	C	C				
Gnaphalium obtusifolium L. Sweet Everlasting				C	C				
Erectites hieracifolia (L.) Raf. Fireweed				U		U			
Cacalia atriplicifolia L. Pale Indian-plantain					C	C			
Cacalia muhlenbergii (Sch.-Bip.) Fern. Great Indian-plantain					U				
Senecio aureus L. Golden Ragwort						C	C	U	C
Senecio glabellus Poir. Butterweed			C	C		C	C	U	C
Eupatorium maculatum L. Spotted Joe-Pye-weed						C	C		C
Eupatorium purpureum L. Purple Joe-Pye-weed					C				
Eupatorium coelestinum L. Mistflower						C	C	C	C

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Eupatorium serotinum Michx. Late Boneset						C	C	C	C
Eupatorium rugosum Houtt. White Snakeroot					C	C	U	U	C
Eupatorium altissimum L. Tall Boneset					C	C			
Eupatorium perfoliatum L. Common Boneset						C	C	C	C
Eupatorium sessilifolium L. Upland Boneset					U				
Brickellia eupatorioides (L.) Shinners False Boneset					Prairie				
Vernonia missurica Raf. Missouri Ironweed						C	U		
Vernonia fasciculata Michx. Common Ironweed				U		U			
Vernonia gigantea (Walt.) Trel. Tall Ironweed						C	U		U
Elephantopus carolinianus Willd. Elephant's-foot					C				

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Arctium minus (Hill) Bernh. Common Burdock			U	U					
Cirsium vulgare (Savi) Tenore Bull Thistle			C	C					
Cirsium discolor (Muhl.) Spreng. Field Thistle				C	C				
Cirsium altissimum (L.) Spreng. Tall Thistle					U				
Cirsium arvense (L.) Scop. Canada Thistle	U	C	C	C					
Centaurea cyanus L. Bachelor's Button				U					
Cichorium intybus L. Chicory			U	C					
Krigia dandelion (L.) Nutt. Dwarf Dandelion					C				
Krigia biflora (Walt.) Blake False Dandelion					U				
Krigia oppositifolia Raf. Dwarf Dandelion				U		U	U		

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Tragopogon dubius Scop. Sand Goat's-beard				Railroad					
Taraxacum officinale Weber Common Dandelion	C	C	C	C	C	C	C	C	C
Taraxacum laevigatum (Willd.) DC. Red-seeded Dandelion	U	U							
Sonchus arvensis L. Field Sow Thistle				U					
Sonchus oleraceus L. Common Sow Thistle				C					
Lactuca canadensis L. Wild Lettuce		U	C	C					
Lactuca serriola L. Prickly Lettuce			C	C					
Lactuca biennis (Moench.) Fern. Tall Blue Lettuce					U				
Lactuca floridana (L.) Gaertn. Woodland Lettuce					C				
Pyrrhopappus carolinianus (Walt.) DC. False Dandelion		C	C	C	C	U	U	U	U

Table 25 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Prenanthes altissima L. Tall White Lettuce					C				
Hieracium gronovii L. Hairy Hawkweed					C				
Additions to the List									
ISOETACEAE									
Isoetes melanopoda Gay & Dur. Black Quillwort							R		
UMBELLIFERAE									
Ptilimnium costatum (Ell.) Raf. Mock Bishop's-weed						R			

Table 26. Birds of the Project Area

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
GAVIIDAE									
Gavia immer Brunnich Common Loon							C	C	
Gavia stellata Pontoppidan Red-throated Loon								R	
PODICIPEDIDAE									
Podiceps auritus Linnaeus Horned Grebe							U	U	
Podilymbus podiceps (Linnaeus) Pied-billed Grebe						C	C	C	C
PHALACROCORACIDAE									
Phalacrocorax auritus Lesson Double-crested Cormorant						U		U	
ARDEIDAE									
Ardea herodias wardi Ridgeway Great Blue Heron			U			C	C	C	C
Butorides striatus Linnaeus Green Heron						C	C		C
Egretta caerulea (Linnaeus) Little Blue Heron							U		

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Bubulcus ibis (Linnaeus) Cattle Egret			U						
Casmerodius albus egretta Gmelin Great Egret						U	C	U	C
Nycticorax nycticorax hoactli Gmelin Black-crowned Night Heron						U	R		U
Nycticorax violacea Linnaeus Yellow-crowned Night Heron						C	C		
Ixobrychus exilis (Gmelin) Least Bittern							U		
Botaurus lentiginosus (Rackett) American Bittern							U		
ANATIDAE									
Branta canadensis Linnaeus Canada Goose			C					C	
*Chen caerulescens (Linnaeus) Snow Goose			U					R	
Anas platyrhynchos Linnaeus Mallard						C	C	C	C

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Athya valisineria (Wilson) Canvasback						U	U	U	
Mergus merganser Linnaeus Common Merganser						U	U	U	
Aix sponsa Linnaeus Wood Duck						C	C	U	U
Aythya collaris (Donovan) Ring-necked Duck						R		R	
Aythya affinis Eyton Lesser Scaup						U	U	U	U
Lophodytes cucullatus (L.) Hooded Merganser						U		U	
Anas crecca carolinensis Gmelin Green-winged Teal						U	U	U	
Anas americana Gmelin American Widgeon						C	C	U	U
Anas clypeata Linnaeus Northern Shoveler						U	U	U	
Anas acuta Linnaeus Pin-tail						C	C	C	

