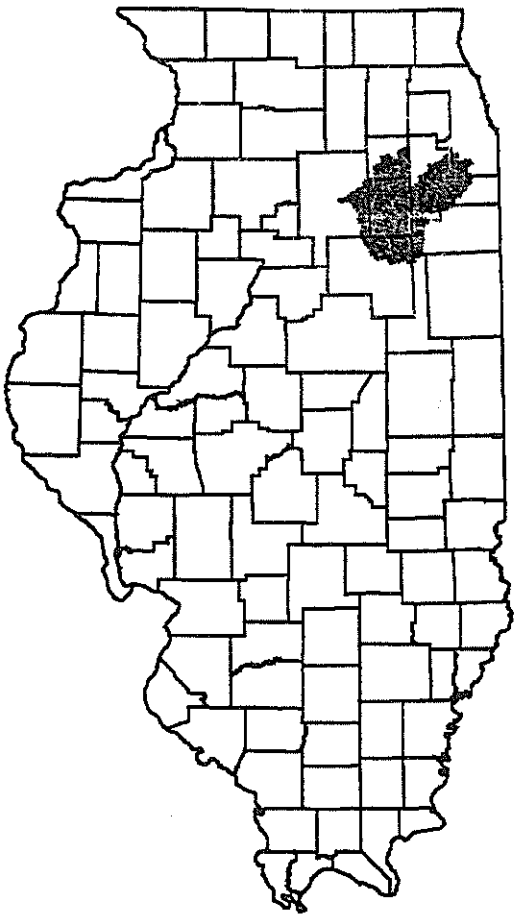
Volume 3

Living Resources

PRAIRIE PARKLANDS AREA ASSESSMENT



ILLINOIS DEPARTMENT OF NATURAL RESOURCES

PRAIRIE PARKLANDS AREA ASSESSMENT

VOLUME 3: LIVING RESOURCES

Illinois Department of Natural Resources
Office of Scientific Research and Analysis
Natural History Survey Division
607 East Peabody Drive
Champaign, Illinois 61820
(217) 333-4949

2000

George H. Ryan, Governor
State of Illinois

Brent Manning, Director
Illinois Department of Natural Resources
524 South Second
Springfield, Illinois 62701

300
Printed by the authority of the State of Illinois

Other CTAP Publications

Prairie Parklands Area Assessment
Vol. 1 *Geology*
Vol. 2 *Water Resources*
Vol. 4 *Socio-Economic Profile, Environmental Quality and Archaeological Resources*
Prairie Parklands: An Inventory of the Region's Resources
— 22-page color booklet

Descriptive inventories and area assessments are also available for the following regions:

Rock River
Cache River
Mackinaw River
Illinois Headwaters
Illinois Big Rivers
Fox River
Kankakee River
Kishwaukee River
Embarras River
Upper Des Plaines River
Illinois River Bluffs
Spoon River
Driftless Area
Lower Rock River
Sinkhole Plain
Sugar-Pecatonica Rivers
Vermilion River
Upper Sangamon River

Also available:

Illinois Land Cover, An Atlas, plus CD-ROM
Inventory of Ecologically Resource-Rich Areas in Illinois
EcoWatch '98, Annual Report of the Illinois EcoWatch Network
Illinois Geographic Information System, CD-ROM of digital geospatial data

All CTAP and Ecosystems Program documents are available from the DNR Clearinghouse at (217) 782-7498 or TDD (217) 782-9175. Selected publications are also available on the World Wide Web at http://dnr.state.il.us/ctap/ctaphome.htm, or http://dnr.state.il.us/c2000/manage/partner.htm, as well as on the EcoForum Bulletin Board at 1 (800) 528-5486 or (217) 782-8447.

For more information about CTAP, call (217) 524-0500 or e-mail at ctap2@dnrmail.state.il.us; for information on the Ecosystems Program call (217) 782-7940 or e-mail at ecoprog@dnrmail.state.il.us.

The Illinois Department of Natural Resources does not discriminate based upon race, color, national origin, age, sex, religion or disability in its programs, services, activities and facilities. If you believe that you have been discriminated against or if you wish additional information, please contact the Department at (217) 785-0067 or the U.S. Department of the Interior Office of Equal Employment, Washington, D.C. 20240.

About This Report

The *Prairie Parklands Area Assessment* examines 1,477 square miles in northeastern Illinois. Because significant natural community and species diversity has been found in the watershed, a portion of the assessment area has been designated a state "Resource Rich Area".[1]

This report is part of a series of reports on areas of Illinois where a public-private partnership has been formed to protect natural resources. These assessments provide information on the natural and human resources of the areas as a basis for managing and improving their ecosystems. The determination of resource rich areas and development of ecosystem-based information and management programs in Illinois are the result of three processes — the Critical Trends Assessment Program, the Conservation Congress, and the Water Resources and Land Use Priorities Task Force.

Background

The Critical Trends Assessment Program (CTAP) documents changes in ecological conditions. In 1994, using existing information, the program provided a baseline of ecological conditions.[2] Three conclusions were drawn from the baseline investigation:

1. the emission and discharge of regulated pollutants over the past 20 years has declined, in some cases dramatically,
2. existing data suggest that the condition of natural ecosystems in Illinois is rapidly declining as a result of fragmentation and continued stress, and
3. data designed to monitor compliance with environmental regulations or the status of individual species are not sufficient to assess ecosystem health statewide.

Based on these findings, CTAP has begun to develop methods to systematically monitor ecological conditions and provide information for ecosystem-based management. Five components make up this effort:

1. identify resource rich areas,
2. conduct regional assessments,
3. publish an atlas and inventory of Illinois landcover,
4. train volunteers to collect ecological indicator data, and
5. develop an educational science curriculum which incorporates data collection

At the same time that CTAP was publishing its baseline findings, the Illinois Conservation Congress and the Water Resources and Land Use Priorities Task Force were presenting their

[1] See *Inventory of Resource Rich Areas in Illinois: An Evaluation of Ecological Resources.*
[2] See *The Changing Illinois Environment: Critical Trends*, summary report and volumes 1-7.

respective findings. These groups agreed with the CTAP conclusion that the state's ecosystems were declining. Better stewardship was needed, and they determined that a voluntary, incentive-based, grassroots approach would be the most appropriate, one that recognized the inter-relatedness of economic development and natural resource protection and enhancement.

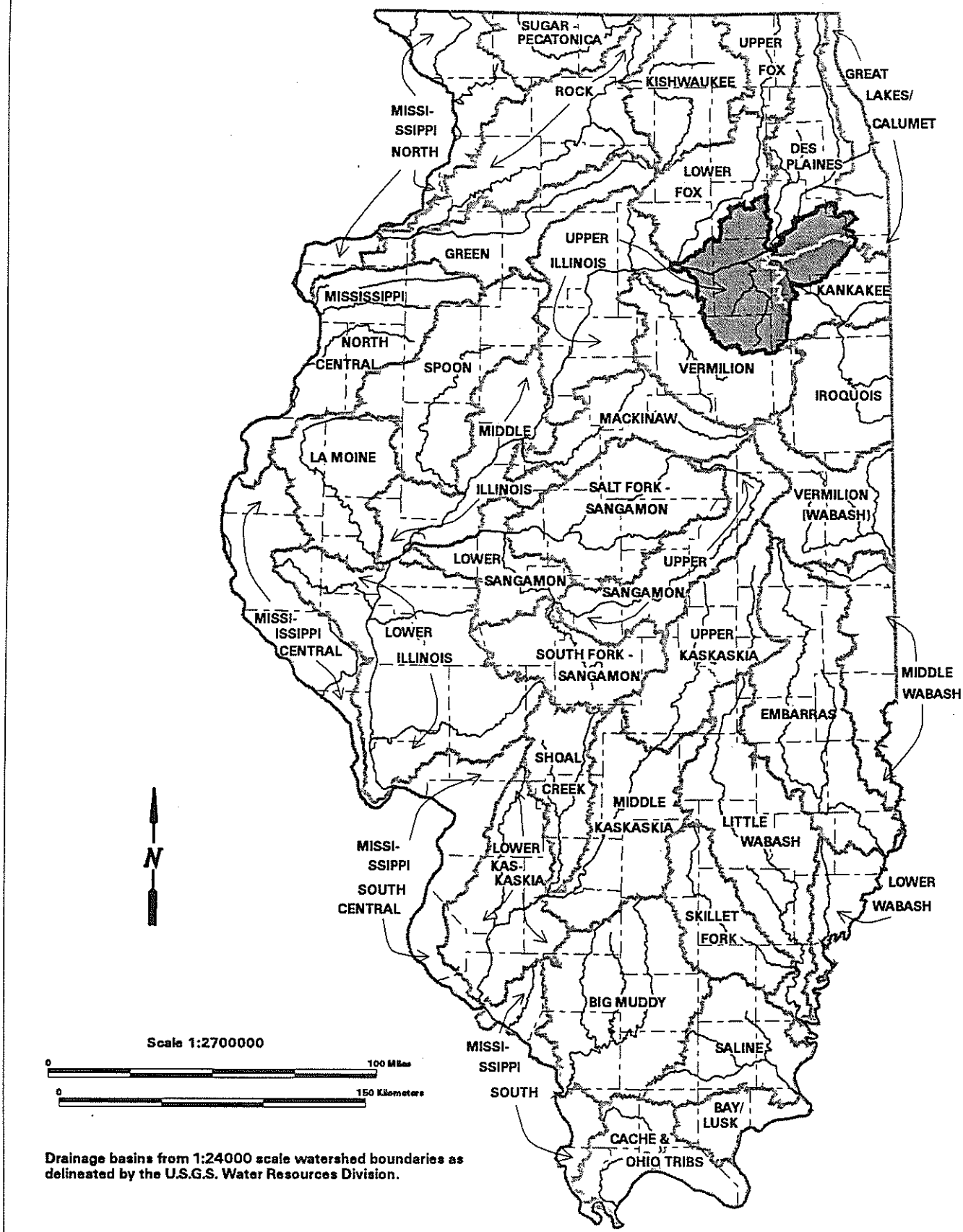
From the three initiatives was born Conservation 2000, a six-year program to begin reversing ecosystem degradation, primarily through the Ecosystems Program, a cooperative process of public-private partnerships that are intended to merge natural resource stewardship with economic and recreational development. To achieve this goal, the program provides financial incentives and technical assistance to private landowners. The Rock River and Cache River were designated as the first Ecosystem Partnership areas.

At the same time, CTAP identified 30 Resource Rich Areas (RRAs) throughout the state. In RRAs and other areas where Ecosystem Partnerships have been formed, CTAP is providing an assessment of the area, drawing from ecological and socio-economic databases to give an overview of the region's resources — geologic, edaphic, hydrologic, biotic, and socio-economic. Although several of the analyses are somewhat restricted by spatial and/or temporal limitations of the data, they help to identify information gaps and additional opportunities and constraints to establishing long-term monitoring programs in the partnership areas.

The Prairie Parklands Area Assessment

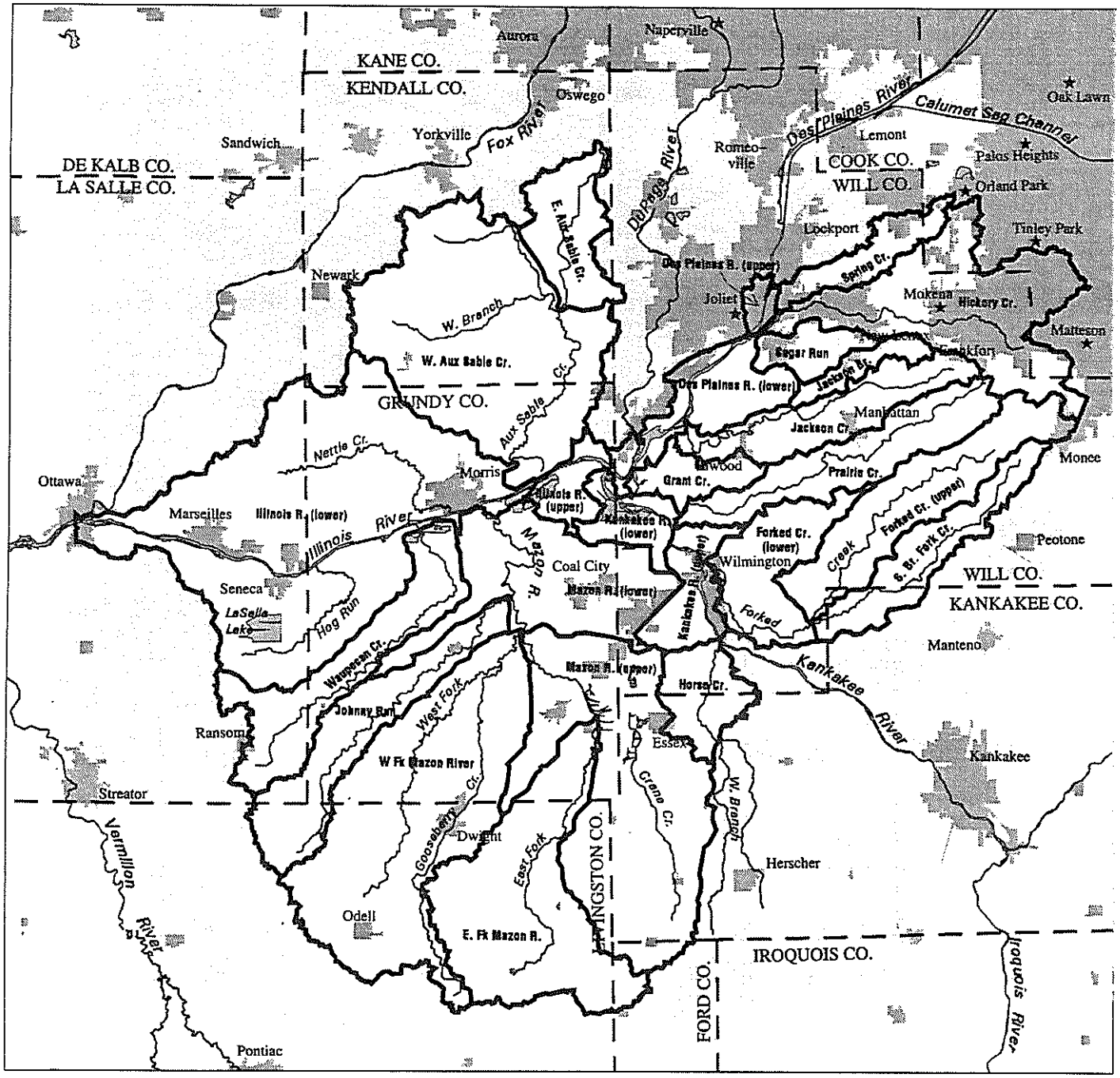
The Prairie Parklands area encompasses approximately 1,477 square miles (945,500 acres) in northeastern Illinois; including large parts of Will, Grundy, and Ke ndall counties, and smaller portions of Cook, Kankakee, Ford, Livingston, and LaSalle counties. The name Prairie Parklands refers to the fact that much of the area historically was open prairie with a park-like appearance of scattered trees. The area encompasses 25 subbasins along the Illinois, Des Plaines, and Kankakee rivers, of which eight have been designated a "Resource Rich Area" because they contain significant natural community diversity. The Prairie Parklands Ecosystem Partnership was subsequently formed around this core area of high quality ecological resources.

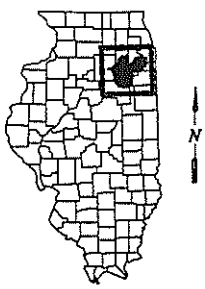
This assessment is comprised of four volumes. In Volume 1, *Geology* discusses the geology, soils, and minerals in the assessment area. Volume 2, *Water Resources*, discusses the surface and groundwater resources and Volume 3, *Living Resources*, describes the natural vegetation communities and the fauna of the region. Volume 4 contains three parts: Part I, *Socio-Economic Profile*, discusses the demographics,



Drainage basins from 1:24000 scale watershed boundaries as delineated by the U.S.G.S. Water Resources Division.

Major drainage basins of Illinois and location of the Prairie Parklands Assessment Area





Scale 1:554400

0 20 Miles

0 30 Kilometers

Subbasins in the Prairie Parklands Assessment Area. Subbasin boundaries depicted are those determined by the Illinois Environmental Protection Agency.

infrastructure, and economy of the area, focusing on Will and Grundy counties; Part II, *Environmental Quality*, discusses air and water quality, and hazardous and toxic waste generation and management in the area; and Part III, *Archaeological Resources*, identifies and assesses the archaeological sites known in the area.

Contributors

Principal Investigator ..... William G. Ruesink

Project Coordinator ..... Daniel K. Niven

Editors ..... Daniel K. Niven, Douglas S.K. Chien

Page Layout ..... Douglas S.K. Chien

Figures ..... Katherine J. Hunter, Liane B. Suloway

Introduction ..... Steven R. Hill, John B. Taft, Liane B. Suloway, Katherine J. Hunter, Douglas S.K. Chien

Natural Vegetation Communities ..... Steven R. Hill, John B. Taft

Birds ..... Steven D. Bailey, Scott K. Robinson

Mammals ..... Joyce E. Hofmann, Edward J. Heske

Amphibians and Reptiles ..... Christopher A. Phillips

Aquatic Biota:

333-1623
333-6846 244-2345

Fishes ..... Larry M. Page, Kevin S. Cummings, Christine A. Mayer

Mussels and Crustaceans ..... Larry M. Page, Kevin S. Cummings, Christine A. Mayer

Other Aquatic Macroinvertebrates ..... Mark J. Wetzel, Donald W. Webb

Table of Contents

Introduction
- Physiographic Characteristics 1
- Climate Patterns 3
- Vegetation History 7
- Current Land Cover 7
- Biologically Significant Features of Natural Communities 16

Natural Vegetation Communities
- Comparison of Biodiversity in the PPAA To Statewide Patterns 29
- Illinois Threatened and Endangered Species 31
- Disturbance, Habitat Quality, and Restoration Potential 35
- Natural Areas and Nature Preserves 36
- Terrestrial Natural Community Descriptions 39
- Forest 40
- Prairie 47
- Savanna 61
- Wetland 63
- Lake and Pond 69
- Stream 70
- Primary 71
- Cave 72
- Cultural 72
- Summary and Recommendations 73

Birds
- Introduction 79
- Forest 92
- Wetland 94
- Savanna 96
- Prairie/Grassland 97
- Lakes, Ponds, and Impoundments 99
- Creeks and Rivers 100
- Cultural Habitats: Cropland 101
- Cultural Habitat: Successional Fields 102
- Cultural Habitats: Developed Land 104
- Management Recommendations 105

Mammal
- Introduction 107
- Forest 109
- Prairie/Grassland 111
- Wetland 112

Amphibians and Reptile
Introduction 115
Forest 117
Wetland 117
Prairie/Grassland 118
Lakes, Ponds, and Impoundments 119
Creeks and Rivers 119
Cultural Habitats 119
Overall Habitat Quality 120
Current Management Concerns for Partnership 120
Aquatic Biota
Introduction 121
Statewide Comparison of Aquatic Biota 122
Common Species 124
Threatened and Endangered Species 142
Non-native Species 144
Unique Habitats 145
Information Gaps 145
Water Quality 146
Biologically Significant Streams 147
Environmental Problems 148
Potential Management Strategies for Aquatic Species 150
References 151
Appendix 1. Incomplete list of vascular plant species known from the PPAA 163
Appendix 2. Plant species, listed by scientific name 215

List of Figures

Figure 1. Major drainage basins of Illinois 4
Figure 2. Subbasins in the Prairie Parklands Assessment Area 5
Figure 3. Natural divisions in the Prairie Parklands Assessment Area 6
Figure 4. Cropland 10
Figure 5. Forest 11
Figure 6. Urban land 12
Figure 7. Grasslands 13
Figure 8. Wetlands 14
Figure 9. Open water 15
Figure 10. Public land 17
Figure 11. Natural areas, nature preserves, and biologically significant stream segments 24

List of Tables

Introduction
Table 1. Natural division acreage 2
Table 2. Current land cover 8
Table 3. Wetland acres 9
Table 4. Public land 16
Table 5. Natural areas 18
Table 6. Category 1 natural communities 21
Table 7. Nature preserves 22
Table 8. Biologically siginificant streams 25
Table 9. Threatened and endangered species 25

Natural Vegetation Communities
Table 10. Illinois threatened and endangered plant species in the PPAA 32
Table 11. Terrestrial natural communities 40
Table 12. Invasive and exotic plant species and eradication methods 78

Birds
Table 13. List of bird species in the Prairie Parklands Assessment Area 80

Mammals
Table 14. List of mammal species in the Prairie Parklands Assessment Area 108

Amphibians and Reptiles
Table 15. List of amphibian and reptile species in the PPAA 116

Aquatic Biota
Table 16. Freshwater fishes 125
Table 17. Freshwater fishes, by habitat 128
Table 18. Freshwater mussels 131
Table 19. Freshwater mussels, by habitat 133
Table 20. Freshwater crustaceans 134
Table 21. Freshwater crustaceans, by habitat 135
Table 22. Aquatic macroinvertebrates 135

Introduction

Physiographic Characteristics

The Prairie Parklands Assessment Area (PPAA) is an approximately 1,477 square-mile (945,497-acre) area including portions of eight Illinois counties. The PPAA extends from southwestern Cook County to northern Livingston County and west to central LaSalle County (Figures 1 and 2). The name Prairie Parklands refers to the fact that much of the area historically was open prairie with a parklike appearance of scattered trees. This Assessment Area includes portions of the lower Des Plaines River drainage basin, the upper Illinois River basin, and the lower Kankakee River basin (Figures 1 and 2). Major streams include the southern portion of the Des Plaines River, the northern portion of the Kankakee River, and the origin and extreme eastern portion of the Illinois River which is formed by the confluence of the two former streams.