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Anas strepera Linnaeus Gadwall						U	U	U	U
Anas discors Linnaeus Blue-winged Teal						C	C	C	U
Anas rubripes Brewster Black Duck						U	U	U	U
Anas cyanoptera Linnaeus Cinnamon Teal						U	U	U	
Oxyura jamaicensis (Gmelin) Ruddy Duck						R	R	R	
Bucephala clangula Linnaeus Common Goldeneye						U	U	U	U
Bucephala albeola (Linnaeus) Bufflehead						U	U	U	
Melanitta fusca Linnaeus White-winged Scoter								U	
CATHARTIDAE									
Cathartes aura septentrionalis Linnaeus Turkey Vulture			C	C	C	C	C	C	C

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Coragyps atratus (Bechstein) Black Vulture					U	U			
ACCIPITRIDAE									
Ictinia mississippiensis (Wilson) Mississippi Kite						R		R	R
Accipiter cooperii (Bonaparte) Cooper's Hawk			U	U	U				
Buteo jamaicensis borealis Gmelin Red-tailed Hawk			C	C	C	C	C	C	C
Buteo jamaicensis harlanii Audubon Harlan's Hawk						R		R	
Buteo lineatus Gmelin Red-shouldered Hawk						U			U
Buteo platypterus Vieillot Broad-winged Hawk					U	U			
*Buteo lagopus Pontoppidan Rough-legged Hawk				R					
Circus cyaneus Linnaeus Marsh Hawk							U		
Haliaeetus leucocephalus Linnaeus Bald Eagle								R	

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
PANDIONIDAE									
*Pandion haliaetus carolinensis (Gmelin) Osprey								R	
FALCONIDAE									
Falco sparverius Linnaeus Sparrow Hawk			C	C					
*Falco peregrinus anatum Bonaparte Peregrine Falcon					R				
PHASIANIDAE									
Colinus virginianus Linnaeus Bobwhite			C	C	C				
MELEAGRIDIDAE									
Meleagris gallopavo silvestris Vieillot Wild Turkey					U	U			
CAPRIMULGIDAE									
Caprimulgus vociferus Wilson Whip-poor-will					C	C			C

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Caprimulgus carolinensis Vieillot Chuck-will's-widow					C	C			C
Chordeiles minor (Forster) Common Nighthawk	U	U							
RALLIDAE									
Rallus elegans Audubon King Rail							U		U
Rallus limicola Vieillot Virginia Rail							U		
*Porzana carolina Linnaeus Sora							R		
Gallinula chloropus cachinnans Bangs Common Gallinule						U	C	U	U
Fulica americana Gmelin American Coot						C	C	C	C
CHARADRIIDAE									
Charadrius vociferus Linnaeus Killdeer			C	C					
Pluvialis dominica Muller American Golden Plover							C	C	C

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
SCOLOPACIDAE									
Actitis macularia Linnaeus Spotted Sandpiper							U	C	C
Calidris alpina Linnaeus Dunlin							C	C	C
Calidris melanotos Vieillot Pectoral Sandpiper							U	U	U
*Calidris fuscicollis (Vieillot) White-rumped Sandpiper								R	
Calidris pusilla (Linnaeus) Semipalmated Sandpiper								R	
*Calidris mauri (Cabanis) Western Sandpiper								R	
Tryngites subruficollis Vieillot Buff-breasted Sandpiper							U	U	U
Philohela minor (Gmelin) American Woodcock						U	U		
Bartramia longicauda (Bechstein) Upland Sandpiper				U					
Tringa melanoleuca Gmelin Greater Yellowlegs			U	U					

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
LARIDAE									
Larus argentatus Pontoppidan Herring Gull							U	U	U
Larus delawarensis Ord Ring-billed Gull						U	C	C	C
Sterna hirundo Linnaeus Common Tern								U	U
Sterna albifrons athilassos Burleigh & Lowery Least Tern								U	
Chlidonias niger Linnaeus Black Tern								U	U
COLUMBIDAE									
Columba livia Gmelin Rock Dove	C	C	C	C					
Zenaida macroura carolinensis Linnaeus Mourning Dove	C	C	C	C					
CUCULIDAE									
Coccyzus americanus Linnaeus Yellow-billed Cuckoo					C				

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
*Coccyzus erythropthalmus (Wilson) Black-billed Cuckoo					R				
STRIGIDAE									
Otus asio Linnaeus Screech Owl					C	C			
Strix varia Barton Barred Owl					C	U			
Bubo virginianus (Gmelin) Great Horned Owl					U	U			
*Asio flammeus (Pontoppidan) Short-eared Owl				R					
APODIDAE									
Chaetura pelagica Linnaeus Chimney Swift	U	U							
TROCHILIDAE									
Archilochus colubris (Linnaeus) Ruby-throated Hummingbird						U			
ALCEDINIDAE									
Megaceryle alcyon Linnaeus Belted Kingfisher							U	U	U

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
PICIDAE									
Colaptes auratus luteus Bangs Yellow-shafted Flicker	C	C		C	C	C			
Dryocopus pileatus Linnaeus Pileated Woodpecker		U			U	U			
Centurus carolinus zebra Boddaert Red-bellied Woodpecker					C	C			
Melanerpes erythrocephalus (Linnaeus) Red-headed Woodpecker	C	C			C	C			
Picoides pubescens (Linnaeus) Downy Woodpecker	C	C			C	C			
Picoides villosus (Linnaeus) Hairy Woodpecker	C	C			C	C			
Sphyrapicus varius (Linnaeus) Yellow-bellied Sapsucker					U	U			
TYRANNIDAE									
Tyrannus tyrannus Linnaeus Eastern Kingbird			C	C					
Myiarchus crinitus boreus Bangs Great Crested Flycatcher					C	U			U

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Sayornis phoebe Latham Eastern Phoebe					C	C			C
Contopus virens Linnaeus Eastern Wood Pewee					C	C			C
Empidonax virescens (Vieillot) Acadian Flycatcher						U			
Empidonax minimus (Baird & Baird) Least Flycatcher					U				
Empidonax traillii (Audubon) Willow Flycatcher					U				
ALAUDIDAE									
Eremophila alpestris praticola Henshaw Horned Lark			C	C					
HIRUNDINIDAE									
Iridoprocne bicolor Vieillot Tree Swallow						C	C		C
Riparia riparia Linnaeus Bank Swallow								C	C

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Stelgidopteryx ruficollis serripennis Audubon Rough-winged Swallow						C	C		C
Hirundo rustica erythrogaster Boddaert Barn Swallow		C	C	C					
Petrochelidon pyrrhonota Vieillot Cliff Swallow					U		U		C
Progne subis Linnaeus Purple Martin	U	U							
CORVIDAE									
Cyanocitta cristata Linnaeus Blue Jay	C	C	C	C	C	C	C	U	U
Corvus brachyrhynchos Brehem Common Crow	C	C	C	C	C	C	C	C	C
Corvus ossifragus Wilson Fish Crow								U	
PARIDAE									
Parus carolinensis extimus Todd & Sutton Carolina Chickadee	C	C			C	C		C	

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Parus atricapillus Linnaeus Black-capped Chickadee	C	C			C	C		C	C
Parus bicolor Linnaeus Tufted Titmouse	C	C			C	C		C	C
SITTIDAE									
Sitta carolinensis cookei Oberholser White-breasted Nuthatch					U	U			
TROGLODYTIDAE									
Troglodytes aedon baldwini Oberholser House Wren	C	C							
Thryothorus ludovicianus Latham Carolina Wren					C	U			U
*Thryomanes bewickii (Audubon) Bewick's Wren		R							
Cistothorus platensis stellaris (Naumann) Short-billed Marsh Wren							U		
Cistothorus palustris dissaepus (Bangs) Long-billed Marsh Wren							U		

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
MIMIDAE									
Mimus polyglottis Linnaeus Mockingbird	C	C		C	C				
Dumetella carolinensis (Linnaeus) Gray Catbird					C	U			U
Toxostoma rufum Linnaeus Brown Thrasher				C	C	U			
TURDIDAE									
Turdus migratorius (L.) Robin	C	C			C	C	U		C
Hylocichla mustelina (Gmelin) Wood Thrush					C	C			
Sialia sialis Linnaeus Eastern Bluebird					C	C	U		C
SYLVIIDAE									
Polioptila caerulea Linnaeus Blue-gray Gnatcatcher						U	U		U
Regulus satrapa Lichtenstein Golden-crowned Kinglet					C	C			U

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Regulus calendula Linnaeus Ruby-crowned Kinglet					C	C			U
LANIIDAE									
Lanius excubitor Linnaeus Northern Shrike					U				
Lanius ludovicianus migrans Palmer Loggerhead Shrike				R					
STURNIDAE									
Sturnus vulgaris Linnaeus Starling	C	C	C	C	C	C	C	C	C
VIREONIDAE									
Vireo griseus noveboracensis (Gmelin) White-eyed Vireo					C	C			C
Vireo flavifrons Vieillot Yellow-throated Vireo						U			
Vireo olivaceus (L.) Red-eyed Vireo					C	C			
Vireo gilvus (Vieillot) Warbling Vireo						U			U

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
PARULIDAE									
Prothonotaria citrea Boddaert Prothonotary Warbler						C			U
Vermivora pinus (L.) Blue-winged Warbler				U	U				
Parula americana (L.) Northern Parula						U	U		
Dendroica petechia aestiva (Gmelin) Yellow Warbler						C	C		C
Icteria virens (Linnaeus) Yellow-breasted Chat				C	C				C
Dendroica coronata Linnaeus Yellow-rumped Warbler					C	U			
Dendroica dominica albiflora Ridgeway Yellow-throated Warbler					C	C			C
Dendroica cerulea (Wilson) Cerulean Warbler						U			
Seiurus motacilla (Vieillot) Louisiana Waterthrush						C			C

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Geothlypis trichas Linnaeus Yellowthroat						U	U		U
Oporornis formosus (Wilson) Kentucky Warbler						C			U
Wilsonia citrina (Boddaert) Hooded Warbler						U			
Setophaga ruticilla (L.) American Redstart					C	C	U	C	U
PLOCEIDAE									
Passer domesticus Linnaeus House Sparrow	C	C	C	C	U				
ICTERIDAE									
Sturnella magna argutula Bangs Eastern Meadowlark		C	C	C					
Agelaius phoeniceus Linnaeus Red-winged Blackbird		C	C	C		C	C	C	C
Icterus galbula Linnaeus Northern Oriole					C	U			
Icterus spurius Linnaeus Orchard Oriole					C				

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Euphagus carolinus (Muller) Rusty Blackbird			C	C	U	C			
Quiscalus quiscula versicolor Vieillot Common Grackle		U	C	C	C	U	U		C
Molothrus ater Boddaert Brown-headed Cowbird	C	C	C	C	C				
BOMBYCILLIDAE									
Bombycilla cedrorum Vieillot Cedar Waxwing		U			C	U			
THRAUPIDAE									
Piranga olivacea Gmelin Scarlet Tanager					U	U			
Piranga rubra (L.) Summer Tanager					C	U			
FRINGILLIDAE									
Cardinalis cardinalis Linnaeus Cardinal	C	C	C	C	C	C	C	C	C
Passerina cyanea Linnaeus Indigo Bunting				U	C	C	C	C	C