Most of the PPAA lies within the Kankakee Plain, a region within the Till Plain Section of the Central Lowland Physiographic Province (Leighton et al. 1948, Willman et al. 1975). The remainder of the PPAA is split between the Bloomington Ridged Plain of the Till Plains Section, and the Wheaton Morainal Country, a region within the Great Lake Section of the Central Lowland Province. The Central Lowland Province is a gently rolling plain of glacial till covered by a thin cap of loess and is dissected by streams and drainages associated with the lower Kankakee and Des Plaines rivers and the upper Illinois River. The Kankakee Plain is a level lowland area, large parts of which are covered by sand deposits and dunes. The Bloomington Ridged Plain and Wheaton Morainal Country have prominent glacial topography characteristic of Wisconsinan glaciation. Elevation within the PPAA ranges only from a maximum of 767 ft. above sea level near Frankfort to a minimum of 459 ft. above sea level near Ottawa along the Illinois River at the western limit of the Assessment Area.

Portions of two natural divisions occur within the boundaries of the PPAA (Table 1, Figure 3), the Grand Prairie Division and the Northeastern Morainal Division (Schwegman et al. 1973). Most of the Assessment Area (780,853 acres [82.59%]), lies within the Grand Prairie Section of the Grand Prairie Natural Division. A relatively small portion of the PPAA (56,951 acres [6.02%]), in the southeastern-central area, lies within the Kankakee Sand Area Section of the Grand Prairie Division. The Grand Prairie Section is a level to gently rolling area formerly dominated by tallgrass prairie with occurrences of dolomite prairie, sedge meadow, marsh, and local areas of exposed dolomite bedrock. The presettlement vegetation of the Kankakee Sand Area Section ranged from generally level prairies, oak savannas, marshes, and other wetlands, all characterized by sandy soil. The remainder of the Assessment Area, about 107,693 acres (11.39 %) in the northeastern portion, lies within the Morainal Section of the Northeastern Morainal Division. The

Morainal Section of the Northeastern Morainal Division is characterized by relatively greater topographic relief compared with the Grand Prairie Division and a higher proportion of forest.

Table 1. Natural divisions occurring in the Prairie Parklands Assessment Area[1].

Division & Section	Acres	% of PPAA
Grand Prairie/Grand Prairie Section	780,853.27	82.59
Northeastern Morainal/Morainal Section	107,692.84	11.39
Grand Prairie/Kankakee Sand Area Section	56,951.05	6.02
Total:	**945,497.16**	**100.00**

[1] Data from the GIS Natural Division Coverage Database (Illinois Geographic Information System).

The surface geology of the PPAA primarily is characterized by deep Woodfordian-aged glacial drift, a substage of Wisconsinan glaciation and the last Pleistocene glacial episode. The glacial drift deposits generally vary from gravelly till towards the northwest and gray clayey till toward the southeast (Willman et al. 1975). Thickness of glacial drift in the PPAA generally ranges from between 50-200 ft and may locally reach a thickness of 400 ft. (Lineback 1979). These drift deposits are capped by a thin (approximately 3 ft.) layer of loess (Fehrenbacher et al. 1984). The loess is derived partially from Wisconsinan-age lake deposits. Portions of the surface deposits, in particular the sands, were created by glacial lakes and outwash from higher moraines. The bedrock of the area is primarily Silurian-aged dolomite. It is exposed along the bluffs of the Des Plaines valley. A small area of Ordovician shale is near the surface or exposed in southwestern Will County and northeastern Grundy County (Willman et al. 1975). A small area of Pennsylvanian sandstones may be found in the PPAA south of the Ordovician shales in northeastern Grundy County.

Soil type and depth vary within two major soil orders in the PPAA (Fehrenbacher et al. 1984). The majority of the soils are mollisols; these are deep, dark-colored (organically-rich), soils formed under grassland vegetation. The occurrence of the mollisols correspond closely with the Grand Prairie Natural Division described above. A band of soils along the northern and northeastern portion of the PPAA, and along the rolling better-drained sites bordering the river valleys and on the moraines, are alfisols (Fehrenbacher et al. 1982). These are light colored, predominately forest soils with lesser amounts of organic matter. Gravelly glacial till is exposed locally, particularly on eroding slopes bordering rivers within the Northeastern Morainal Natural Division. The mollisols include the soil associations Varna-Elliott-Ashkum and Symerton-Andres-Reddick. These formed in thin layers of loess (<20 ft.) and silty clay-loam glacial till. The alfisols include the soil associations Morley-Blount-Beecher and St. Clair-Nappanee-Frankfort, soils that also formed in thin layers of loess over silty-clay or clay glacial till. Along the Des Plaines

River is a band of soil formed in thin to thick loess or loam over limestone known as the Channahon-Dodgeville-Ashdale soil association, a mollisol parallel to the Morley-Blount-Beecher association (Fehrenbacher et al. 1982). This mollisol association supports several significant plants and plant communities that are uncommon in Illinois.

The Kankakee Sand Area described is characterized by an abundance of sandy soils. The majority of these are mollisols formed from sandy glacial outwash and alluvium or windblown sands, and belong to the Sparta-Dickinson-Onarga soil association. Where forests developed on these sandy deposits, the alfisol association Oakville-Lamont-Alvin is present. Because of locally poor drainage (e.g., where old lake beds occur), despite high permeability, these sandy soils can be wet in the winter and spring and dry and droughty in the summer and fall. This soil association supports plant communities that are limited elsewhere in Illinois to other local sand deposits.

In summary, most of the soils in the PPAA are dark, organically-rich, prairie mollisols or light-colored forest soils relatively low in organic matter. Two soil associations of particular significance in terms of unique vegetation types are present in the Assessment Area. One, the Channahon-Dodgeville-Ashdale soil association, is a dark soil developed mostly in loess over thinly buried dolomitic limestone. The other is the Sparta-Dickinson-Onarga association formed in deep sand deposits.

Climate Patterns[1]

The climate in the Prairie Parkland Area Assessment (PPAA) is typical of many continental locations, in that there are rather wide temperature fluctuations. The average high temperatures (°F) in the summer are in the 80s with average lows in the 60s. Winter highs are generally in the 30s with lows in the teens and 20s. Record temperature extremes range from -26°F to a high of 109°F. There is an average of six months without frost each year.

Precipitation is highest during April through September (averages of 3.77 to 3.98 inches per month) and lowest in January (1.38 inches) and February (1.39 inches), with a yearly average of 36.26 inches.

[1] Information in this section has been taken from the Prairie Parklands Area Assessment, Volume 2 (Illinois Department of Natural Resources 1999). See that volume for a more detailed discussion of climate patterns and long term trends in the PPAA.

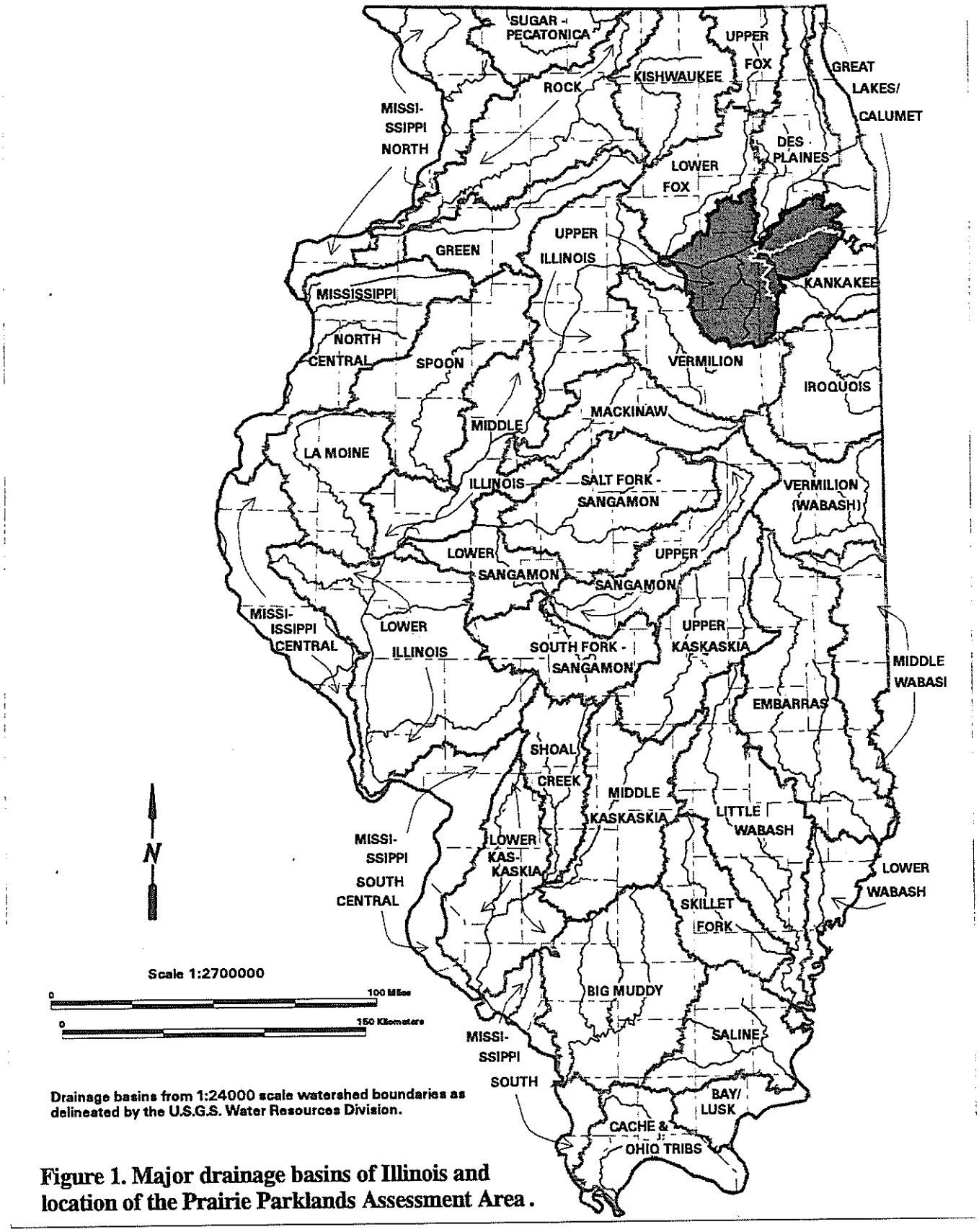


Figure 1. Major drainage basins of Illinois and location of the Prairie Parklands Assessment Area.

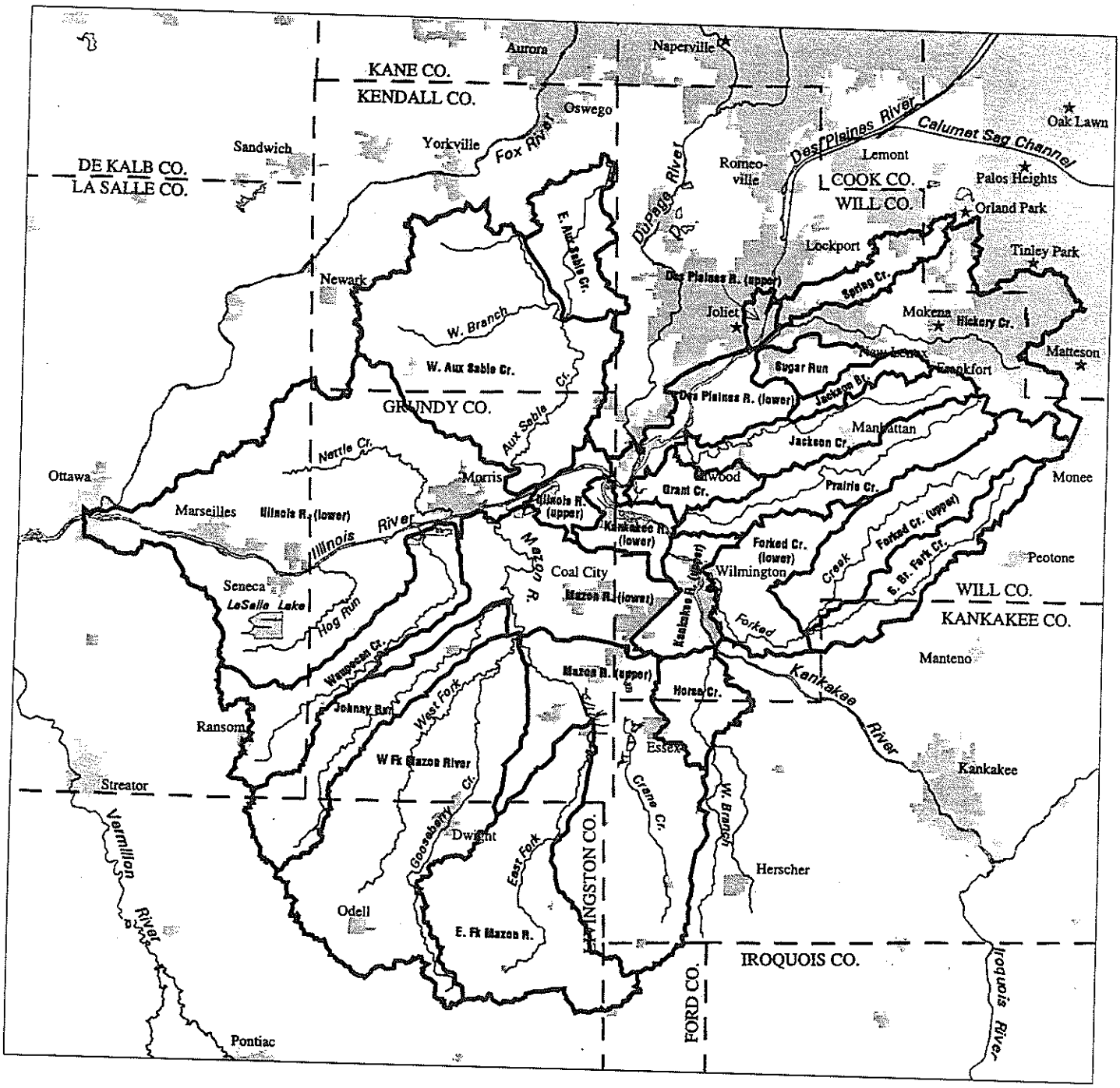


Figure 2. Subbasins in the Prairie Parklands Assessment Area. Subbasin boundaries depicted are those determined by the Illinois Environmental Protection Agency.

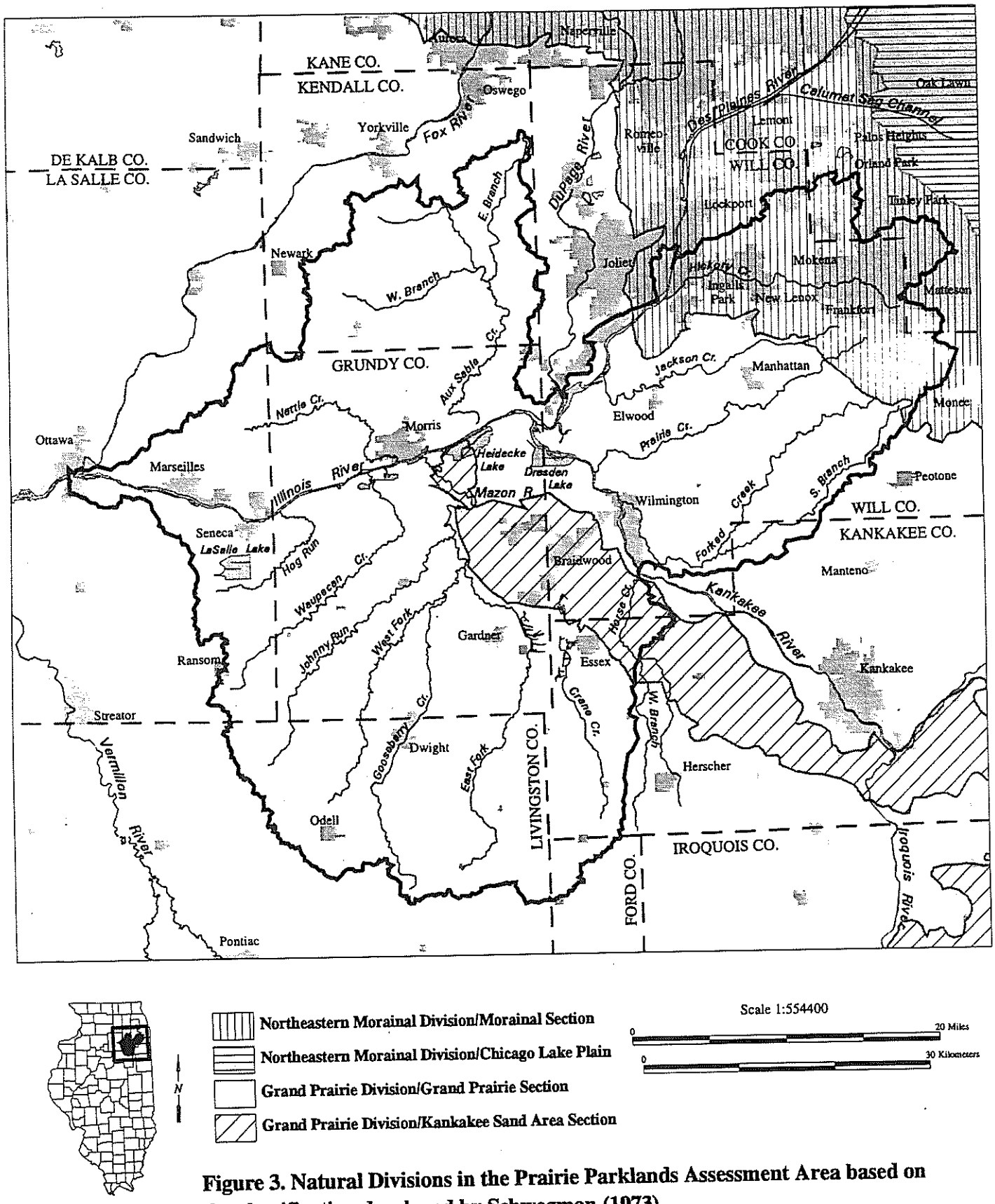


Figure 3. Natural Divisions in the Prairie Parklands Assessment Area based on the classification developed by Schwegman (1973).

Vegetation History

The presettlement vegetation in Illinois (prior to 1820) can be described generally as prairie and forest. Interpretations of the original distribution of prairie and forest (Vestal 1931, Anderson 1970, Iverson et al. 1989) consistently indicate a predominance of prairie occupying about 61% of the State's total land area. Forests statewide occupied about 38% of the land area. The proportion of prairie generally was greatest in central and northeastern Illinois. Based on the Government Land Office survey records around 1820, prairie cover was about 91% of the PPAA (858,580 acres) and forest cover was about 9% of the area (85,063). A small proportion (0.2%) was open water (1,852 acres). The prairies and forests can be correlated with the Natural Divisions and soil types as discussed above.

The total area of savanna and/or open woodlands at that time is unclear. The PPAA is within the general area of the transition zone of prairie and forest (Kilburn 1959, Anderson 1983) and probably supported some tallgrass savanna (Nuzzo 1986). Some savanna-like areas probably were present on thin soil over bedrock. However, savannas typically were unstable and their total area and distribution varied on the presettlement landscape depending on several factors including local conditions of climate, and fire frequency and intensity (Taft 1997). Fire is generally considered to have been a major ecological factor in the maintenance of tallgrass prairie, savanna, and open woodland vegetation in the Midwest (Anderson 1970, 1983, 1990; Axelrod 1985; Taft et al. 1995).

The total area of presettlement wetlands in the PPAA can not be determined with precision. The best estimates come from county-wide acreage data for hydric soils for the most prominent counties (Havera et al. 1994) and making inference to the remainder of the Assessment Area. Will County had about 210,300 wetland acres, or 39% of the county. Presettlement wetland acreage for Grundy County has been estimated as about 85,800 wetland acres, or 31.4% of the county. Presettlement wetland acreage for Kendall County has been estimated as about 57,500 wetland acres, or 29% of the county. Judging from these estimates, the proportion of wetland in the PPAA was probably between 30% and 39%.

Current Land Cover

The characterization of the land cover of the PPAA is based on information from the Land Cover of Illinois database (Illinois Geographic Information System), which was derived from satellite imagery acquired between 1991 and 1995. Figures given for high- quality acreages are based on the ongoing Illinois Natural Areas Inventory (White 1978). These latter data reflect the total area that remains in a relatively undisturbed condition (i.e., undegraded by human activity) and are used to provide an opportunity to compare statewide trends of habitat loss and degradation.

The landscape of the PPAA currently is dominated by agricultural uses (about 628,296 acres, 66.45%), chiefly cropland (Table 2). Most of this is in the Grand Prairie Natural Division which mostly has been transformed into cropland (Figure 4). Cropland is less common

within the Kankakee Sand Area, on sloping land within the Northeastern Morainal Division, and in the urban areas. About 6.44% (60,897 acres) of the PPAA remains forested (Table 2) with upland forest concentrated on the slopes and ravines of the Northeastern Morainal Division and along river bluffs where agriculture has not been as practical and bottomland forest along the three river systems in the PPAA (Figure 5). About 270 acres within the PPAA (0.4% of the remaining forest, comprising 0.03% of the total land area) remains as high-quality (undegraded) forest.

Table 2. Current Land Cover for the Prairie Parklands Assessment Area[1].

Land Cover	Acres	Percent
Cropland	628,296	66.45
Grassland	166,250	17.58
Urban/Built-up	59,721	6.31
Upland forest	50,945	5.39
Water	20,223	2.14
Nonforested wetlands	10,109	1.07
Bottomland forest	9,952	1.05
Total:	**945,498**	**99.99**

[1] Acreage from the Land Cover of Illinois Database (Illinois Geographic Information System).

Urban development has been considerable in the northeastern third of the PPAA as the western suburbs of Chicago have expanded; development has also occurred in areas around Frankfort and Joliet (Figure 6). Urban/built-up areas occupy 59,721 acres or 6.31% of the PPAA (Table 2).

Grasslands (non-urban grasslands) occupy 166,250 acres (17.58%) of the land area of the PPAA (Table 2). They are widely scattered in the Grand Prairie Division but are most frequent today in the central third of the PPAA (Figure 7). This cover class includes pastures, hay, idle fields, road and railroad rights-of-way, and remnant prairie. An important feature of the PPAA is the Midewin National Tallgrass Prairie, the first federally designated tallgrass prairie preserve, located at the former Joliet Arsenal in southwestern Will County. Also of major significance is the tallgrass prairie at Goose Lake Prairie State Park in northeastern Grundy County south of the Illinois River. Additional areas of prairie occur near Wilmington and Braidwood in Will County and near Seneca and Marseilles in La Salle County. A total of about 181 acres of high-quality (undegraded) prairie remains in the PPAA, primarily in southwestern Will County and northeastern Grundy County. This is only 0.02% of the current land area of the PPAA, a dramatic decrease from the estimated 87% cover of prairie on the presettlement landscape.

Wetland land cover data are available from the Land Cover of Illinois Database (Table 2), however, more accurate and detailed information can be found in the Illinois Wetlands Inventory (IWI) database. Using data from the IWI wetlands in the PPAA occupy about 22,247 acres, or 2.% of the area. IWI data for the Prairie Parklands area was derived from high-altitude photography taken in 1980 and 1981 and is the most recent comprehensive wetlands data available for the state. Three categories of wetlands exist in the Assessment Area: palustrine, lacustrine, and riverine wetlands (Table 3). Wetlands and open water are

concentrated along the three river corridors (Figures 8 and 9). The open-water areas include La Salle Lake, Heidecke Lake, Dresden Lake, and several large strip mine lakes, all artificially created.

Table 3. Wetland habitat of the Prairie Parklands Assessment Area[1,2]

Category	Acreage	% of Wetland Area	% of Assessment Area
Palustrine Wetlands			
Shrub-Scrub Wetlands	674.91	3.0	0.1
Forested Wetlands			
Bottomland Forest	8,919.70	40.1	0.9
Swamp	35.96	0.2	0.0
Emergent Wetlands			
Shallow Marsh/Wet Meadow	6,111.73	27.5	0.6
Deep Marsh	1,523.58	6.8	0.2
Open Water Wetlands	3,514.76	15.8	0.4
Subtotal Palustrine	**20,780.64**	**93.4**	**2.2**
Lacustrine Wetlands			
Shallow Lake	114.49	0.5	0.0
Lake Shore	8.59	0.0	0.0
Emergent Lake	0.00	0.0	0.0
Subtotal Lacustrine	**123.08**	**0.6**	**0.0**
Riverine Wetlands			
Perennial Riverine	0.00	0.0	0.0
Intermittent Riverine	1,343.30	6.0	0.1
Subtotal Riverine	**1,343.30**	**6.0**	**0.1**
Total Wetlands:	**22,247.02**	**100.0**	**2.4**

[1] Adapted from Suloway and Hubbell (1994).
[2] Based on Illinois Wetlands Inventory database (Illinois Geographic Information System).

Wetlands occupy 2.4% of the PPAA area compared to 3.5% of the total area of the state (Suloway and Hubbell 1994). In the PPAA, wetlands occupy about 22,247 acres (Table 2). Forty percent of the wetland area is bottomland forest, compared to the statewide figure of 60.5%. Approximately 27.5% of the wetland acreage is shallow marsh/wet meadow wetlands (compared to 13.1% of the state's wetlands). Open water wetlands account for 15.8% of the wetland acreage in the Assessment Area (compared to 11.4% for the state).

The mean size of contiguous forested wetlands is 7.7 acres (range <0.1 to 177 acres); there are 1,138 separate forested wetlands in the Prairie Parklands Assessment Area. The largest forested wetland tracts (>100 acres) are located along the Illinois River near Seneca, near the confluence of the Des Plaines and Kankakee rivers near Channahon, near Mokena, and along the Illinois River near Morris.

Emergent wetlands range in size from less than 0.1 acre to 792 acres, with a mean size of 3.5 acres. There are 2,172 separate emergent wetlands in the PPAA. The largest emergent wetland is located in the northern half of Goose Lake Prairie State Park.

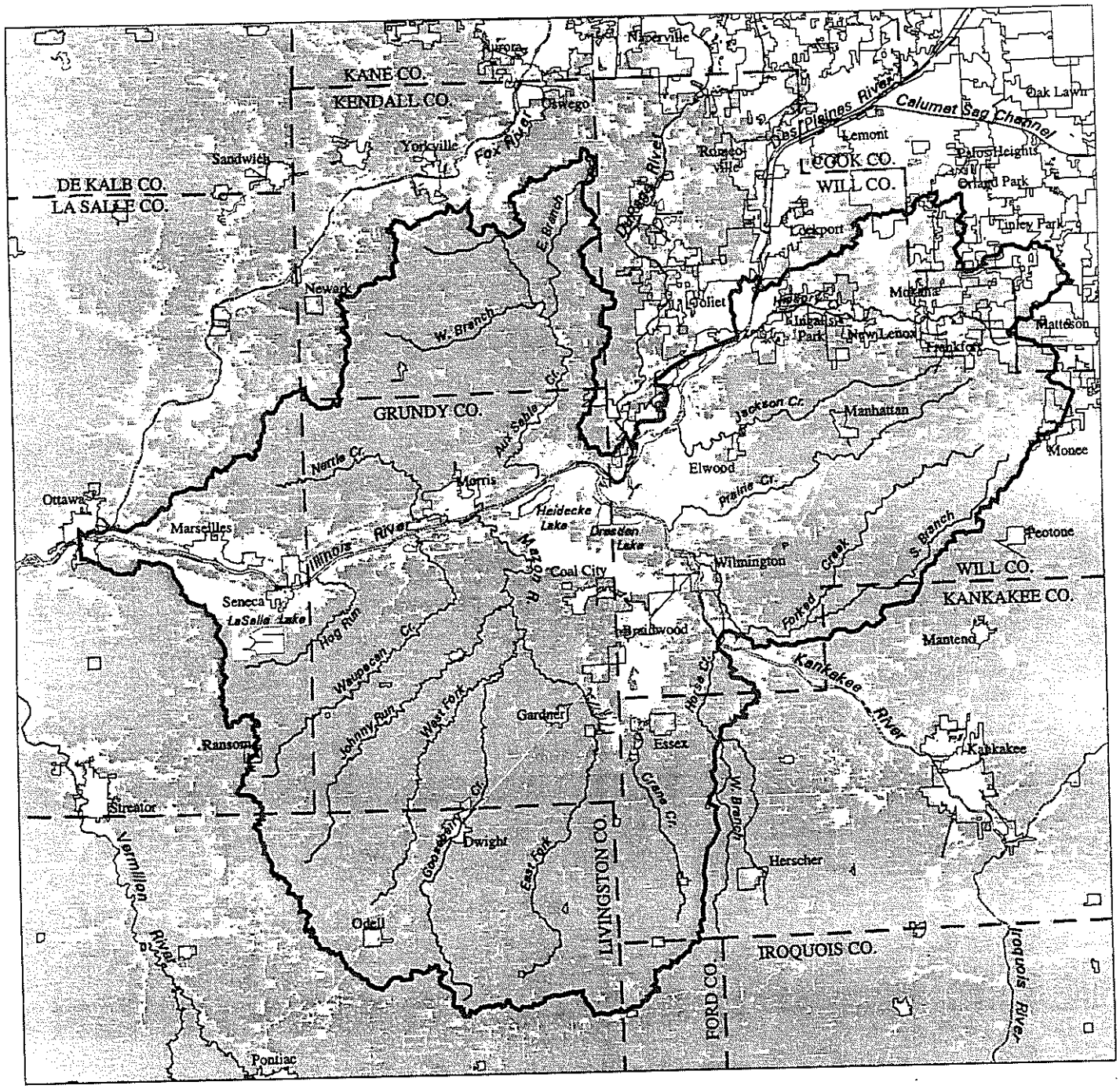


Figure 4. Cropland in the Prairie Parklands Assessment Area. Cropland depicted on this map includes row crops and small grains from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

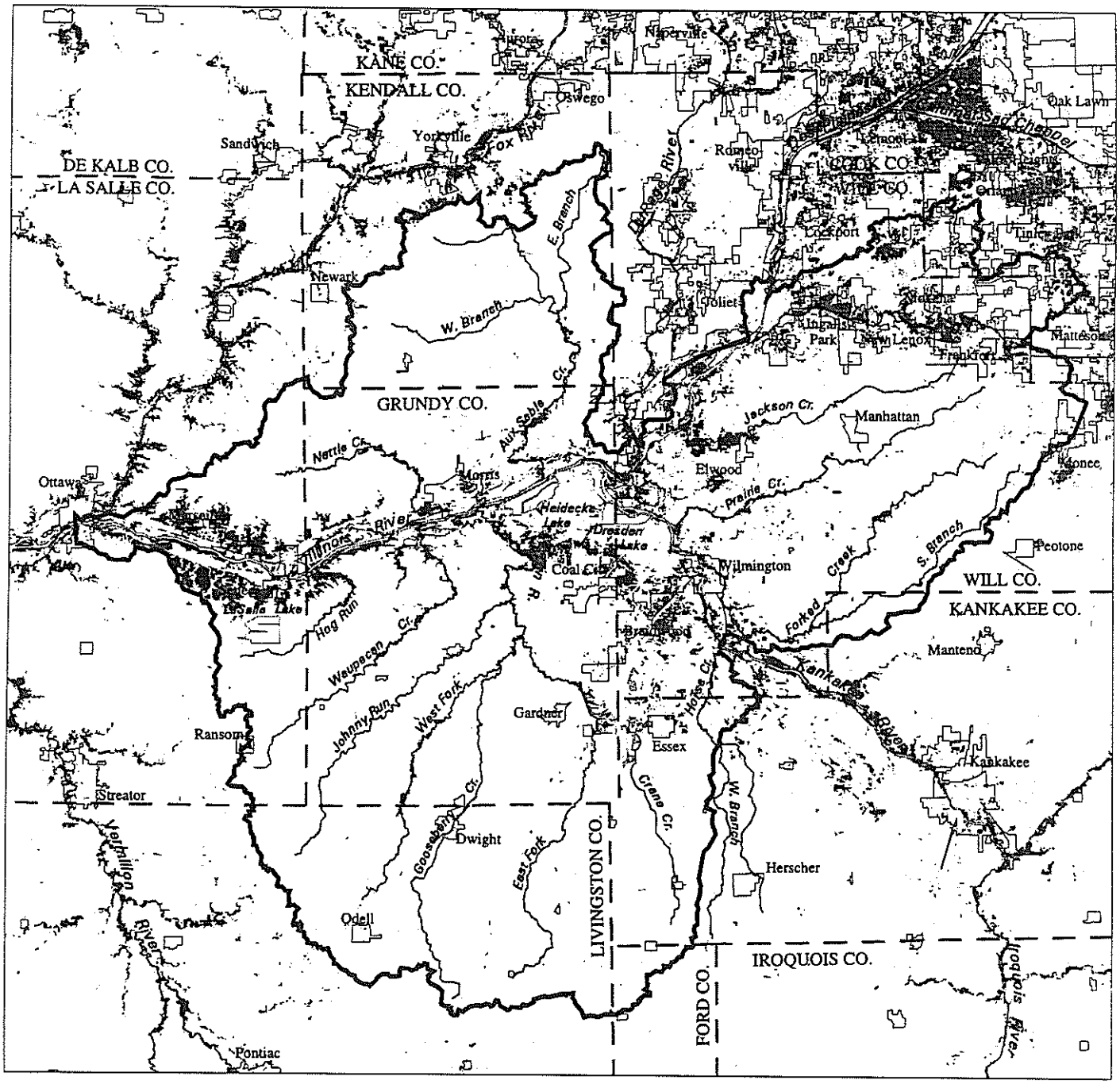


Figure 5. Forest in the Prairie Parklands Assessment Area. Forest depicted on this map includes upland and bottomland forest from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