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Pipilo erythrophthalmus Linnaeus Rufous-sided Towhee	C	C			C	U			
Spiza americana (Gmelin) Dickcissel		C	C	C					
Carduelis pinus (Wilson) Pine Siskin	U	U							
Carduelis tristis (Linnaeus) American Goldfinch	U	U		C	C				
Carpodacus purpureus (Gmelin) Purple Finch	U								
Junco hyemalis Linnaeus Dark-eyed Junco	C	C	C	C	C				
Passerculus sandwichensis Gmelin Savannah Sparrow			U						
Ammodramus savannarum pratensis (Vieillot) Grasshopper Sparrow			U	U					
*Passerherbulus caudacutus Latham LeConte's Sparrow			R						
Pooecetes gramineus Gmelin Vesper Sparrow			U	U					

Table 26 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Spizella arborea Wilson Tree Sparrow				U	U				
Spizella passerina Bechstein Chipping Sparrow		C		C	C	C			
Spizella pusilla Wilson Field Sparrow		C		C	C	U	U		C
Zonotrichia leucophrys Forster White-crowned Sparrow		U		C	C	U			C
Zonotrichia albicollis Gmelin White-throated Sparrow		U		C	C	C	U	U	C
Passella iliaca (Merrem) Fox Sparrow				C	C				
Melospiza georgiana Latham Swamp Sparrow							U	U	U
Melospiza melodia euphonia Wotmore Song Sparrow	C	C	C	C	C	C	C	C	C

Table 27. Mammals of the Project Area

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
DIDELPHIDAE									
Didelphis marsupialis Linnaeus Opossum	C	C	C	C	C	C	C	C	C
SORICIDAE									
Blarina brevicauda (Say) Short-tailed Shrew	C	C	C	C	C	C			U
Cryptotis parva (Say) Least Shrew				U	U				U
TALPIDAE									
Scalopus aquaticus (Linnaeus) Eastern Mole	C	C	C	C	C	U			U
VESPERTILIONIDAE									
Myotis lucifugus (LeConte) Little Brown Bat					C				C
Lasionycteris noctivagans (LeConte) Silver-haired Bat					C	U			C
Eptesicus fuscus (Beauvois) Big Brown Bat					C	U			C
Lasiurus borealis (Muller) Red Bat					C	C			C

Table 27 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Lasiurus cinereus (Beauvois) Hoary Bat					R				C
Nycticeius humeralis (Rafinesque) Evening Bat					R				C
LEPORIDAE									
Sylvilagus floridanus (Allen) Eastern Cottontail	C	C	C	C	C	C	C	C	C
Sylvilagus aquaticus Bachman Swamp Rabbit						U			
SCIURIDAE									
Tamias striatus (Linnaeus) Eastern Chipmunk		U		C	C				
Marmota monax (Linnaeus) Woodchuck		C	C	C	C	C			C
Sciurus carolinensis Gmelin Eastern Gray Squirrel	C	C			C	C			C
Sciurus niger Linnaeus Eastern Fox Squirrel	C	C			C	C			C

Table 27 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
CASTORIDAE									
Castor canadensis Kuhl Beaver						C	C	C	C
CRICETIDAE									
*Oryzomys palustris (Harlan) Rice Rat							R		
Peromyscus maniculatus (Wagner) Deer Mouse		C	C	C	U	U			C
Peromyscus leucopus (Rafinesque) White-footed Mouse		C	C	C	C	C			U
*Peromyscus gossypinus (LeConte) Cotton Mouse						R			
Peromyscus nuttallii (Harlan) Golden Mouse						R			
Neotoma floridana (Ord) Eastern Wood Rat					R				
Microtus ochrogaster (Wagner) Prairie Vole			C	C					
Pitymys pinetorum (LeConte) Pine Vole				U	U				

Table 27 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Ondatra zibethicus (Linnaeus) Muskrat						C	C	C	C
MURIDAE									
Rattus norregicus (Berkenhout) Norway Rat	U	U							
Mus musculus (Linnaeus) House Mouse	C	C	C	C	C	U			
ZAPODIDAE									
Zapus hudsonius (Zimmermann) Meadow Jumping-mouse				R					
CANIDAE									
Canis familiaris Linnaeus Domestic Dog	C	C							
Canis latrans Say Coyote			U	U	U	U			U
Vulpes vulpes (Linnaeus) Red Fox					C	C			U
Urocyon cinereoargenteus (Schreber) Gray Fox					C	C			U

Table 27 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
PROCYONIDAE									
Procyon lotor (Linnaeus) Raccoon	U	C	C	C	C	C	C	C	C
MUSTELIDAE									
Mustela frenata Lichtenstein Long-tailed Weasel					U	U			U
Mustela vison Schreber Mink						U	C	U	C
Mephitis mephitis (Schreber) Striped Skunk		C	C	C	C	C	C	C	C
*Lutra canadensis (Schreber) River Otter								R	
FELIDAE									
*Lynx rufus (Schreber) Bobcat						Expected			
CERVIDAE									
Odocoileus virginiana (Zimmermann) White-tailed Deer		C	C	C	C	C	C	C	C

Table 28. Amphibians and Reptiles of the Project Area

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
AMBYSTOMATIDAE									
Ambystoma maculatum (Shaw) Spotted Salamander					U	C	C		
Ambystoma opacum (Gravenhorst) Marbled Salamander					C	C	U		
* Ambystoma talpoideum (Holbrook) Mole Salamander						R			
Ambystoma texanum (Matthes) Small-mouthed Salamander					U	C	C	C	C
Ambystoma tigrinum (Green) Eastern Tiger Salamander					U	C	C	C	C
SALAMANDRIDAE									
Notophthalmus viridescens louisianensis Wolterstorff Central Newt						R	R		
PROTEIDAE									
Necturus maculosus (Rafinesque) Mudpuppy						U	C	C	C

Table 28 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
SIRENIDAE									
Siren intermedia nettingi Goin Siren						U	U		
PELOBATIDAE									
**Scaphiopus holbrooki* (Harlan) Eastern Spadefoot Toad								R	
BUFONIDAE									
Bufo americanus Holbrook American Toad						C	C	C	C
Bufo americanus charlesmithii Bragg Dwarf Toad						U			
Bufo woodhousei fowleri Hinckley Fowler's Toad						C	C	C	C
HYLIDAE									
Acris crepi ans blanchardi Harper Blanchard's Cricket Frog						C	C	C	C
Pseudacris triseriata (Wied) Western Chorus Frog						C	C	C	C
Pseudacris triseriata feriarum (Baird) Upland Chorus Frog						C			U

Table 28 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Hyla crucifer Wied Northern Spring Peeper						C	C	C	C
Hyla versicolor LeConte Gray Treefrog					C	C			U
RANIDAE									
Rana areolata circulosa Rice & Davis Northern Crayfish Frog						C	C	C	C
Rana catesbeiana Shaw Bullfrog						C	C	C	C
Rana clamitans melanota (Rafinesque) Green Frog						U			
Rana pipiens sphenocephala Cope Southern Leopard Frog						C	C	C	C
CHELYDRIDAE									
Chelydra serpentina (Linnaeus) Snapping Turtle						C	C	C	C
Macroclemgs temmincki (Troost) Alligator Snapping Turtle						U		U	

Table 28 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
KINOSTERNIDAE									
Sternothaerus odoratus (Latreille) Stinkpot						C	C	C	C
TESTUDINIDAE									
Terrapene carolina (Linnaeus) Eastern Box Turtle		U	U	U	C	C	C	U	C
Chrysemys picta marginata Agassiz Midland Painted Turtle						C	U	U	U
Pseudemys scripta elegans (Wied) Red-eared Turtle						C	C	C	C
Pseudemys concinna hieroglyphica (Holbrook) Hieroglyphic Turtle						R			U
Graptemys geographica (LeSueur) Map Turtle						U		U	
Graptemys pseudogeographica (Gray) False Map Turtle						U	U	U	U
TRIONYCHIDAE									
Trionyx muticus LeSueur Smooth Softshell Turtle						U	C	C	C

Table 28 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Trionyx spinifer LeSueur Spiny Softshell Turtle						U	C	C	C
IGUANIDAE									
Sceleporus undulatus hyacinthinus (Green) Northern Fence Lizard				U	C				
ANGUIDAE									
*Ophisaurus attenuatus Cope Western Slender Glass Lizard					R				
SCINCIDAE									
Scincella laterale (Say) Ground Skink					C	U			
Eumeces fasciatus (Linnaeus) Five-lined Skink						C			U
Eumeces laticeps (Schneider) Broad-headed Skink					U	C			U
TEIIDAE									
Cnemidophorus sexlineatus Linnaeus Six-lined Race-runner					C				

Table 28 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
COLUBRIDAE									
Heterodon platyrhinos Latreille Eastern Hognose Snake					C	C			U
Opheodrys aestivus (Linnaeus) Rough Green Snake		R			C	C		U	C
Coluber constrictor flaviventris Say Eastern Yellow-bellied Racer				C	C	C			C
Elaphe obsoleta (Say) Black Rat Snake						C	C	C	C
Elaphe obsoleta spiloides Dumeril, Bibron, & Dumeril Gray Rat Snake						C			C
Lampropeltis calligaster (Harlan) Prairie Kingsnake			U	C					
Lampropeltis getulus niger (Yarrow) Black Kingsnake					U	U	U	C	C
Lampropeltis holbrooki Stejneger Speckled Kingsnake					U	U	U	U	C
Lampropeltis triangulum syspila (Cope) Red Milksnake					U				

Table 28 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Thamnophis sauritus proximus (Say) Western Ribbon Snake						C	C	C	C
Thamnophis sirtalis (Linnaeus) Eastern Garter Snake	U	C	U	C	C	U			U
Storeria dekayi wrightorum Trapido Midland Brown Snake			C	C	C	U			U
Storeria occipitomoculata (Storer) Northern Red-bellied Snake				U		U			
Natrix erythrogaster flavigaster Conant Yellow-bellied Water Snake						C	C		
Natrix grahami (Baird & Gerard) Graham's Water Snake						U	C		U
Natrix rhombifera (Hallowell) Diamond-backed Water Snake						C	C	C	C
CROTALIDAE									
Agkistrodon piscivorus leucostomus (Troost) Western Cottonmouth						C	C	U	U
Agkistrodon contortrix mokeson (Daudin) Northern Copperhead					C	U			U

Table 28 (continued)

Species	City Sub-urban	Exurban	Agri-culture	Old Field	Upland Forest	Flood-plain Forest	Marshes Ponds	Rivers Sand Mud	Streams & Tribs.
Crotalus horridus Linnaeus Timber Rattlesnake					U	C			

Pestiferous Plants and Animals

Several plants in the project area may be classified as pestiferous, but their degree of harmfulness is partly determined by the individual affected.

Poison ivy (Toxicodendron radicans) is the most widespread and abundant of the pestiferous plants, being found in all habitats. Contact with any part of the plant, or even from smoke derived from the burning of the plant, may cause skin irritation, dependent upon the sensitivity of the person. Some people seemingly are not affected by poison ivy.