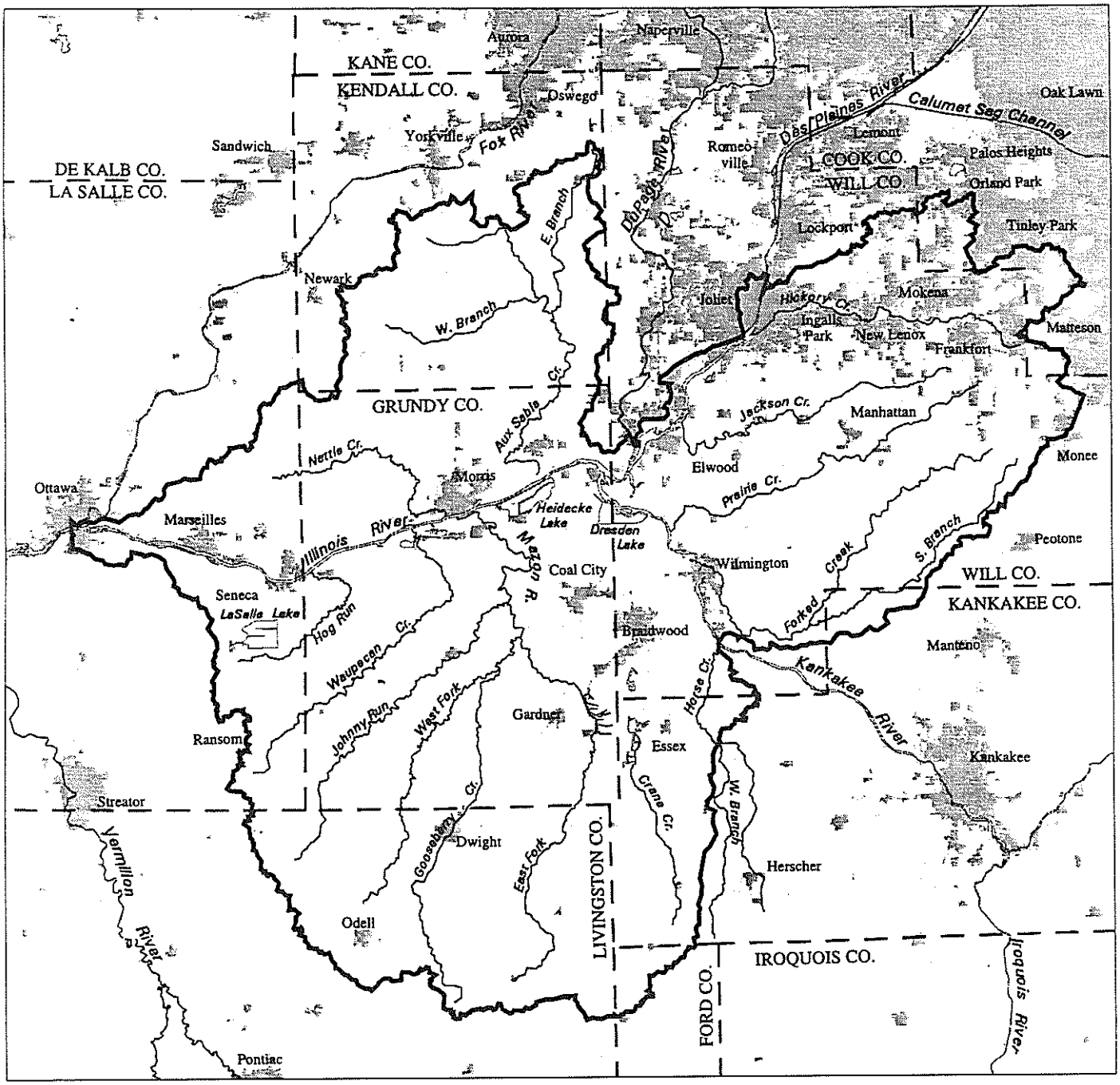


Figure 6. Urban land in the Prairie Parklands Assessment Area. Urban land depicted on this map includes urban/built-up land and urban grassland from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

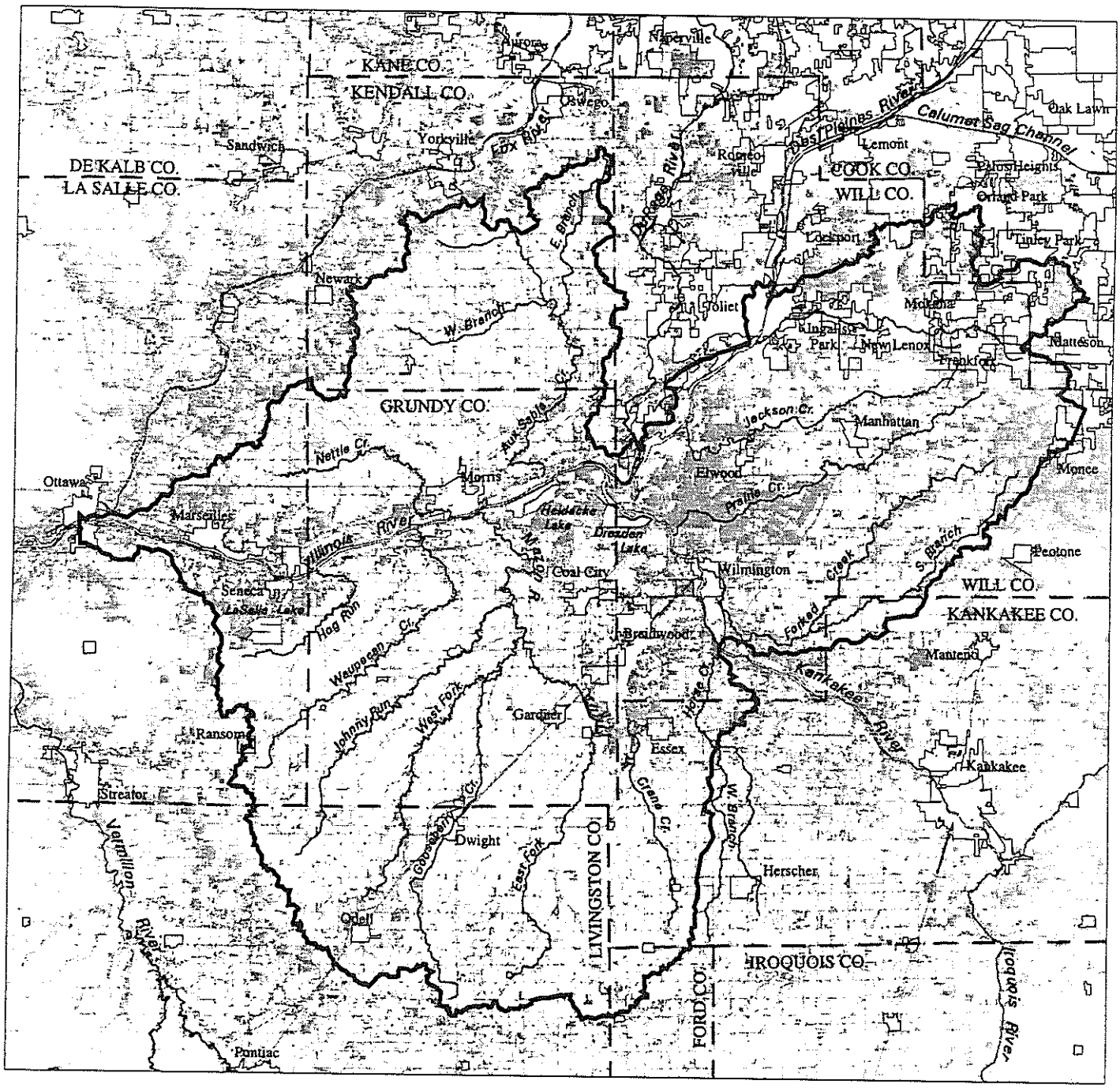


Figure 7. Grasslands in the Prairie Parklands Assessment Area. Grasslands depicted on this map are nonurban grasslands from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

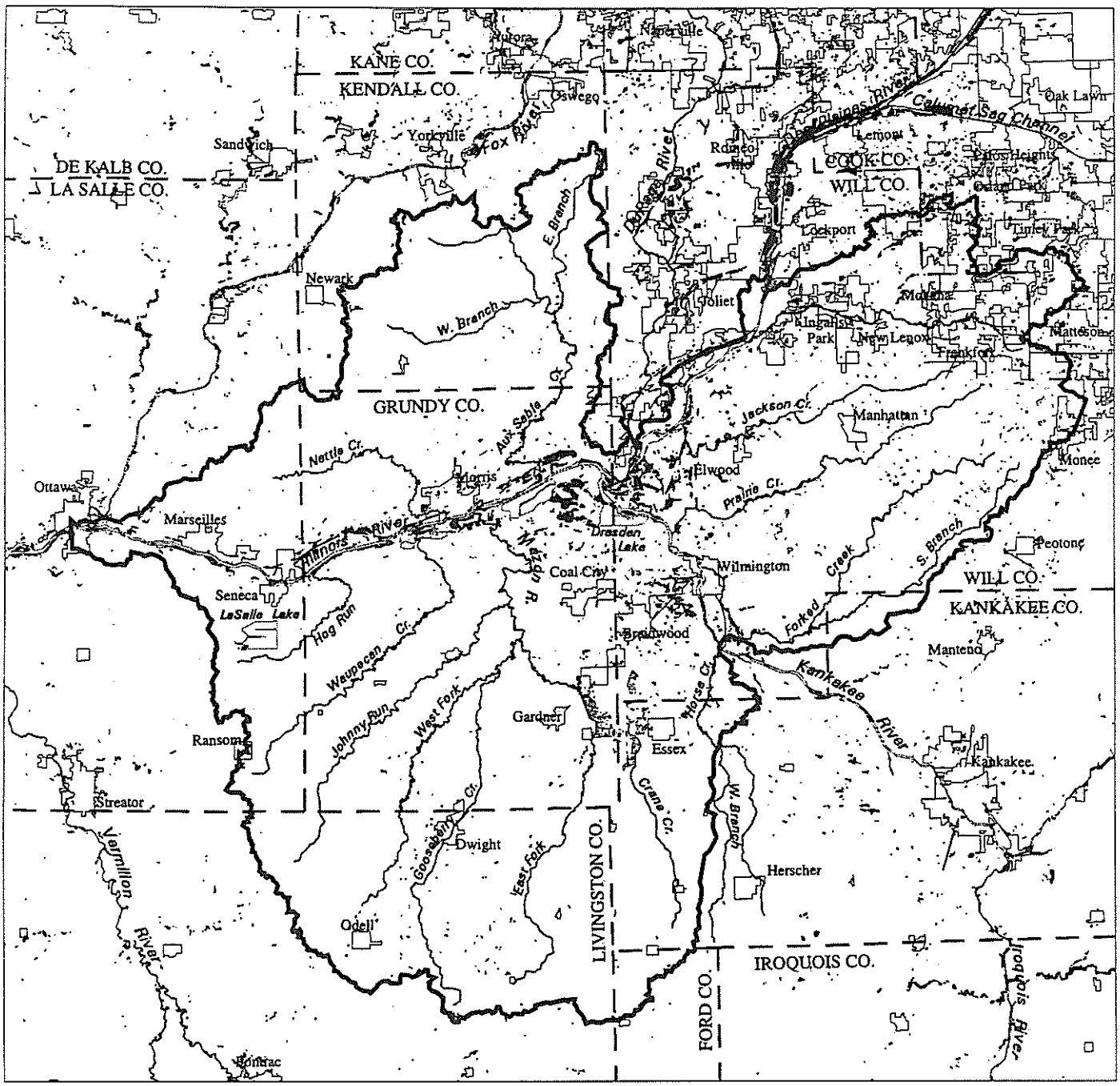


Figure 8. Wetlands in the Prairie Parklands Assessment Area. Wetlands depicted on this map include nonforested wetlands and bottomland forest from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

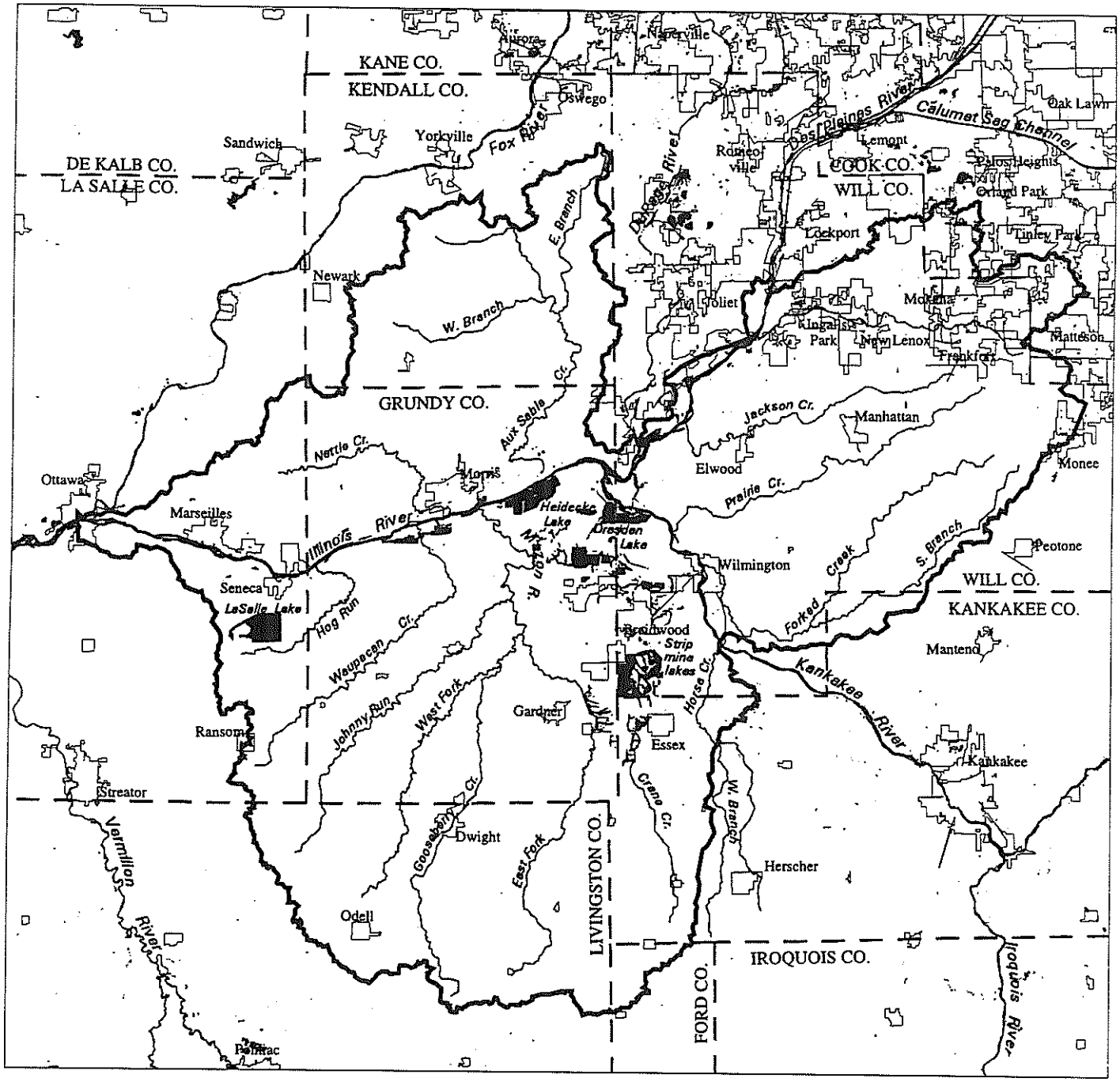


Figure 9. Open water in the Prairie Parklands Assessment Area from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

Biologically Significant Features of Natural Communities

Public Land

Although well over two-thirds of the land in the PPAA is used for agricultural purposes, 43,712 acres (4.62% of the PPAA) has been set aside by the federal, state, and county governments as parks, fish and wildlife areas, conservation areas, and forest preserves (Table 4, Figure 10). These areas give some level of protection to the natural communities in the area, and in some cases they are the only refuge for certain endangered species or natural communities. However, these areas do not always offer adequate protection, and they are not all situated in the most biologically important areas.

Table 4. Public land in the Prairie Parklands Assessment Area[1].

Name	Acres	Name	Acres
County Land[2]		State Land	
Baker Forest Preserve	16	Des Plaines State Conservation Area	4,611
Houses Grove Forest Preserve	23	Gebhard Woods State Park	27
Old Plank Road Trail	110	Goose Lake Prairie State Park	2,477
Tinley Creek Preserve	2,539	Illini State Park	246
Braidwood Dunes and Savanna	500	Illinois and Michigan Canal State Park	257
Forsythe Woods	124	Lasalle Lake State Fish & Wildlife Area	1,751
Heritage Park	17	Marseilles State Fish and Wildlife Area	2,301
Hickory Creek	711	Mazonia (Braidwood R.A.) State Fish and Wildlife Area	975
Joliet Junior College	119	William G. Stratton State Park	18
Laughton Preserve	464	Unnamed New Acquisition[3]	1,662
Lower Spring Creek	192		
McKinley Woods	495	**Total state land:**	**14,325**
Messenger Woods	1000		
Sauk Trail	236	Federal Land	
Sugar Creek	283	Midewin National Tallgrass Prairie	18,839
Wayne Lehnert Preserve	85	Joliet Army Training Center	3,435
Total county land:	**7,113**	**Total federal land:**	**22,274**

[1] Does not include any natural areas or nature preserves that may be state owned,.

[2] County land is limited to forest preserves.

[3] Purchased by the State of Illinois in November 1999. It is located in Kankaee County west of Essex along and north of county highway 6. Due to its recent acquisition, it is not shown on Figure 10.

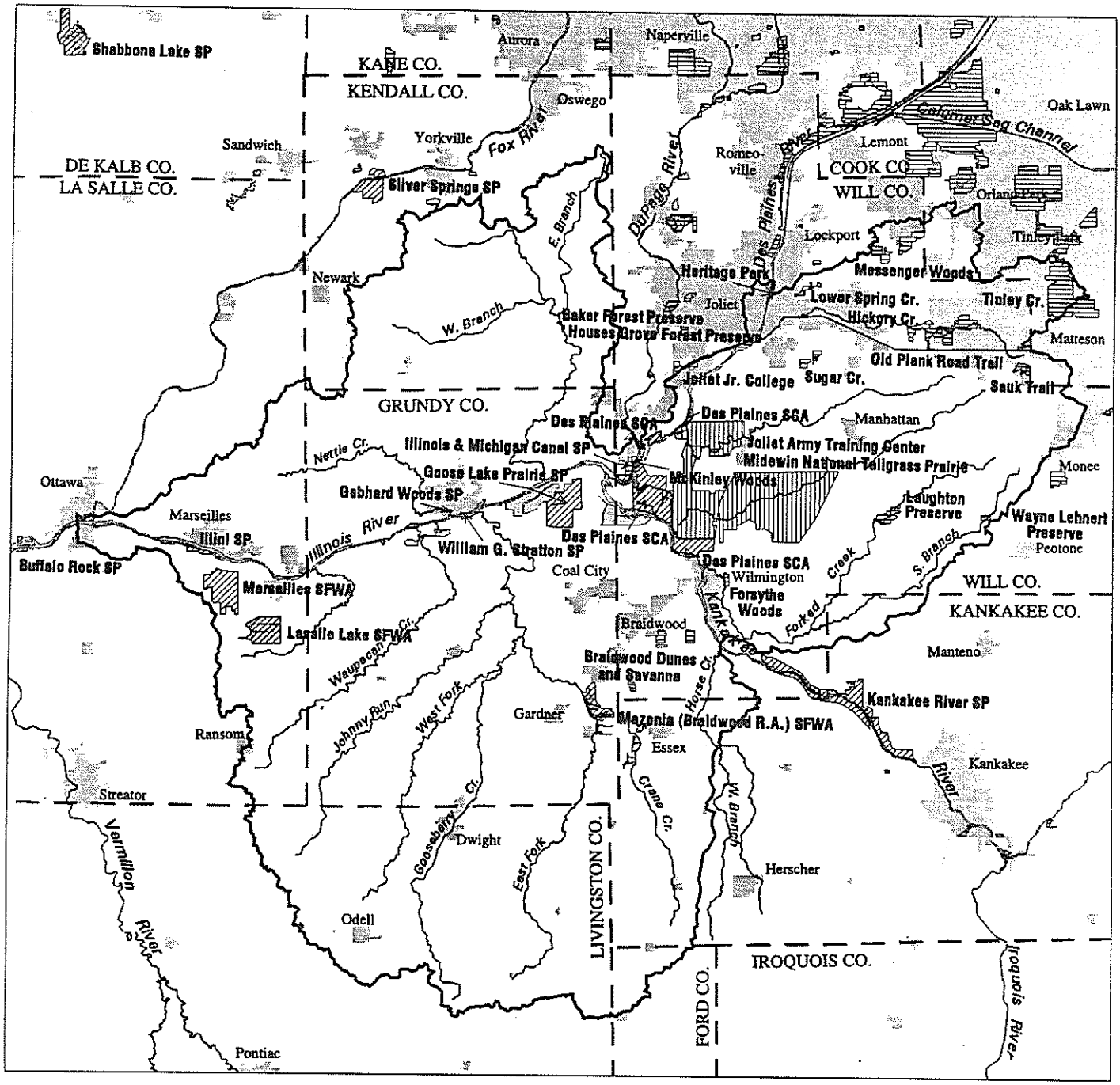


Figure 10. Public land in the Prairie Parklands Assessment Area. State land is limited to parks (SP), conservation areas (SCA), forests (SF), and fish and wildlife areas (SFWA) and county land to forest preserves.