Several plants produce pollen which causes allergic reactions to certain people. Chief among these plants are giant and common ragweed (Ambrosia trifida and A. artemisiifolia), and several tree species, including elm and willow (Ulmus spp. and Salix spp.).

A few species of the nettle family (Urticaceae) cause painful but usually not serious skin irritation when brushed against. Hairs on the stems of these nettles break off, liberating formic acid which will penetrate through light clothing. Species which have this stinging potential are stinging nettle (Urtica dioica), false stinging nettle (Laportea canadensis), and round-leaved stinging nettle (Urtica chamaedryoides).

Several plants are poisonous when eaten. Although man rarely attempts to eat these poisonous plants, livestock sometimes do. Among the common poisonous plants are snakeroots (Eupatorium serotinum and E. rugosum) and water hemlock (Cicuta maculata).

A number of animal species in the project area are potentially dangerous. The brown recluse spider (Loxosceles reclusa), an inhabitant of upland forests as well as in the vicinity of human habitation, is potentially dangerous. Its bite is painful and uncommonly slow to heal. Another dangerous spider is the black widow (Latrodectus mactans), whose bite is painful and usually severe. The black widow, like the brown recluse, lives in upland forests and around human habitation.

There are no recent cases of poisonous spider bites reported by the Jackson County Health Department.

At least two species of ticks in the project area are known to be carriers of Rickettsia rickettsia, the pathogen which causes rocky mountain spotted fever. These are the wood tick (Dermacentor variabilis) and lone star tick (Amblyomma americanus). Although rocky mountain spotted fever is infrequent, it has the potential of being fatal to man.

Another disease whose vector is carried by the lone star tick is tularemia.

Mosquitoes provide another potential source of danger because they may transmit malaria and various strains of encephalitis, particularly

the St. Louis strain. One case of St. Louis encephalitis was reported from Jackson County during 1977.

Many other insects produce painful but rarely dangerous bites, although extremely sensitive persons may show severe illness from bites and stings of yellow jackets, hornets, mud daubers, and wasps.

Rabies is another disease carried by several animals in the area, most notably the striped skunk (Mephitis mephitis) and feral dogs (Canis familiaris).

Among the reptiles, one turtle and three snakes are dangerous. The alligator snapping turtle (Macroclemys temmincki) has powerful jaws strong enough to inflict damage to man. Three crotalids, the western cottonmouth (Agkistrodon piscivorus leucostoma), the northern copperhead (Agkistrodon contortrix mokeson), and the timber rattlesnake (Crotalus horridus) occur in the area. The western cottonmouth is common in wet situations, while the northern copperhead is common in upland regions. The timber rattlesnake, uncommon in the project area, may be found in rocky uplands or in bottomland forests. No recent reports of bites from these three poisonous reptiles have been reported recently in Jackson County.

Land Use Conversions

Each year more forested land becomes converted into agricultural land. One woodland tract of 20 acres in Section 9, T9S, R4W was cleared during 1977. As this report was being revised and the final maps prepared, a 5-acre woods in Section 33, T8S, R4W was cleared.

Comparison of aerial photographs from the study area in 1969 and 1977 shows a conversion of forest land to agriculture. An estimated 148 acres during this eight year period underwent the shift to agriculture.

Threatened, Rare, and Endangered Species

FLORA. At the time of this report, no plant species in Illinois are protected by Federal law, although American ginseng (Panax quinquefolius) is protected by the Convention on International Trade.

The State of Illinois, however, is moving quickly toward the finalization of a list of endangered and threatened species which will be submitted to the state legislature. The Endangered Plants Project, which is charged to prepare and submit such a list, has issued a semi-final list of endangered and threatened plants on January 18, 1978.

Definitions for the various categories in Illinois' Semi-final List follow:

Endangered: Those species of plants in danger of extinction. Existence may be endangered because of the destruction, drastic modification, or severe curtailment of habitat, or because of overexploitation, disease, or even unknown reasons.

Threatened: Those species of plants that are likely to become endangered within the forseeable future.

Extirpated: Those species no longer thought to be extant in the state.

Rare: Those species judged rare enough to warrant their inclusion on a "watch" list.

Uncertain: Those species which may qualify for one of the above categories, but for which not enough information is known.

In the study area, four endangered, four threatened, and three rare species of vascular plants were found. Of these, seven occur in upland or mesophytic forests, either at Fountain Bluff or the limestone cliffs immediately north of Grand Tower. Three of the four wetland species (Carex socialis, Iris fulva, and Cynosciadium digitatum) occur in the Oakwood Bottoms of the Shawnee National Forest. As a result, they probably are afforded a little more protection than species on private property. The fourth wetland species, the water hickory (Carya aquatica) occurs on private land (Lucy Pond, Section 9, T9S, R4W), about one-fourth mile from a wooded tract that was cleared in 1977.

Carex socialis Mohlenbr. & Schwegm. Threatened. A small colony occurs east of Worthen Bayou and north of the levee road. This species was recommended for national threatened status in the Smithsonian Report (1974).

Panicum nitidum Lam. Endangered. This panic grass grows on dry limestone on Devil's Backbone north of Grand Tower.

Iris fulva Ker. Threatened. A small colony of the swamp red iris grows in the Oakwood Bottoms one mile east of Howardton.

Hexalectris spicata (Walt.) Barnh. Endangered. The crested coral-root orchid grows on a wooded slope at Fountain Bluff.

Panax quinquefolius L. Threatened. American ginseng occurs infrequently in mesic woods in the Kinkaid Hills and at Fountain Bluff. It is also proposed as nationally threatened.

Berberis canadensis Mill. Endangered. American barberry grows on a moist sandstone ledge at Fountain Bluff.

Hydrastis canadensis L. Threatened. Goldenseal is found occasionally in mesic woods in the Kinkaid Hills and at Fountain Bluff. It is also proposed as nationally threatened.

Cynosciadium digitatum DC. Endangered. This member of the carrot family has its only known Illinois occurrence in the Oakwood Bottoms.

The following vascular plants are listed as Rare:

Muhlenbergia capillaris (Lam.) Trin. Hair Grass. Upland woods. Fountain Bluff.

Aristolochia tomentosa Sims. Dutchman's Pipevine. Limestone bluffs. Devil's Bake Oven.

Carya aquatica (Michx. f.) Nutt. Water Hickory. Swampy woods. Lucy Pond.

Listed as Uncertain are Aesculus discolor Pursh, the red buckeye, known from Fountain Bluff, and Ptilimnium nuttallii (DC.) Britt., the mock bishop's-weed from the Oakwood Bottoms.

Grand Tower Island, although east of the present channel of the Mississippi River, is actually in Perry County. Several unusual plants were found on the island, but only one of them, the round-leaved stinging nettle (Urtica chamaedryoides) is listed in the 1977 booklet, Rare and Endangered Species of Missouri. This publication lists the nettle as Status Undetermined. Other species deemed rare for Missouri by the contractor, but not included in Rare and Endangered Species of Missouri (1977) are Alliaria officinalis (only Missouri station) and Phacelia ranunculacea (eighth Missouri station).

FAUNA. On December 31, 1977, an Administrative Order from the Illinois Department of Conservation came into effect. The order is entitled Article CXXXVIII - Illinois List of Endangered and Threatened Vertebrate Species Issued in Accordance with Provisions of Section 337 of the Illinois Endangered Species Protection Act.

The list which follows has been adopted by the Illinois Endangered Species Protection Board as the Official List of Endangered and Threatened Vertebrate Species of Illinois. Definitions used are as follows:

Federally Endangered Species: Any species which is in danger of extinction throughout all or a significant portion of its range.

Federally Threatened Species: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

State Endangered Species: Any species which is in danger of extinction as a breeding species in Illinois.

State Threatened Species: Any breeding species which is likely to become a state endangered species within the foreseeable future in Illinois.

The Missouri Department of Conservation and the United States Department of Agriculture Soil Conservation Service published a revised list of rare and endangered species of Missouri in 1977. In addition to categories of endangered and rare, a category called status undetermined was created for species where more information is needed.

The only vertebrates recorded in this 1977 work as previously known from Perry County are the alligator snapping turtle (Macroclemys temminckii) and the long-tailed weasel (Mustela frenata). Other vertebrates observed in the study area (from Illinois) and which are recorded from Missouri (but not Perry County) as endangered are red-shouldered hawk (Buteo lineatus), double-crested cormorant (Phalacrocorax auritus), marsh hawk (Circus cyaneus), Cooper's hawk (Accipiter cooperii), least tern (Sterna albifrons), osprey (Pandion haliaetus), peregrine falcon (Falco peregrinus), and river otter (Lutra canadensis). Those listed as rare for Missouri (but not Perry County) are Mississippi kite (Ictinia mississippiensis), king rail (Rallus elegans), upland sandpiper (Bartramia longicauda), bald eagle (Haliaeetus leucocephalus), and swamp rabbit (Sylvilagus aquaticus).

One species determined to be rare (1977) and observed in this study from Grand Tower Island (Perry County) is the hognose snake (Heterodon nasicus). It was known previously only from Scott and Mississippi counties.

In the project area in Illinois, the following avifauna, mammals, amphibians, and reptiles are known to occur:

Avifauna

Phalacrocorax auritus Lesson. Double-crested Cormorant. State Endangered. Over water.

Egretta caerulea (Linnaeus). Little Blue Heron. State Endangered. Wet ground; ditches.

Casmerodius albus egretta Gmelin. Great Egret. State Endangered. Bottomland woods; near water.

Botaurus lentiginosus (Rackett). American Bittern. State Endangered. Marshes.

Nycticorax nycticorax hoactli Gmelin. Black-crowned Night Heron. State Endangered. Floodplain forests.

Ictinia mississippiensis (Wilson). Mississippi Kite. State Endangered. Floodplain woods.

Accipiter cooperii (Bonaparte). Cooper's Hawk. State Endangered. Upland forests.

Buteo lineatus Gmelin. Red-shouldered Hawk. State Endangered. Floodplain forests.

Halieetus leucocephalus Linnaeus. Bald Eagle. Federally Endangered. State Endangered. Sandbars.

Circus cyaneus Linnaeus. Marsh Hawk. State Endangered. Old fields.

Pandion haliaetus carolinensis (Gmelin). Osprey. State Endangered. Over water.

Falco peregrinus anatum Bonaparte. Peregrine Falcon. Federally Endangered. State Endangered. Upland forests.

Bartramia longicauda (Bechstein). Upland Sandpiper. State Endangered. Old fields.

Sterna hirundo Linnaeus. Common Tern. State Endangered. Near rivers.

Sterna albifrons athilassos Burleigh. Least Tern. State Endangered. Sandbars.

Chlidonias niger Linnaeus. Black Tern. State Endangered. Sandbars.

Asio flammeus (Pontoppidan). Short-eared Owl. State Endangered. Old fields.

Gallinula chloropus cachinnans Bangs. Common Gallinule. State Threatened. Marshes.

Thryomanes bewickii (Audubon). Bewick's Wren. State Threatened. Exurban.

Lanius ludovicianus migrans Palmer. Loggerhead Shrike. State Threatened. Old fields.