Natural Areas and Nature Preserves

The Illinois Natural Areas Inventory (INAI) was conducted over a three-year period during the mid 1970s to document remaining significant and exceptional examples of the natural communities and other features in Illinois (White 1978). The INAI established seven categories of natural areas based on significant features. The categories are: I - High Quality Natural Communities; II - Habitat for Endangered Species; III - Habitat for Relict Species; IV - Outstanding Geological Areas; V - Approved Natural Areas and Restoration Sites; VI - Unique Natural Areas; and VII - Outstanding Aquatic Areas. The INAI also established a grading system to rank natural quality (White 1978). The natural quality of a community or area was graded as "A" (relatively stable or undisturbed), "B" (late successional or lightly disturbed), or "C" (mid-successional or moderately to heavily disturbed). Grades "D" (early successional or severely disturbed) and "E" (very early successional or severely disturbed) were used for land within a natural area that is used as a buffer for protection of the significant or exceptional feature. In general, only grade "A" or "B" communities are designated as significant or exceptional features, although many natural areas include some Grade C-quality habitats. The estimates and comparisons of natural areas within the PPAA and statewide are based on the best available data. In some cases, comparisons are made using recent data for natural communities within the Assessment Area and comparing to statewide data that are from White (1978) and thus over 20 years old. Consequently, if discoveries of natural areas do not equal area of recently degraded or destroyed natural areas, some data for trends among natural areas may be slightly over or underestimated.

Twenty-eight Category I and II terrestrial natural areas, nine Category IV geological natural areas (including 1 quarry), and four Category VII biologically significant stream segments, all designated as INAI sites, occur in the PPAA (Table 5). Twenty-one of these sites are located in Will County, fourteen of these are in Grundy County, three are in Kankakee County, three are in La Salle County, one is in Cook County, and one is in Livingston County (Figure 11). The total area of high-quality (Grades A and B) natural areas is 593.3 acres (0.063% of the PPAA; Table 6); a similar proportion of high-quality natural areas (0.07) is found for the entire state (White 1978). Comparisons of the area of individual Category I natural communities in relation to the total remaining in Illinois are made under each community type, when possible, in the following section on Natural Community Descriptions, and have been summarized in Table 6.

Table 5. Natural areas in the Prairie Parklands Assessment Area and surrounding region[1].

NA#[2]	County	Acres[3,4]	Name
54	**Grundy**	**7.87**	**Commonwealth Edison Hill Prairie**
55	**Grundy**	**27.34**	**Dupont Hill Prairies**
65	Kankakee	56.87	Campbell's Woods
66	Kankakee	39.64	Kankakee River Nature Preserve (Altorf Island)
67	Kankakee	103.23	Kankakee River State Park Prairie

Table 5. Continued.

NA#[2]	County	Acres[3, 4]	Name
69	Kendall	27.27	Yorkville Prairie
78	La Salle	0.53	Sheridan Red Pine Site
80	**La Salle**	**9.87**	**Seneca Hill Prairie**
106	Kankakee	23.90	Gooseberry Island
255	Cook	77.83	Black Partridge Woods
256	Cook	1.57	Sagawau Canyon
267	Cook	351.33	Little Red Schoolhouse Nature Center
398	Cook	34.11	Chicago Ridge Prairie
399	Cook	143.14	Paw Paw Woods
421	Cook	44.39	Palos Fen
425	Cook	9.88	Dropseed Prairie
432	**Grundy**	**7.20**	**Waupecan Creek Geological Area**
529	Du Page	52.97	Lemont East Geological Area
532	Du Page	1,074.02	Waterfall Glen
536	Cook	24.38	Lemont Bluff Geological Area
540	*Cook*	*1.81*	*Plank Road Trail Prairie - A*
541	*Cook*	*3.70*	*Plank Road Trail Prairie - B*
560	**Grundy**	**14.06**	**Collins Station Prairie**
561	**Grundy**	**19.65**	**Mazon Creek Geological Area**
562	**Grundy**	**2.12**	**Aux Sables Railroad Prairie**
563	**Grundy**	**3.31**	**Mazonia Railroad Prairie**
564	**Grundy**	**6.54**	**Braceville Railroad Prairie**
580	Iroquois	3.04	Beaverville South Railroad Prairie
639	Kankakee	14.25	Bourbonnais Geological Area
640	**Kankakee**	**83.09**	**Essex Pit Number Eleven Geological Area**
641	Kankakee	2.93	Manteno Southwest Geological Area
642	Kankakee	1.59	Goodrich Railroad Prairie
643	**Kankakee**	**13.86**	**Union Hill Railroad Prairie**
644	Kankakee	6.41	Otto Road Railroad Prairie
645	Kendall	5.10	Silver Springs Railroad Prairie
646	Kendall	32.12	Dixon Valley Sedge Meadow
675	La Salle	10.59	Catlin Salt Marsh
676	La Salle	16.01	Wedron Palisades
678	La Salle	10.00	Marsh Relicts
698	*Livingston*	*0.81*	*English Prairie*
699	**Livingston**	**14.96**	**Sunbury Railroad Prairie**
881	Will	72.10	Material Services Prairie
883	Will	50.81	Lockport Prairie East
884	**Will**	**171.11**	**Messenger Woods**
886	**Will**	**31.14**	**Hickory Creek Sedge Meadow**
887	Will	78.28	Raccoon Grove Forest Preserve
888	**Will**	**113.41**	**Grant Creek Prairie**
889	**Will**	**12.06**	**Des Plaines Dolomite Prairie**
891	**Will**	**2.24**	**Schweizer West Geological Area**
892	**Will**	**3.48**	**Plaines Station Geological Area**

Table 5. Continued.

NA#[2]	County	Acres[3, 4]	Name
893	**Will**	**4.69**	**Markgraf Quarry**
895	**Will**	**2.71**	**Wilmington Geological Area**
896	**Will**	**54.92**	**Wilmington West Geological Area**
897	**Will**	**4.68**	**Rockdale Geological Area**
898	**Will**	**4.63**	**Godley Railroad Prairie**
900	Will	1.61	Peotone Railroad Prairie
901	**Will**	**1.39**	**Monee Railroad Prairie**
902	**Will**	**147.83**	**Munch Area**
903	*Will*	*176.41*	*Kankakee River Nature Preserve Addition*
904	*Will*	*41.03*	*Boy Scout Road Area*
932	Will	244.05	Lockport Prairie
933	Will	759.21	Thorn Creek Woods
934	**Will**	**120.88**	**Wilmington Shrub Prairie**
935	**Will**	**302.37**	**Braidwood Dunes and Savanna**
936	Will	191.80	Romeoville Prairie
937	**Will**	**299.23**	**Pilcher Park**
980	**Kankakee**	**[9.10]**	**Kankakee River**
981	Kendall	4.04	Millhurst Fen
982	Kendall	25.26	Yorkville Seep
1039	Will	43.66	Long Run Seep
1047	**Will**	**348.58**	**Hitts Siding Prairie**
1060	Will	322.37	Lake Renwick Heron Colony
1067	**Grundy**	**1,781.74**	**Goose Lake Prairie**
1080	Will	0.86	Vermont Cemetery Prairie
1082	*Will*	*10.53*	*Rockdale Railroad Prairie*
1357	*Cook*	*306.73*	*McGinnis Slough*
1358	**Cook**	**439.72**	**Vollmer Road Area**
1360	**Grundy**	**0.67**	**Hildy Prairies**
1361	**Grundy**	**13.60**	**Third Avenue Prairie**
1365	Iroquois	[27.80]	Little Beaver Creek
1369	**Will**	**5,763.93**	**Joliet Army Ammunition Plant**
1370	*Will*	*1.61*	*Rock Run American Burnet Site*
1371	**Will**	**3.41**	**Rock Run Corn Salad Site**
1372	Will	77.12	O'Hara Woods
1414	Kendall	0.00	Reservation Woods
1416	Kendall	14.19	Millington Fen
1438	**Grundy**	**[7.80]**	**Illinois River - Dresden**
1444	*La Salle*	*[61.20]*	*Fox River*
1446	**La Salle**	**[7.60]**	**Illinois River - Marseilles**
1447	*Livingston*	*[106.00]*	*Vermilion River*
1462	**Will**	**[7.80]**	**Manhattan Creek**
1486	Will	253.30	Theodore Street Marsh
1489	*La Salle*	*[16.50]*	*Otter Creek*
1497	*Ford*	*6.03*	*Don Gardner's Prairie Restoration*
1513	**Will**	**382.63**	**Blodgett Road Dolomite Prairie**

Table 5. Continued.

NA#[2]	County	Acres[3, 4]	Name
1516	Du Page	1,776.74	Springbrook Prairie
1520	**La Salle**	**39.82**	**Marseilles Hill Prairie**

Total acres in the PPAA: 10,260.74
Total stream miles in the PPAA: 32.3

[1] Bold type indicates natural area within the PPAA and italics indicates natural area boundary is within the one mile buffer zone.
[2] The number of the natural area (NA#) refers to the number designated in the Natural Heritage Database (Illinois Department of Natural Resources 1998) and in Figure 11.
[3] Values within brackets indicate Stream natural areas; which do not have acreage. The reported number is an approximate distance in miles and is not included in the total natural area acreage.
[4] Acreage of 0.00 indicates that no figures are currently available and were not mapped as of August 1998.

Table 6. Category I natural communities in the Prairie Parklands Assessment Area.[1]

		Acres of category I in the PPAA			Acres of category I in Illinois			% of Illinois Category I in the PPAA		
Community type	Grades in PPAA	Grade A	Grade B	PPAA Total	Grade A	Grade B	IL Total	Grade A	Grade B	% of IL Total
Dry-mesic upland forest	B	-	50.0	50.0	986.0	2084.0	3070.0	0.0	2.4	1.6
Mesic upland forest	A,B	98.0	40.0	138.0	1058.0	1473.0	2531.0	9.3	2.7	5.5
Wet-mesic upland forest	B	-	50.0	50.0	0.0	61.0	61.0	0.0	82.0	82.0
Wet floodplain forest	B	-	32.0	32.0	336.0	2522.0	2858.0	0.0	1.3	1.1
Dry-mesic prairie	A,B	0.2	4.0	4.2	9.4	50.0	59.4	2.1	8.0	7.1
Mesic prairie	A,B	4.2	102.2	106.4	54.0	220.0	274.0	7.8	46.5	38.8
Wet-mesic prairie	B	-	23.0	23.0	26.0	99.0	125.0	0.0	23.2	18.4
Wet prairie	B	-	1.0	1.0	12.0	169.0	181.0	0.0	0.6	0.6
Dry sand prairie	B	-	0.2	0.2	122.0	293.0	415.0	0.0	<0.1	<0.1
Mesic sand prairie	A,B	3.0	4.8	7.8	69.0	90.0	159.0	4.3	5.3	4.9
Wet-mesic sand prairie	B	-	1.3	1.3	16.0	26.0	42.0	0.0	5.0	3.1
Wet sand prairie	B	-	0.1	0.1	79.0	84.0	163.0	0.0	<0.1	<0.1
Dry-mesic dolomite prairie	B	-	4.0	4.0	1.0	7.2	8.2	0.0	55.6	48.8
Glacial drift hill prairie	A,B	1.0	5.3	6.3	14.0	20.0	34.0	7.1	26.5	18.5
Shrub Prairie	B	-	27.0	27.0	-	60.1	60.1	0.0	44.9	44.9
Dry-mesic sand savanna	B	-	84.0	84.0	53.0	470.0	523.0	0.0	17.9	16.1
Marsh	B	-	6.0	6.0	310.0	1920.0	2230.0	0.0	0.3	0.3
Sedge meadow	B	-	47.0	47.0	155.0	533.0	688.0	0.0	8.8	6.8
Seep	B	-	5.0	5.0	31.0	63.0	94.0	0.0	7.9	5.3
Totals:		**106.4**	**486.9**	**593.3**	**3331.4**	**10244.3**	**13575.7**			

[1] Category I indicates natural communities that have remained relatively undisturbed and in high-quality condition: Grades A and B (White and Madany 1978).

Nature preserves are areas of land or water in public or private ownership that are formally dedicated to receive maximum protection of significant natural features. The central goal of the nature preserve system, currently with over 280 preserves in the state, is to protect and preserve examples of all significant natural features found in Illinois for the purposes of scientific research, education, conserving biodiversity, and esthetic enjoyment. Nature preserves are administered largely by the Illinois Nature Preserves Commission (INPC). Preserves usually are the shared responsibility of the INPC, the Illinois Department of Natural Resources, and land owners (McFall and Karnes 1995).

Ten sites dedicated as Illinois Nature Preserves occur within the PPAA (Table 7); each contains noteworthy remnants of natural communities. Seven of the nature preserves occur in Will County, two are in Grundy County, and one is in Livingston County (Figure 11). Summarizing from McFall and Karnes (1995), each Nature Preserve is described briefly in the chapter on Natural Vegetation Communities.

Table 7. Nature preserves in the Prairie Parklands Assessment Area and surrounding region[1].

NP#[2]	Corr - NA[3]	County	Acres[4]	Name
2	255	Cook	71.74	Black Partridge Woods
4	422	Cook	1,537.34	Cap Sauers Holdings
5	423	Cook	976.61	Cranberry Slough
7	399	Cook	118.46	Paw Paw Woods
15	*66*	*Kankakee*	*80.52*	*Kankakee River*
21	**1067**	**Grundy**	**1,543.68**	**Goose Lake Prairie**
66	933	Will	519.81	Thorn Creek Woods
67	**888**	**Will**	**68.47**	**Grant Creek Prairie**
81	**935**	**Will**	**244.77**	**Braidwood Dunes and Savanna**
93	1372	Will	71.62	O'Hara Woods
106	**699**	**Livingston**	**34.49**	**Sunbury Railroad Prairie**
110	932	Will	221.85	Lockport Prairie
120	421	Cook	77.54	Palos Fen
121	256	Cook	9.41	Sagawau Canyon
126	936	Will	103.21	Romeoville Prairie
155	1541	Kendall	41.85	Maramech Woods
163	**1545**	**Grundy**	**1.83**	**Short Pioneer Cemetery Prairie**
172	887	Will	77.36	Racoon Grove
175	106	Kankakee	11.94	Gooseberry Island
181	**934**	**Will**	**155.53**	**Wilmington Shrub Prairie**
188	1039	Will	43.29	Long Run Seep
212	1416	Kendall	10.94	Tucker-Millington Fen
217	1060	Will	299.42	Lake Renwick
220	65	Kankakee	46.40	Iroquois Woods
231	**902**	**Will**	**165.70**	**Sand Ridge Savannah**
243	398	Cook	12.89	Chicago Ridge Prairie
245	**884**	**Will**	**395.23**	**Messenger Woods**
251	69	Kendall	4.61	Yorkville Prairie

Table 7. Continued.

NP#[2]	Corr - NA[3]	County	Acres[4]	Name
260	639	Kankakee	16.21	Bourbonnais Geological Area
264	*540*	*Cook*	*12.56*	*Old Plank Road Prairie*
265	253	Cook	0.00	Santa Fe Prairie
271	**0**	**Will**	**540.21**	**Hickory Creek Barrens**
280	**1047**	**Will**	**261.30**	**Hitts Siding Prairie**
Total acres in the PPAA:			**3,411.21**	

[1] Bold type designates nature preserves within the PPAA and italics indicates natural preserve boundary is within the one mile buffer zone.

[2] The nature preserve number (NP#) refers to the number designated in the Natural Heritage database (Illinois Department of Natural Resources 1998) and in Figure 11.

[3] Each of the nature preserves is associated with a corresponding natural area (Corr.-NA) referred to in Table 5.

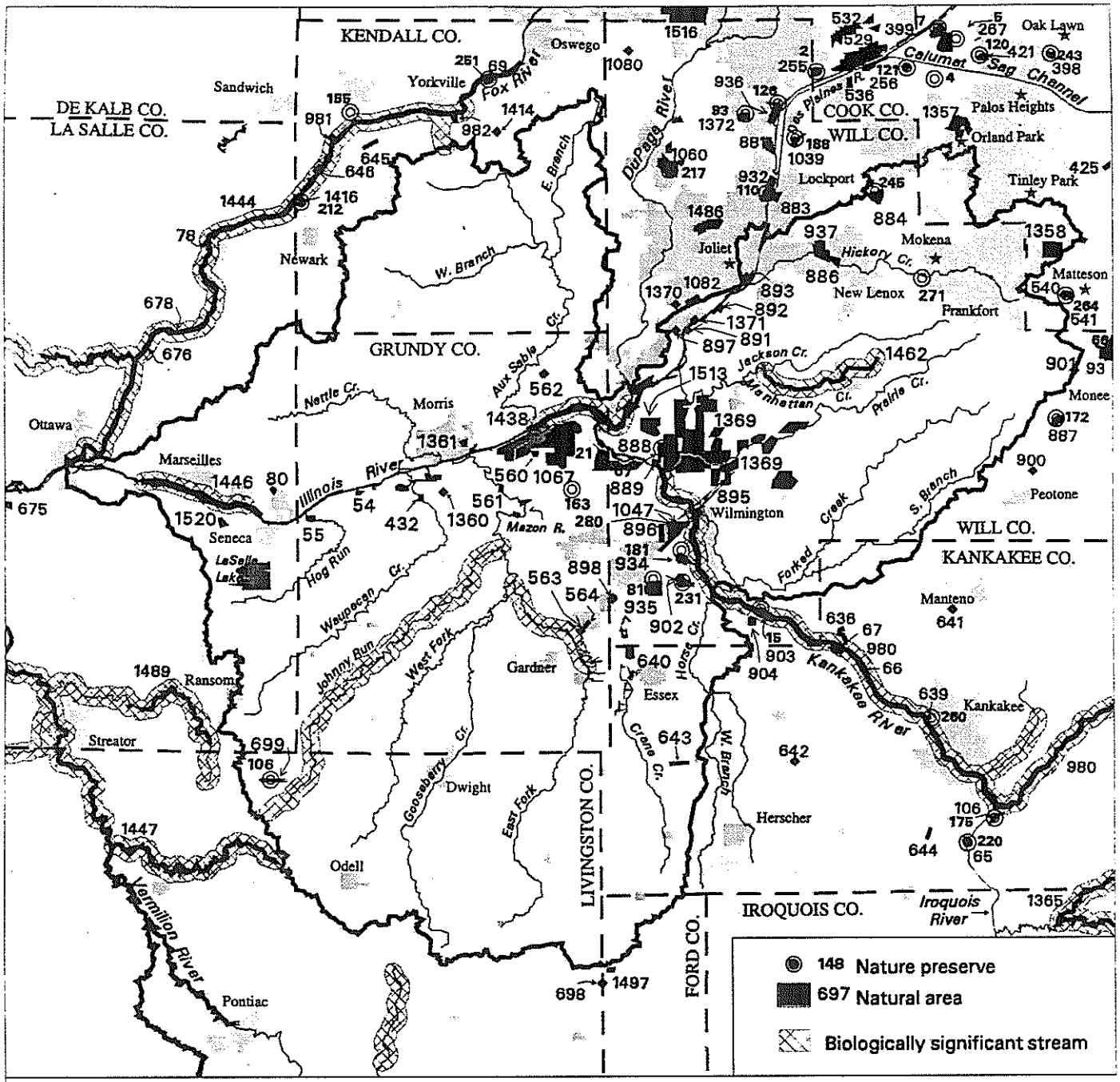
[4] Acreage of 0.00 indicates that no figures are currently available and were not mapped as of August 1998.