Mammals

Neotoma floridana (Ord). Eastern Wood Rat. State Endangered. Upland forests.

Lynx rufus (Schreber). Bobcat. State Threatened. (Not known from the project area, but to be expected.) Floodplain woods.

Lutra canadensis (Schreber). River Otter. State Threatened. Rivers.

Ochrotomys nuttallii (Harlan). Golden Mouse. State Threatened. Floodplain forests.

Oryzomys palustris (Harlan). Rice Rat. State Threatened. Marshes.

Two other threatened bats, known from Jackson County but not recorded during the present study are the Indiana bat (Myotis sodalis) and the gray bat (Myotis nigrescens).

Amphibians and Reptiles

No amphibians and reptiles in the project area are on the State or Federal List.

Problems and Opportunities

The area covered by the Degognia and Fountain Bluff Levee and Drainage District and the Grand Tower Drainage and Levee District has a few problems as well as some unique opportunities for future use and development. These are called attention to in the paragraphs below as they may be useful in making long-term decisions for the drainage districts.

Problems. A major problem in the area is the continuous threat of flooding and the exceptionally slow drainage of the bottomlands. As a result, the use of these lands as agricultural fields is always a touch-and-go situation. The drainage districts are a vast basin surrounded by levees on three sides and the formidable Kinkaid Hills on the fourth.

Local land owners lay the blame on insufficient ways of transporting rapid runoff from the Kinkaid Hills out of the area. One resident related that no rain may fall in the bottoms, but a hard rain in the adjacent Kinkaid Hills will cause considerable standing water on his farm within 24 hours.

A second problem relates to the slow drainage and frequent standing water. These areas provide excellent breeding grounds for mosquitoes and may provide habitats for other disease-carrying insects.

Equally important are the problems of land use. With the bottomland forests being converted to agricultural use, suitable wildlife habitat is being depleted. Except for the extensive Oakwood Bottoms, only occasional bottomland forests occur, and they are gradually being converted to agriculture by the private land owners.

Also disturbing are the poor land use practices. Some of the remaining bottomland forests are used as grazing plots for pigs and cattle. This extreme disturbance caused rapid degeneration of wildlife habitats.

Opportunities. A number of opportunities exist in the project area.

Because of its geographical location and historical significance, Grand Tower has the potential of developing into a major visitor's attraction. Devil's Backbone Park, at the north end of town, could be further developed, particularly in conjunction with the ferry which crosses the Mississippi River.

Further development of the Oakwood Bottoms by the United States Forest Service would attract more sportsmen to the area.

Developments for water-based recreation could be done at several places along the Mississippi River. Particularly attractive sites are at Wagner's Landing, Brunkhorst Landing, and at Grand Tower.

Fountain Bluff has the potential of being developed into a major natural and archeological area because of the great diversity of plants and animals and because of the Indian petroglyphs. The area is well-qualified for a National Natural Landmark.

Bibliography

This bibliography contains any work which pertains to the plants, avifauna, mammals, amphibians, and reptiles in the Degognia and Fountain Bluff Levee and Drainage District and the Grand Tower Drainage and Levee District.

It was prepared by searching appropriate biological journals and books which may contain information concerning the biota of the area. (A list of the journals consulted is in Appendix A.) In addition, unpublished theses and dissertations in Botany and Zoology at Southern Illinois University, Carbondale, were checked.

The bibliography is divided into six sections--vascular plants, avifauna, mammals, amphibians and reptiles, general ecology, and miscellaneous.

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APPENDIX A

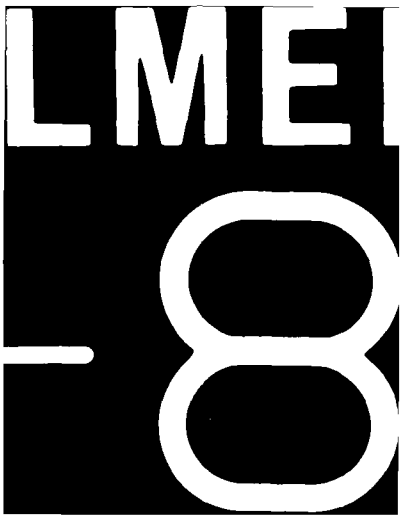
Periodicals Reviewed

American Fern Journal
American Midland Naturalist
American Naturalist
Annals of the Missouri Botanical Garden
Audubon
Auk
Bird Banding
Bulletin of the Missouri Botanical Garden
Bulletin of the Torrey Botanical Club
Castanea
Chicago Academy of Science Transactions
Condor
Copeia
Eastern Bird Banding News
Ecological Monographs
Ecology
Fieldiana: Botany and Zoology Series
Forest Science
Herpetologica
Illinois Natural History Survey Bulletin
Illinois State Academy of Science Transactions
Inland Bird Banding News
Iowa State Academy of Science Transactions
Iowa State Journal of Science
Journal of Ecology
Journal of Forestry
Journal of Herpetology
Journal of Mammalogy
Journal of the Arnold Arboretum
Journal of Wildlife Management
Living Bird
North American Wildlife Conference Transactions
Ohio Journal of Science
Recent Literature of Mammalogy
Rhodora
Sida
Tennessee State Academy of Science Transactions
Torreya
Wildlife Abstracts
Wilson Bulletin
Zoological Record

APPENDIX B

Explanation of Maps

Two maps are included with this study. One of these designates, by means of patterns, the location of the major habitats. The other map indicates the locality of fifty-two distinct plant associations. The numbers refer to the numbers given in the text, beginning on page 55. The letter which precedes some of the numbers denotes the areas selected for detailed study.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