Biological Stream Categorization and Biologically Significant Streams

Illinois streams have also been categorized based on their quality. One stream quality index used to identify high-quality streams is the Biological Stream Characterization (BSC). The BSC was developed by the Illinois Department of Conservation and the Illinois Environmental Protection Agency (Bertrand et al. 1995) and is derived from data on fish populations, water quality, and aquatic macroinvertebrates. In the BSC, stream segments are categorized from "A" (highest quality) to "E" (lowest quality). Twenty-four stream segments in Illinois currently are considered to be in the "A" category, and 50 in the "B" category.

Another study, "Biologically Significant Illinois Streams" (Page et al. 1992), was conducted to expand the list of high-quality streams beyond the BSC "A" streams by considering additional data on biodiversity; specifically, data on threatened and endangered species (fishes, crustaceans, mussels, and plants) and on mussel diversity. The expanded list identified the most important streams that should be protected and managed for their outstanding biological characteristics. Protection of streams identified in the Biologically Significant Streams (BSS) report (Page et al. 1992) will constitute a major step toward the protection of 100% of the stream-dependent biodiversity.

Six areas in the PPAA were recognized as Biologically Significant Streams (Page et al. 1992) because of the presence of threatened and/or endangered species and high mussel and/or fish diversity (Table 8). These streams provide the best opportunities in the basin for the protection of large numbers of native species.



Nature preserves within the boundary

21	Goose Lake Prairie
67	Grant Creek Prairie
81	Braidwood Dunes and Savanna
106	Sunbury Railroad Prairie
163	Short Pioneer Cemetery Prairie
181	Wilmington Shrub Prairie
231	Sand Ridge Savannah
245	Messenger Woods
271	Hickory Creek Barrens
280	Hitt's Siding Prairie

Natural areas within the boundary

54	Commonwealth Edison Hill Prairie
55	Dupont Hill Prairies
80	Seneca Hill Prairie
432	Waupecan Creek Geological Area
560	Collins Station Prairie
561	Mazon Creek Geological Area
562	Aux Sables Railroad Prairie
563	Mazonia Railroad Prairie

Natural areas (cont.)

564	Braceville Railroad Prairie
640	Essex Pit Number Eleven Geological Area
643	Union Hill Railroad Prairie
699	Sunbury Railroad Prairie
884	Messenger Woods
886	Hickory Creek Sedge Meadow
888	Grant Creek Prairie
889	Des Plaines Dolomite Prairie
891	Schweizer West Geological Area
892	Plaines Station Geological Area
893	Markgraf Quarry
895	Wilmington Geological Area
896	Wilmington West Geological Area
897	Rockdale Geological Area
898	Godley Railroad Prairie
901	Monee Railroad Prairie
902	Munch Area
934	Wilmington Shrub Prairie
935	Braidwood Dunes and Savanna
937	Pilcher Park

Natural areas (cont.)

980	Kankakee River
1047	Hitts Siding Prairie
1067	Goose Lake Prairie
1358	Vollmer Road Area
1360	Hildy Prairies
1361	Third Avenue Prairie
1369	Joliet Army Ammunition Plant
1371	Rock Run Botanical Area
1438	Illinois River - Dresden
1446	Illinois River - Marseilles
1513	Blodgett Road Dolomite Prairie
1520	Marseilles Hill Prairie

Nature preserves and natural areas boundaries from 1:24000 IGIS database, August, 1998.

Significant stream data from Page, L. M. et. al., 1992. Stream data derived from 1:100000 U.S.G.S. DLG hydrology.

Scale 1:554400

0 20 Miles

0 30 Kilometers

Figure 11. Natural areas, nature preserves and biologically significant stream segments in the Prairie Parklands Assessment Area.

Table 8. Biologically significant stream segments in the Prairie Parklands Assessment Area.

Site Description[1]	Length (Miles)
Johnny Run	28.53
Manhattan Creek	8.32
Kankankee River, Des Plaines Conservation Area east to PPAA boundary	8.31
Mazon River, between West Fork and East Fork confluences	7.97
Illinois River above Dresden	7.08
Illinois River at Marseilles	6.37
Total:	**66.58**

[1] Additional information is provided in the chapter on Aquatic Biota.

Threatened and Endangered Species

At least 66 species of plants and animals considered to be threatened or endangered by the Illinois Endangered Species Protection Board (1999) currently occur in the PPAA, including 12 species of birds that migrate through the area but do not breed here (Table 9). This number includes 1 that is federally threatened and 2 that are federally endangered. Only 6.9% of the state's 331 threatened or endangered plants are known to occur in the PPAA. For other taxa, the percentage of the state's threatened or endangered species that occur in the area are as follows: birds (76.5%), terrestrial insects (16.7%), reptiles (6.67%), fishes (16.1%), and freshwater mussels (37.0%). Additional information about threatened or endangered species is given in their respective chapters.

Table 9. Threatened and endangered species occuring in the Prairie Parklands Assessment Area.[1]

Common name	Scientific name	Status[2, 3]
Plants:		
Alkali bulrush	*Scirpus paludosus*	SE
American burnet	*Sanguisorba canadensis*	SE
Bristly blackberry	*Rubus setosus*	SE
Buffalo clover	*Trifolium reflexum*	SE
Butler's quillwort	*Isoetes butleri*	SE
Corn salad	*Valerianella chenopodiifolia*	SE
Ear-leaved foxglove	*Tomanthera auriculata*	ST
False mallow	*Malvastrum hispidum*	SE
Forked aster	*Aster furcatus*	ST
Grass pink orchid	*Calopogon tuberosus*	SE
Hill's thistle	*Cirsium hillii*	ST
Leafy prairie clover	*Dalea foliosa*	FE, SE
Narrow-leaved sundew	*Drosera intermedia*	ST
Prairie white-fringed orchid	*Platanthera leucophaea*	FT, SE

Table 9. Continued.

Common name	Scientific name	Status[2, 3]
Pretty sedge	*Carex woodii*	ST
Queen-of-the-prairie	*Filipendula rubra*	SE
Rock elm	*Ulmus thomasii*	SE
Running pine	*Lycopodium clavatum*	SE
Savanna blazing star	*Liatris scariosa* var. *nieuwlandii*	ST
Shore St. John's wort	*Hypericum adpressum*	SE
Slender sandwort	*Arenaria patula*	ST
Tubercled orchid	*Platanthera flava* var. *herbiola*	SE
White lady's slipper	*Cypripedium candidum*	ST
Birds:		
Pied-billed Grebe	*Podilymbus podiceps*	ST
American Bittern	*Botaurus lentiginosus*	SE
Least Bittern	*Ixobrychus exilis*	ST
Snowy Egret	*Egretta thula*	SE*
Little Blue Heron	*Egretta caerulea*	SE*
Black-crowned Night-Heron	*Nycticorax nycticorax*	SE*
Yellow-crowned Night-Heron	*Nycticorax violacea*	SE*
Osprey	*Pandion haliaetus*	SE*
Bald Eagle	*Haliaeetus leucocephalus*	ST*
Northern Harrier	*Circus cyaneus*	SE
Red-shouldered Hawk	*Buteo lineatus*	ST
Black Rail	*Laterallus jamaicensis*	SE*
King Rail	*Rallus elegans*	SE
Common Moorhen	*Gallinula chloropus*	ST
Sandhill Crane	*Grus canadensis*	ST*
Upland Sandpiper	*Bartramia longicauda*	SE
Wilson's Phalarope	*Phalaropus tricolor*	SE*
Common Tern	*Sterna hirundo*	SE*
Forster's Tern	*Sterna forsteri*	SE*
Black Tern	*Chlidonias niger*	SE*
Barn Owl	*Tyto alba*	SE
Short-eared Owl	*Asio flammeus*	SE
Loggerhead Shrike	*Lanius ludovicianus*	ST
Brown Creeper	*Certhia americana*	ST
Henslow's Sparrow	*Ammodramus henslowii*	SE
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	SE
Terrestrial Insects:		
Red-veined Prairie Leafhopper	*Aflexia rubranura*	ST
Eryngium Stemborer	*Papaigema eryngii*	SE
Reptiles:		
Blanding's turtle	*Emydoidea blandingii*	ST
Aquatic Biota:		
Fish		
pallid shiner	*Hybopsis amnis*	SE
bigeye shiner	*Notropis boops*	SE

Table 9. Continued.

Common name	Scientific name	Status[2]
river redhorse	*Moxostoma carinatum*	ST
greater redhorse	*Moxostoma valenciennesi*	SE
western sand darter	*Ammocrypta clara*	SE
Freshwater Mussels		
spectaclecase	*Cumberlandia monodonta*	SE
slippershell mussel	*Alasmidonta viridis*	SE
salamander mussel	*Simpsonaias ambigua*	SE
elephantear	*Elliptio crassidens*	ST
spike	*Elliptio dilatata*	ST
sheepnose	*Plethobasus cyphyus*	SE
butterfly	*Ellipsaria lineolata*	ST
snuffbox	*Epioblasma triquetra*	SE
Higgins eye	*Lampsilis higginsii*	FE, SE
rainbow	*Villosa iris*	SE

[1] As determined by the Illinois Endangered Species Protection Board (1999).
[2] SE = state endangered; ST = state threatened; FE = federally endangered; FT = federally threatened.
[3] Asterisks (*) indicates that the species is found in the PPAA but does not breed in the Assessment Area.

Natural Vegetation Communities

The description of the vegetation for the Prairie Parklands Assessment Area (PPAA) is organized into six sections: 1) Comparison of Biodiversity to Statewide Patterns, 2) Threatened and Endangered Species, 3) Disturbance, Habitat Quality, and Restoration Potential, 4) Natural Areas and Nature Preserves, 5) Natural Community Descriptions, and 6) Summary and Recommendations.

Comparison of Biodiversity in the PPAA To Statewide Patterns

Approximately 593.3 acres (0.06%) remain in an undegraded, high-quality ecological condition in the PPAA (White 1978, Illinois Department of Natural Resources 1998, Table 6). This is similar to statewide levels of habitat loss and destruction where 0.07% of the total area remains in a high-quality condition (White 1978). Natural areas are described in more detail in subsequent sections of this report. Trends for each community class are described below.

Prairie - About 0.01% of the original area of prairie in the state persists in a high-quality condition (White 1978). About 181 acres (0.02% of the land cover) of relatively undisturbed prairie remain throughout the PPAA (Table 6). Most acreage of relatively undisturbed prairie in the Assessment Area, as in Illinois overall, is on agriculturally less suitable lands such as sand deposits or thin soils. An unknown quantity of unmapped degraded prairie persists locally in the Assessment Area (e.g., along railroad rights-of-way). Some degraded prairie has restoration potential, especially within the Goose Lake Prairie and Midewin National Tallgrass Prairie sites.

Forest - About 30% of the presettlement acreage of forest remains statewide (Iverson et al. 1989), although only about 0.3% of the remaining forest (0.1% of presettlement forest area) remains in a high-quality condition. About 6.4% (60,897 acres) of the PPAA is forested, compared with an estimated presettlement forest cover of 9%. While little, if any, of the original forest remains, decline in percent forest cover has been considerably less in the PPAA compared with statewide trends. About 270 acres within the PPAA (0.4% of the remaining forest, 0.3% of the original forested area) remain as high-quality forest (Table 6).

Savanna - Savannas have declined in area throughout Illinois and the Midwest, perhaps more than any other community class (Taft 1997). Presettlement acreage of savanna in Illinois and in the PPAA is unknown, as are any figures on the remaining acreage of degraded savannas. About 84 acres (0.009% of the land cover) of high-quality savanna remain in the PPAA, compared to 1,243 acres (0.0034% total land cover) of high quality savanna in Illinois overall (White 1978). This is about 6.8% of all of the high-quality

savanna left in Illinois and three times the percentage of land cover averaged statewide (Table 6), making this vegetation type a particularly important natural resource of this Assessment Area.

Wetlands - Natural wetlands in Illinois have declined from presettlement statewide estimates of about 23% of the land area to about 3.5% of the state today (Havera et al. 1994). This is a loss of 89% of the original wetlands in the state. Statewide, only about 6,000 acres remain in a high-quality condition (White 1978) representing 0.65% of the remaining and 0.07% of the original wetland area (Havera et al. 1994). In the PPAA, about 2.4% (22,247 acres) remains as wetland (Table 3) compared with a baseline of about 35% (approximately 330,924 acres). The remaining wetlands are about 6.7% of the original extent (about 93% have been destroyed). About 165.4 acres of wetland are high-quality and relatively undegraded (Table 6), about 0.74% of current wetland acreage and 0.05% of the original wetland area.

Primary - Primary communities refer to communities in which soil is thin or absent and the parent material (generally bedrock) is at or near the surface (White 1978). Within the PPAA primary communities include the dolomite cliffs community. The communities are maintained at an early stage of succession since soil-developing processes are very slow or absent. Quarrying and urban development are the primary sources of habitat degradation. Total acreage of this cover type in the PPAA is unknown because most areas are vertical exposures or very small and included among other cover types. There are no areas of high-quality dolomite cliffs known in the Assessment Area. Examples of dolomite cliffs occur along the Des Plaines River in Will County south of Joliet, where the Joliet and Kankakee formations are exposed. Exposures of bedrock often support a unique assemblage of specially adapted species, including some listed as threatened or endangered (Table 10).

The total species richness of plants within the PPAA at the time of European settlement is unknown. Nineteenth-century botanical explorers surveyed portions of the area providing some early records and there have been more extensive surveys in more recent years. A total of 1,453 different vascular plants (all plants other than mosses, liverworts, and algae) have been reported from within the Assessment Area (Appendix 1). Of these, 1,051 (72.3%) are native to the Assessment Area and 402 (27.7%) are introduced. These figures indicate that a slightly lesser percent of non-native plants occur in the PPAA than in the state as a whole. Statewide, 71% of the kinds of plants known are native, and 29% are introduced species. Appendix 2 is an alphabetical listing of scientific names of the species listed in Appendix 1 along with the corresponding common names. The compilation probably underestimates somewhat the species richness of both native and non-native kinds of plants in the PPAA, but it is thought to be rather complete considering the extensive botanical work in the area. The list was based on a variety of sources including herbarium records from the Assessment Area in the INHS herbarium, Swink & Wilhelm (1994), literature and reports cited at the end of this section, and the IDNR Natural Heritage database (Illinois Department of Natural Reources 1998). The total number of species reported from the PPAA compares to 2,200 native taxa of plants and 3,102 total taxa of plants reported from Illinois overall (Mohlenbrock 1986) and represents about 47% of the Illinois flora.

Reduction in habitat sizes in the PPAA and invasion of exotic species probably has resulted in reduced population sizes for many native species, particularly those sensitive to habitat degradation. As populations decline in size, they are more likely to undergo local extinctions. Consequently, richness of native species probably has declined in the PPAA since European settlement. At the statewide scale, prairie species appear to form a somewhat resistant species pool. Despite the tremendous loss of prairie habitat in Illinois, only about five species of prairie plants have become extinct in the state (Taft 1995). However, many prairie species occur at low population levels in the state, and about 103 are listed as threatened and endangered (Herkert 1991, 1994; Taft 1995, Illinois Endangered Species Protection Board 1999).

Illinois Threatened and Endangered Species

Twenty-four plant species currently listed by the Illinois Endangered Species Protection Board (IESPB) as threatened or endangered (T&E) or on the unofficial watch-list are known to currently exist within the PPAA (Table 10; compiled from the IDNR Natural Heritage Database; Herkert 1991, 1994; IESPB 1999). Ten additional T&E species and one watch-list species have been reported from within the PPAA but have not been relocated and may have become extirpated from the region. These 35 taxa total about 10.5% of the species listed as threatened or endangered by the IESPB. Among these taxa, one is listed by the U.S. Fish and Wildlife Service as federally endangered (leafy prairie clover) and one is listed as federally threatened (prairie white-fringed orchid). Two plant species historically reported from the PPAA are now thought to be extinct in Illinois. A combination of these four categories totals 36 sensitive plant species of conservation concern that are known or historically known from within the Prairie Parklands Assessment Area. Of these species, 12 apparently were extirpated during the last 100 years.

The T&E plant species in and near the Prairie Parklands Assessment Area have declined primarily due to loss of habitat. This is particularly true for species previously known in eastern Will County sites that are now included within areas of urban development. The group of species dependent on wetland habitats have been severely affected by the loss of wetlands in the PPAA, as in the cases of sweet Indian plantain, snake-mouth orchid, Vasey's pondweed, seaside crowfoot, arbor vitae, and false asphodel. Several of the species presented in Table 10 probably were not very numerous even in presettlement times because they represent species on the edges of their ranges, as in the cases of Tennessee milk vetch, wood orchid, and great chickweed.

The species included in Table 10 have been reported from most of the natural community types found in the PPAA. The communities supporting the most T&E species in the PPAA are the wet-mesic sand prairies with ten T&E species, the graminoid fens (including wet calcareous prairies) with eight, and the wet sand prairies and the dry-mesic dolomite prairies each with 7 reported T&E species. Other plant communities with T&E species include the mesic upland forest and the seeps with 6 each, the mesic prairie, wet-mesic prairie, mesic-sand prairie, and shrub prairie each with 5, the dry-mesic prairie and dry dolomite prairie each with 4, the dry-mesic sand savanna, the dry-mesic gravel prairie, and

wet prairie each with 3, the mesic and wet floodplain forests, glacial-drift hill prairie, dry sand savanna, dolomite cliff, and shrub swamp each with 2, and the dry-mesic upland forest, wet-mesic upland forest, mesic gravel prairie, brackish marsh, and pond each with one T&E species reported (Table 10).

Table 10. Threatened and endangered plant species reported from the Prairie Parklands Assessment Area.

Common Name[1] *Scientific Name*[1]	Status[2]	Habitat	Occurance[3]	Range (U.S. and PPAA)
Alkali bulrush *Scirpus paludosus*	SE	Saline marshes and roadsides	X	W U.S. to MN, IL, MO. Probably introduced to the PPAA; known from Grundy Co.
American burnet *Sanguisorba canadensis*	SE	Wet-mesic calcareous prairies and fens	X	Boreal E Canada, south into NE U.S. and the Appalachians. Known from Will Co. w/in 1 mi of PPAA and probably occurs in the PPAA
Arbor vitae *Thuja occidentalis*	ST	Glacial till bluffs, sandstone and limestone cliffs, calcareous springy slopes, fens & bogs	H	NE U.S. west to MN, south to TN. Formerly known from Will Co.
Bristly blackberry *Rubus setosus*	SE	Wet-mesic, sometimes acid, sand prairies	X	NE U.S. Known from Will Co.
Buffalo clover *Trifolium reflexum*	SE	Dry-mesic savannas, flatwoods & prairies	X	Eastern and central U.S. Known from Will Co.
Butler's quillwort *Isoetes butleri*	SE	Limestone glades & dolomite prairies	X	SC KY to NW GA, W to AR and E to KS. Disjunct population known from Will Co.
Butternut *Juglans cinerea*	WL	Mesic woods, & springy, wooded calcareous slopes	X	MN to ME and adjacent Canada. S to GA and AR. Known from Grundy Co. & formerly from Will Co.
Carey's heartease *Polygonum careyi*	SE	Wet-mesic sand prairies, woods, & fallow fields	H	Northeastern U.S. Formerly known from Grundy Co.
Corn salad *Valerianella chenopodiifolia*	SE	Moist woods & floodplains, S-facing limestone bluffs	X	NE and central U.S. and adjacent Canada. Known from Will Co.
Ear-leaved foxglove *Tomanthera auriculata*	ST	Savannas, disturbed & mesic prairies	X	OH to MN, south to KS and MO. Known from Grundy and Will cos.
False asphodel *Tofieldia glutinosa*	ST	Calcareous wetlands, fens, & interdunal swales	H	C & E Canada south to IL, IN & NY. Formerly known in Will Co.

Table 10. Continued.

Common Name[1] *Scientific Name[1]*	Status[2]	Habitat	Occurance[3]	Range (U.S. and PPAA)
False mallow *Malvastrum hispidum*	SE	Dry, rocky dolomite prairies and barrens	X	Central U.S. Known from Grundy and Will cos.
Forked aster *Aster furcatus*	ST	Seeps along N-facing wooded bluffs & stream banks	X	East-central U.S. Known from Grundy Co.
Grass pink orchid *Calopogon tuberosus*	SE	Mesic prairies, & peaty bogs & fens	X	Eastern U.S. and adj. Canada. Known from Will & Grundy cos.
Great chickweed *Stellaria pubera*	SE	Wooded limestone bluffs & rocky woods	H	Eastern and SE U.S. Formerly known from Will Co.
Hill's thistle *Cirsium hillii*	ST	Hill prairies, dry prairies	X	S Ontario to PA, W to MN and SD. Known from Grundy & Will cos.
Leafy prairie clover *Dalea foliosa*	FE, SE	Dolomite prairies	X	TN to AL and disjunct in IL. Known from Will Co.
Narrow-leaved sundew *Drosera intermedia*	ST	Wet sand prairies and peat bogs	X	NE U.S., S in coastal plain to TX. Known from Grundy & Will cos.
Prairie buttercup *Ranunculus rhomboideus*	ST	Dry gravel & dolomite prairies	H	MI west to SD and adjacent Canada. Formerly known in Will Co.
Prairie white fringed orchid *Platanthera leucophaea*	FT, SE	Dry, mesic & wet prairies	X	East-central and eastern U.S. Known from Grundy and Will cos.
Pretty sedge *Carex woodii*	ST	Mesic calcareous forests	X	Northeastern U.S. and adjacent Canada. Known from Will Co.
Queen-of-the-prairie *Filipendula rubra*	SE	Calcareous fens, mesic sand prairies, & seeps	X	NY west to MN, south to NC and KY. Known from Grundy Co.
Rock elm *Ulmus thomasii*	SE	Calcareous woods, often near streams & assoc. with hillside seeps	X	Southwestern Quebec to MN, south to TN and AR. Known from Will Co.
Running pine *Lycopodium clavatum*	SE	North-facing slopes, sandstone ledges, & mesic sand prairies	X	Circumboreal, south into northern U.S. Known from Will Co.
Savanna blazing star *Liatris scariosa* var. *nieuwlandii*	ST	Silt-loam savannas	X	Northeastern and north-central U.S. Known from Will Co.

Table 10. Continued.

Common Name[1] *Scientific Name[1]*	Status[2]	Habitat	Occurance[3]	Range (U.S. and PPAA)
Seaside crowfoot *Ranunculus cymbalaria*	SE	Muddy or sandy marshes & in ditches	H	Widespread in N and W N. America. Formerly known in Will Co.
Shore St. John's wort *Hypericum adpressum*	SE	Moist sandy or peaty soil on marsh borders & in ditches	X	Eastern U.S. Known from Will Co.
Slender sandwort *Arenaria patula*	ST	Dolomite prairies and rocky ledges	X	Southeastern U.S. Populations in Grundy and Will cos.
Snake-mouth orchid *Pogonia ophioglossoides*	SE	Graminoid fens, wet sand prairies, & sphagnum bogs	H	Boreal eastern Canada, south into eastern U.S. Formerly in Will Co.
Spotted coral-root orchid *Corallorhiza maculata*	ST	Mesic forests	H	S Canada, S into NE U.S. & the Appalachians. Formerly known from Will Co.
Sweet Indian plantain *Cacalia suaveolens*	WL	Calcareous fens	H	NE U.S. south to GA, west to MN and IL; formerly known in Will Co.
Tennessee milk vetch *Astragalus tennesseensis*	SE	Dolomite and dry gravel prairies	H	TN, AL, and IL. Formerly known from Grundy and Will cos., thought to be locally extinct
Tubercled orchid *Platanthera flava* var. *herbiola*	SE	Wet-mesic sand & peaty sand prairies, low swampy woods & floodplains	X	Southeastern U.S. Known from Will Co.
Vasey's pondweed *Potamogeton vaseyi*	DL	Ponds	EXT	PA and OH, W to MN and IL, and adj. Canada. Formerly known from Grundy & Will cos.
Western wild lettuce *Lactuca ludoviciana*	DL	Dry to mesic prairies	EXT	Western and central U.S. Formerly known from Will Co.
White lady's slipper *Cypripedium candidum*	ST	Fens and wet mesic prairies	X	North-central and northeastern U.S. Known from Will Co.
Wood orchid *Platanthera clavellata*	SE	Mesic sand & peaty sand prairies, thickets, and mesophytic swamps	H	Eastern U.S. & adj. Canada. Formerly known from Will Co.

[1] Common and scientific names are those used by the Illinois Endangered Species Protection Board (1999) and Herkert (1991, 1994).

[2] WL = Illinois Watch List (plant has no legal protection); ST = state threatened; SE = state endangered; FT = Federally threatened; FE = Federally endangered; DL = recently delisted (April 1999) by the Illinois Endangered Species Protection Board .

[3] Occurrence listing: X = current listing; H = historical listing only; EXT = extirpated within the State of Illinois.

Disturbance, Habitat Quality, and Restoration Potential

In addition to the primary cause of habitat loss through conversion to cropland and urban areas, most remnant plant communities in the PPAA have experienced human-caused disturbances that have resulted in differing levels of degradation. Fragmentation, fire absence, and exotic species introductions are other typical consequences of intensive habitat conversion that have implications for habitat restoration potential. These issues are discussed briefly below.

Disturbance is a general term referring to any perturbation. Plant communities (or ecosystems) are **degraded** when recovery to original condition is unlikely under normal circumstances. Degraded lands can be distinguished further by those that can be *restored* to original condition through management efforts and those which, at best, can be *reclaimed* for only limited use in severe examples (e.g., strip mining), or *rehabilitated* to a condition somewhat similar to the original but where compositional differences remain (Lovejoy 1975). Degraded lands are *derelict* when land uses become very limited (Brown and Lugo 1994). Perturbations that exceed the intensity, frequency, or duration of the natural disturbance regime can result in loss of species lacking tolerance or adaptations to the new levels. When certain "keystone" species, or assemblages of other taxa, are extirpated from a community, the system's capability for restoration is diminished and integrity is lowered. A common source of degradation in Illinois plant communities is overgrazing; however, multiple factors often are interacting.

Fragmentation is a process describing landscape patterns where habitat remnants become isolated by land-cover conversions. Fragmented habitats often undergo alterations in many environmental conditions (Gelhausen et al., in review). Increased surface area of edge compared to volume in forest communities can result in changes in soil moisture conditions and levels of solar radiation, as well as increased opportunity for exotic species invasions and wind damage. Fragmented habitats, typically, support fewer species and species at lower population levels compared to less fragmented habitats. Species at lower population levels are more prone to undergo local extirpation. Other effects of fragmentation include interruption of species migration patterns. Consequently, high levels of fragmentation limit the recovery potential of degraded sites since species immigration, needed to compensate for the local extirpation of taxa with low population levels, is seriously challenged (Taft 1996, 1997). Fragmentation also results in alterations in natural disturbance regimes such as fire.

Fire is an example of a large-scale natural disturbance in many Midwestern plant communities and fire frequency is an important determining factor for many community characteristics. The compositional and structural characteristics of many native Illinois plant communities demonstrate some level of fire dependency. Fire absence in these communities can result in profound changes in community characteristics that lead to reduced diversity. For example, vegetational changes common throughout Illinois such as from prairie to shrub thicket or forest, or oak-dominated woodland to maple-dominated forest, are attributable to reduced fire frequency and fire absence.

Exotic species (non-native or adventive taxa) introductions also often result in lowered integrity. Adventive taxa in a system may be sorting into disturbance or habitat niches that result in the replacement of native taxa. The establishment of adventive taxa can result in arrested development and interfere with rates of recovery processes. The recovery potential of plant communities with appropriate ecological restoration and management is an area of much needed additional research. Specific and general recommendations for restoration of natural communities in the PPAA, including exotic species control measures, are offered in the Summary and Recommendations section following the descriptions of natural communities.

Natural Areas and Nature Preserves

The Illinois Natural Areas Inventory (INAI) was conducted over a three-year period during the mid 1970s to document remaining significant and exceptional examples of the natural communities and other features in Illinois (White 1978). The INAI established seven categories of natural areas based on significant features. The categories are: I - High Quality Natural Communities; II - Habitat for Endangered Species; III - Habitat for Relict Species; IV - Outstanding Geological Areas; V - Approved Natural Areas and Restoration Sites; VI - Unique Natural Areas; and VII - Outstanding Aquatic Areas. The INAI also established a grading system to rank natural quality (White 1978). The natural quality of a community or area was graded as "A" (relatively stable or undisturbed), "B" (late successional or lightly disturbed), or "C" (mid-successional or moderately to heavily disturbed). Grades "D" (early successional or severely disturbed) and "E" (very early successional or severely disturbed) were used for land within a natural area that is used as a buffer for protection of the significant or exceptional feature. In general, only grade "A" or "B" communities are designated as significant or exceptional features, although many natural areas include some Grade C-quality habitats. The estimates and comparisons of natural areas within the PPAA and statewide are based on the best available data. In some cases, comparisons are made using recent data for natural communities within the Assessment Area and comparing to statewide data that are from White (1978) and thus over 20 years old. Consequently, if discoveries of natural areas do not equal area of recently degraded or destroyed natural areas, some data for trends among natural areas may be slightly over or underestimated.

Twenty-eight Category I and II terrestrial natural areas, nine Category IV geological natural areas (including 1 quarry), and four Category VII biologically significant stream segments, all designated as INAI sites, occur in the PPAA (Tables 5 and 8). Twenty-one of these sites are located in Will County, fourteen of these are in Grundy County, three are in Kankakee County, three are in La Salle County, one is in Cook County, and one is in Livingston County (Figure 11). The total area of high-quality (Grades A and B) natural areas is 593.3 acres (0.063% of the PPAA; Table 6); a similar proportion of high-quality natural areas (0.07) is found for the entire state (White 1978). Comparisons of the area of individual Category I natural communities in relation to the total remaining in Illinois are made under each community type, when possible, in the following section on Natural Community Descriptions, and have been summarized in Table 6.

Ten sites dedicated as Illinois Nature Preserves occur within the PPAA (Table 7); each contains noteworthy remnants of natural communities. Seven of the nature preserves occur in Will County, two are in Grundy County, and one is in Livingston County (Figure 11). Summarizing from McFall and Karnes (1995), each Nature Preserve is described briefly below.

Braidwood Dunes and Savanna Nature Preserve, Will County - Owned by the Forest Preserve District of Will County, this 259 acre site was dedicated in 1981 as a nature preserve. This site also includes acreage of INAI natural area. It is located southeast of Braidwood within the Kankakee Sand Area Section of the Grand Prairie Natural Division. The site contains one of the largest and most diverse dry-mesic sand savannas in Illinois, as well as high-quality marsh, mesic sand prairie, wet-mesic sand prairie, and sedge meadow natural communities. Two state endangered vascular plants and one threatened plant are known within the nature preserve.

Goose Lake Prairie Nature Preserve, Grundy County - This IDNR-owned 1,537 acre nature preserve was dedicated in 1969 and is one of the earliest of the dedicated preserves. It also contains the Goose Lake Prairie Natural Area. It is located south of the Illinois River within the larger Goose Lake Prairie State Park east of Morris, mostly within the Grand Prairie Section, on the border of the Kankakee Sand Area Section, of the Grand Prairie Natural Division. The site is considered to be the largest remnant of prairie left in Illinois. While none of the communities are graded A or B, significant areas of Grade C dry-mesic prairie, mesic prairie, wet-mesic prairie, wet prairie, and pond are found at the site and large-scale natural community restoration efforts continue. Three threatened vascular plant species and two endangered plants are known to occur here.

Grant Creek Prairie Nature Preserve, Will County - This IDNR-owned 78 acre nature preserve was dedicated in 1978 and includes acreage of INAI natural areas. It is located within the eastern margin of the larger Des Plaines Wildlife Conservation Area near the junctions of the Des Plaines and Kankakee River south of Channahon in the Grand Prairie Section of the Grand Prairie Natural Division. The site contains high-quality mesic prairie, wet-mesic prairie, and wet prairie natural communities with more than 110 native prairie plant species. Two threatened plant species and one Illinois endangered (and federally threatened) plant species occur here.

Hickory Creek Barrens Nature Preserve, Will County - Owned by the Forest Preserve District of Will County, this 575 acre nature preserve was recently dedicated in 1997 (B. Reilly, IDNR, pers. comm.). It is located on both sides of Hickory Creek northeast of the intersection of IL Rt. 30 and School House Road halfway between Frankfort and New Lenox. The preserve is described as containing an example of the dynamic interface between a prairie on the north side of the creek and an oak-hickory forest on the south, with its associated remnants of scrub oak barrens and oak savanna (mostly black oak and shingle oak), and it is being managed to preserve this interface. No high-quality (Grades A & B) communities have been designated within the preserve; however, restoration efforts may yield areas that meet the INAI criteria for Category I natural areas. One Illinois

endangered plant species is known to occur, and one additional endangered plant species has been reintroduced.

Hitts Siding Prairie Nature Preserve, Will County - This 260 acre nature preserve was dedicated in 1996. Owned by the Illinois Department of Natural Resources, it is located in a triangle bounded by the Illinois Central Gulf Railroad, County Road 29 (Stripmine Road), and, on the west, by a powerline easement east of IL Rt. 129, at the west side of Wilmington. The Kankakee River lies about 0.5 mile to its east. The site contains high-quality mesic prairie, wet-mesic prairie, wet prairie, marsh, and mesic sand prairie, along with sand savanna and sand borrow pits with an interesting flora. Two Illinois endangered plants, one Illinois threatened plant, 1 endangered insect, one threatened insect, and one threatened bird are known at the site.

Messenger Woods Nature Preserve, Will County - Owned by the Forest Preserve District of Will County, this 407 acre nature preserve was dedicated in 1994 (B. Reilly, IDNR, pers. comm.). It is also a registered natural area. It is located about 3.5 miles north of New Lenox and 5 miles east of Lockport in Homer township. The preserve contains examples of Grade A and B mesic upland forest, Grade B dry-mesic upland forest, and Grade C shrub swamp and wet prairie. It has also been described as one of the 7 natural wonders of the Chicagoland area, known especially for its spring wildflower display. Two state endangered plant species are known to occur at the site.

Sand Ridge Savanna Nature Preserve, Will County - Owned by the Will County Forest Preserve District, this 151.5 acre nature preserve was dedicated in 1993. It also includes portions of the Munch Natural Area. It is located west of the Kankakee River southeast of Braidwood and 3 miles southwest of Wilmington at the eastern edge of the Kankakee Sand Area Section of the Grand Prairie Natural Division. The nature preserve is a diverse, complex with examples of high-quality sand prairie, wetland, and savanna. Special features include examples of Grade B sand prairie and Grade B shrub prairie. Two state endangered plant species and one state threatened plant are known in the reserve. This site currently has no public access.

Short Pioneer Cemetery Prairie Nature Preserve, Grundy County - This privately owned 1.3 acre nature preserve was dedicated in 1988. It is located south of Goose Lake Prairie and southeast of Morris at the western edge of the Kankakee Sand Area Section of the Grand Prairie Natural Division. This small pioneer cemetery contains a remnant of dry-mesic sand prairie.

Sunbury Railroad Prairie Nature Preserve, Livingston County - This IDNR and Prairie Lands Foundation owned 12 acre site was dedicated in 1983. It is also recognized as an INAI natural area. The railroad prairie is located west of Dwight within the Grand Prairie Section of the Grand Prairie Natural Division. It contains an example of high-quality (grades A and B) mesic prairie representative of the former condition of tallgrass Illinois prairie.

Wilmington Shrub Prairie Nature Preserve, Will County - This IDNR owned 146 acre site was dedicated as a nature preserve in 1989. It is also includes acreage of INAI natural area. It is located northeast of Braidwood at the east side of a strip mining area. This site is one of the few remaining examples of shrub prairie in Illinois and contains high-quality (Grade B) examples of this community and sedge meadow and wet-mesic prairie natural communities. Two state endangered plant species are known in the nature preserve.

Terrestrial Natural Community Descriptions

The Illinois Natural Areas Inventory (INAI) classification subdivides the natural divisions and sections of Illinois into nine community classes: **Forest, Prairie, Savanna, Wetland, Lake and Pond, Stream, Primary, Cave,** and **Cultural** (White 1978). The smallest unit in the classification is a ***natural community***, which is a subdivision of community class. A natural community is a group of organisms interrelated with each other and their environment. They are named by choosing the dominant descriptive features that distinguish one community from the others. Soil moisture is a basic characteristic used to distinguish the communities. The soil moisture classes are *xeric* (excessively drained), *dry* (somewhat excessively drained), *dry-mesic* (well-drained), *mesic* (moderately well-drained), *wet-mesic* (imperfectly drained), *wet* (poorly drained), and *hydric* (nearly always wet). The boundaries between these classes are not always sharp due to individualistic responses of species to environmental variables.

The natural communities present within the PPAA (Table 6 in part, Table 11, Appendices 1 and 2) were determined by examining data from several sources. These included descriptions of existing community types as well as plant communities inferred to have occurred prior to European settlement and large-scale alteration of the landscape. Since native vegetation in the PPAA has been so greatly converted, modified, and degraded, some of the following community types may no longer persist in a high-quality form. The following describes the natural communities known to occur in the PPAA as well as the characteristics of disturbed land and/or degraded communities. Community classification follows White and Madany (1978). The descriptive information on each natural plant community has been gathered primarily from White (1978), Swink and Wilhelm (1994), the IDNR Natural Heritage Database (Illinois Department of Natural Resources 1998), and Hill (1998).

Botanical nomenclature follows Mohlenbrock (1986) except for certain threatened and endangered species where nomenclature follows that used in Herkert (1991, 1994) and the Illinois Register (1998). Appendix 1 lists all taxa of vascular plants (1,444 species and 9 additional varieties) known within the Assessment Area by common name followed by their scientific names along with the natural community within which each species has been reported in the PPAA. Appendix 2 presents the scientific names listed alphabetically with the corresponding common names. The list was compiled primarily from vouchered specimens in the Illinois Natural History Survey herbarium, from descriptions in Swink and Wilhelm (1994), from descriptions of vegetation in publications and technical reports

(e.g. Bell and Zales 1978), and from habitat descriptions in the Illinois Natural Heritage Database (Illinois Department of Natural Resources 1998). The descriptions of the individual natural communities provided below are based on undegraded examples. Consequently, exotic species often found in degraded examples are not listed among the characteristic species.

Table 11. Terrestrial natural communities known or believed to have occurred formerly in the Prairie Parklands Assessment Area.[1,2]

FOREST
- **Upland forest**
  - *dry-mesic upland forest
  - *mesic upland forest
  - *wet-mesic upland forest
- **Floodplain forest**
  - mesic floodplain forest
  - wet-mesic floodplain forest
  - *wet floodplain forest

CAVE
- **cave**
  - terrestrial cave

LAKE & POND
- **Pond**
  - pond

STREAM
- *Creek
- *River

PRIMARY
- **Cliff**
  - dolomite cliff community

SAVANNA
- **Savanna**
  - dry-mesic savanna
  - mesic savanna
- **Sand savanna**
  - dry sand savanna
  - *dry-mesic sand savanna
- **Barren**
  - dry-mesic barrens

WETLAND
- **Marsh**
  - *marsh
  - brackish marsh
- **Swamp**
  - shrub swamp
- **Fen**
  - graminoid fen
- **Sedge meadow**
  - *sedge meadow
- **Seep & spring**
  - *seep
  - spring community

CULTURAL
- prairie reconstruction

PRAIRIE
- **Prairie**
  - *dry-mesic prairie
  - *mesic prairie
  - *wet-mesic prairie
  - *wet prairie
- **Sand Prairie**
  - dry sand prairie
  - dry-mesic sand prairie
  - *mesic sand prairie
  - *wet-mesic sand prairie
  - *wet sand prairie
- **Gravel prairie**
  - dry-mesic gravel prairie
  - mesic gravel prairie
- **Dolomite prairie**
  - dry dolomite prairie
  - *dry-mesic dolomite prairie
  - mesic dolomite prairie
  - wet-mesic dolomite prairie
  - wet dolomite prairie
- **Hill prairie**
  - *glacial-drift hill prairie
- **Shrub prairie**
  - *shrub prairie

[1] Adapted from the Illinois Natural Areas Inventory's community classification (White and Madany 1978).
[2] Asterisk (*) indicates a high-quality (Grade A or B) remnant present within the PPAA, see also Table 6.

Forest

Forests are communities that are dominated by trees, with an average canopy cover usually greater than 80%. Forests in the PPAA belong to the Prairie Peninsula Section in the Northern Division of the Oak-Hickory Forest Region (Braun 1950). Due to a level of protection from the characteristic presettlement prairie fires, forests in the PPAA historically have been concentrated on the slopes, ravines, and bottomlands associated with the major drainages and in protected areas associated with moraines (Gleason 1913,

Figure 5). The subclasses of forests in Illinois include **upland forest, sand forest, floodplain forest**, and **flatwoods**. No confirmed examples of the sand forest and flatwoods subclasses have been identified in the PPAA, though they may have existed in the past or may still exist in degraded remnants. Forest subclasses present here include upland forest and floodplain forest. These forest types are characterized below. Approximately 9% (85,063 acres) of the PPAA was once forested based upon original land surveys; currently, about 6.4% (60,897 acres) of the PPAA remains forested and about 0.4 % (270 acres) remains in a state of high ecological integrity (Table 6; Illinois Department of Natural Resources 1998).

Common ecological problems associated with forest communities, in general, include clearing, logging, general habitat degradation, fragmentation, exotic species introductions, and particularly in upland forests, fire absence. A typical source of habitat degradation in standing forests is overgrazing which often produces changes in the compositional and structural characteristics. Just as in much of Illinois, grazing-sensitive species probably have been eliminated from many forest remnants in the PPAA. In contrast, species that increase with grazing (e.g., native thorn-bearing plants such as hawthorns, honey locust, Missouri gooseberry, and blackberry, and exotic species such as Japanese honeysuckle, Osage orange, multiflora rose, tree-of-heaven, garlic mustard, and barberry) are often abundant in overgrazed forest remnants. In many cases, the abundance of exotic species appears to be directly proportional to the historic grazing intensity. Recovery of these sites following cessation of grazing appears to be slow. Complete restoration may not be possible without intensive management including species reintroduction. Fire absence in upland forest communities typically results in compositional changes in more mesic sites and primarily structural changes in drier sites. These changes often result in increases in both stem density of woody plants and shade. This leads to a reduction in cover and diversity of the herbaceous ground flora, typically the most diverse stratum in Illinois woodlands.

Upland Forest

The total extent of upland forest in the PPAA is estimated to be about 50,945 acres, or about 5.4% of the total PPAA land cover (Table 2). A total of 238.0 acres (0.47% of the upland forest remaining) of high-quality (Grades A and B) upland forest has been identified by the INAI in the Assessment Area (Table 6). Upland forest communities can be characterized by soil-moisture characteristics. *Xeric*, *dry*, *dry-mesic*, *mesic*, and *wet-mesic* upland forest communities are recognized in Illinois in context with increasing available soil moisture (White and Madany 1978). Major tree species respond in predictable ways along these soil-moisture gradients (Adams and Anderson 1980, Fralish 1994, Taft et al. 1995). Xeric and dry upland forests have not been identified in the PPAA. Dry-mesic, mesic, and wet-mesic upland forests do occur. Existing types can be characterized as follows.

Dry-Mesic Upland Forest - Dry-mesic upland forest occurs commonly in the PPAA on the upper slopes and ridges of the dissected terrain bordering the major streams and on well-

drained portions of moraines. The total extent in the PPAA is unknown. A total of 50.0 acres of Grade B dry-mesic upland forest in the Assessment Area is recognized as high quality and statewide significant by the INAI. This is about 1.6% of all of the high-quality dry-mesic upland forest (Grades A and B) remaining in Illinois (Table 6).
Dominant **canopy trees** are shagbark hickory, white ash, white oak, red oak, and black oak. Common **subcanopy trees** include sugar maple, shadbush, blue beech, hop hornbeam, eastern redbud, witch hazel, black cherry, sassafras, and slippery elm. Typical **shrubs** include prickly ash and downy arrowwood. Common **woody vines** include Virginia creeper, bittersweet, and poison ivy. **Groundcover** species include soft agrimony, smooth rock cress, wild ginger, ebony spleenwort, tall anemone, everlasting, heart-leaved aster, Short's aster, woodland brome, sedges (e.g. *Carex blanda, Carex hirsutella, Carex pensylvanica*), poverty oat grass, tick trefoil, spring beauty, bottlebrush grass, white snakeroot, shining bedstraw, stickseed, common satin grass, common cinquefoil, common blackberry, black snakeroot, false Solomon's seal, elm-leaved goldenrod, and horse gentian.

One threatened plant species, spotted coral-root orchid, may be found in the dry-mesic upland forest habitats in the PPAA, but is not currently known from within its boundary. Most of the remaining species present in the community are widespread forest species.

The primary dangers to the dry-mesic upland forest community are from logging, clearing for housing and commercial development, grazing damage, and the absence of fire. Typical **exotic species** include shrubby and vine honeysuckles (Japanese, tartarian, and amur honeysuckles), Japanese barberry, Osage orange, white mulberry, multiflora rose, and garlic mustard. Fire absence can lead towards an increased importance of sugar maple in the subcanopy and potentially lesser importance of oaks in the canopy. Where oaks have been removed by selective logging practices, wild black cherry, shagbark hickory, slippery elm and sugar maple are among the species that gain prominence in the canopy.

Mesic Upland Forest - Mesic upland forests are found on lower slopes, in ravines, and on high terraces of the major streams and tributaries. They are characteristic of soil-covered north-facing slopes, and are found occasionally in protected locations of western exposures. Total acreage within the PPAA is not known, but it is probably the most prevalent upland forest type in the Assessment Area. A total of 138 acres of this community type in the PPAA is recognized by the INAI as high-quality (Grades A and B) and of statewide ecological significance (Table 6). This is 5.5% of the total high-quality mesic upland forest (2,531 acres of Grades A and B) remaining in Illinois.

Species composition is relatively rich including numerous species at each forest layer. Sometimes no species are dominant. Characteristic **canopy trees** include sugar maple, bitternut hickory, shagbark hickory, white ash, white oak, red oak, bur oak, basswood, and American elm. Occasional **tree** species include pignut hickory, hackberry, black walnut, black oak, and chinquapin oak. **Subcanopy trees** include Ohio buckeye, blue beech, hop hornbeam, black cherry, and slippery elm. Typical **shrubs** include paw paw, eastern redbud, gray dogwood, wahoo, Missouri gooseberry, bladdernut, and black haw. **Woody vines** include Virginia creeper, bristly greenbrier, poison ivy, and riverbank grape.

Herbaceous groundcover composition includes a rich assortment of species, particularly spring ephemerals. Selected species reported from the PPAA include doll's eyes, wild leek, wild garlic, sicklepod, American spikenard, wild ginger, green dragon, Jack-in-the-pulpit, goat's-beard, lady fern, rattlesnake fern, sedges (e.g. *Carex albursina, C. blanda, C. davisii, C. hirsutella, C. jamesii, C. rosea*), blue cohosh, enchanter's nightshade, spring beauty, fragile fern, toothwort, dutchman's breeches, shooting star, harbinger-of-spring, white trout lily, wild geranium, shining bedstraw, white avens, liverleaf, great waterleaf, false rue anemone, sweet cicely, Virginia bluebells, ginseng, common phlox, mayapple, Solomon's seal, bloodroot, false Solomon's seal, black snakeroot, common snakeroot, lopseed, starry catchfly, rue anemone, white trillium, prairie trillium, horse gentian, bellwort, and downy blue violet.

Two plant species listed as endangered by the IESPB, three listed as threatened, and one watch list species do or may occur in the mesic upland forest natural community in the PPAA (Table 10). The state-endangered rock elm (*Ulmus thomasii*) is currently known from Will County and the great chickweed (*Stellaria pubera*) is historically known from Will County. The state-threatened forked aster (*Aster furcatus*) and pretty sedge (*Carex woodii*) are currently known in Grundy and Will cos., respectively, and the spotted coral- root orchid (*Corallorhiza maculata*) is known from Will County. The watch list species is the butternut (*Juglans cinerea*) which is currently known in Grundy, Kendall, and Cook cos.

The major ecological problems associated with mesic upland forests are degradation from clearing for development, grazing, exotic species invasions, habitat fragmentation, and logging. Fire is not considered to be a necessary maintaining factor in this community type, and could be detrimental. Among the **exotic species** causing problems within mesic upland forests are white mulberry, garlic mustard, Japanese barberry, amur honeysuckle, Japanese honeysuckle, and common buckthorn.

Wet-Mesic Upland Forest - Wet-mesic upland forests are unusual communities caused by poor drainage in uplands and are localized to depressions, along shallow drainages, and areas of seepage. Small stands occur in the upland forested regions throughout Illinois. Total acreage within the PPAA is not known, but it is probably the least prevalent upland forest type in the Assessment Area. A total of 50 acres of this community type in the PPAA is recognized by the INAI as high-quality (Grade B) and of statewide ecological significance (Table 6). This is the majority of the total high-quality wet-mesic upland forest, 82% (61.0 acres of Grades A and B is the Illinois total), remaining in Illinois, and, therefore, is an extremely valuable natural resource within the PPAA. This forested area is found in the Pilcher Park Natural Area in Will County.

Species composition is not as rich as in the mesic upland forest because of a combination of shade and poor drainage which many upland forest species cannot tolerate. The community shares species with both the floodplain forest and the mesic upland forest. The characteristic **canopy trees** include American elm, slippery elm, hackberry, swamp white oak, and bur oak. Occasional **tree** species include sugar maple, white ash, white oak, red oak, and basswood. **Subcanopy trees** include Ohio buckeye, blue beech, hop hornbeam,

and black cherry. Typical **shrubs** include paw paw, gray dogwood, wahoo, Missouri gooseberry, bladdernut, black haw, and occasionally buttonbush. **Woody vines** include poison ivy, Virginia creeper, and riverbank grape. **Herbaceous groundcover** composition is somewhat limited and includes green dragon, Jack-in-the-pulpit, lady fern, sedges (e.g. *Carex blanda, C. davisii, C. jamesii, C. rosea*), spring beauty, white trout lily, annual bedstraw, white avens, Virginia bluebells, black snakeroot, common snakeroot, and downy blue violet.

One plant species listed as threatened by the IESPB, pretty sedge (*Carex woodii*), is known in this plant community within the PPAA in Will County. The major ecological problems associated with wet-mesic upland forests are degradation from draining and clearing for development, grazing, and logging. Since this is a wet forest, fire is not considered to be a necessary maintaining factor, and may actually be detrimental to the community. Among the **exotic** species causing problems within wet-mesic upland forests are white mulberry, garlic mustard, amur honeysuckle, and common buckthorn.

Floodplain Forest

Floodplain (bottomland) forests are characterized by conditions of poor drainage and slow permeability of soils and are usually classified as wetlands. Local areas of sand and gravel increase permeability. Floodplain forest communities in Illinois include *mesic*, *wet-mesic*, and *wet* floodplain forests and are classified according to characteristics of flooding. All three types occur in the PPAA. Wet-mesic to mesic floodplain forests occur on low and high terraces, respectively. Wet floodplain forests occur on the floodplain, often in the zone bordering rivers, and include the forested river bank. The total extent of floodplain forest in the PPAA is estimated to be about 9,952 acres, or about 1.1% of the total land cover (Table 2). A total of 32 acres (0.3% of the floodplain forest remaining) has been identified to be of high-quality (Grades A and B) by the INAI (Table 6). Significant areas of floodplain forest remain along the Kankakee River, the Mazon River, the Illinois River, and along Aux Sable, Jackson and Hickory Creeks (Figure 5).

In general, the flooding regime, including depth and duration of flooding, is a strong selective force on composition and species richness in floodplain forests (Bell 1974) and also in regulating tree growth (Robertson 1992). Wet floodplain forests are often seasonally flooded and/or have perched water during a portion of the year, often in late winter and spring. Diversity of species composition tends to increase from wet to mesic floodplain forest. Generally, flooding is of shorter duration and less frequent in mesic floodplain forests than in wet-mesic floodplain forests, and so mesic floodplain forests have fewer flood-tolerant species. Compositional changes favoring more flood tolerant tree species like silver maple have occurred since presettlement conditions along some Illinois rivers (Nelson et al. 1994).

Ecological problems in floodplain forest involve siltation from silt-laden flood waters, changes in the hydrological regime (e.g., stream entrenchment [including draining] or

increased flooding duration and frequency due to changes in the upper watershed), clearing for agricultural or recreational purposes, and exotic species invasion. The expansion of erosion-prone agricultural land has produced dramatic compositional changes of the vegetation in floodplain natural communities (Nelson et al. 1994). A description of the composition of the floodplain forests within the PPAA follows.

Mesic Floodplain Forest - This forest community is very similar to and transitional to the mesic upland forest and is separated from that only by historic flooding limits. Species which are completely intolerant of flooding do not occur, and elements from the wetter floodplain forests occur with limited frequency. There is no high-quality (Grades A or B) mesic floodplain forest known within the PPAA; 210 acres of this community remain high-quality in all of Illinois. The extent of this community in the PPAA is not known.

Common to occasional **canopy trees** include green ash, Kentucky coffee tree, hackberry, black walnut, white oak, bur oak, shingle oak, swamp white oak, red oak, basswood and American elm. **Subcanopy trees** include Ohio buckeye, box elder, red mulberry, and slippery elm. Shrubs include paw paw, redbud, Missouri gooseberry, bladdernut, smooth arrowwood, and red hawthorn. **Woody vines** include Virginia creeper, poison ivy, moonseed, bristly greenbrier, and riverbank grape. **Groundcover** species include many of the mesic upland forest wildflowers as well as others, including small-fruited agrimony, wild garlic, groundnut, green dragon, Jack-in-the-pulpit, wild ginger, Ontario aster, panicled aster, lady fern, spring beauty, tall bellflower, sedges (e.g. *Carex blanda, C. davisii, C. jamesii*), wild chervil, blue-eyed Mary, sweet cicily, honewort, Virginia blue bells, mayapple, Solomon's seal, common snakeroot, Virginia wild rye, nodding fescue, common wood reed, white avens, wood sage, and wild yam.

One plant species listed as threatened, forked aster (*Aster furcatus*), currently is known in Grundy County and one watch-list species, butternut (*Juglans cinerea*), occurs in the mesic floodplain forest natural community in the PPAA within Grundy, Kendall, and Cook counties (Table 10).

The major ecological problems associated with mesic floodplain forests are extended flooding, draining, clearing for agriculture, degradation from grazing, exotic species introductions, and logging. Since this is a moist forest, fire is not considered to be a maintaining factor and may actually be detrimental to the community. Among the common **exotic** species within mesic floodplain forests are the **trees:** white mulberry and Osage orange, the **shrubs:** common buckthorn, amur honeysuckle and multiflora rose, the **vine:** Japanese honeysuckle, the **herbs:** garlic mustard, creeping Charlie, dame's rocket, moneywort, and orange day lily, and the **grass:** reed canary grass.

Wet-Mesic Floodplain Forest - There is no estimate of the proportion of the floodplain forest within the PPAA that is wet-mesic floodplain forest. No high-quality wet-mesic floodplain forest has been identified from within the Assessment Area by the INAI; 3,114.0 acres of high-quality examples of this community exist in all of Illinois.

Common to occasional **canopy trees** include silver maple, bitternut hickory, hackberry, honey locust, green ash, black walnut, pin oak, swamp white oak, and American elm. **Subcanopy trees** include box elder, red hawthorn, red mulberry, Kentucky coffee tree, and slippery elm. **Shrubs** include paw paw, Missouri gooseberry, and elderberry. **Vines** include poison ivy, moonseed, bristly greenbrier, and riverbank grape. **Groundcover** species include giant ragweed, green dragon, panicled aster, common beggar ticks, false nettle, several sedges (e.g. *Carex frankii, C. davisii, C. grayi, C. grisea*, and *C. granularis*), wild chervil, honewort, scouring rush, Aunt Lucy, Virginia wild rye, annual bedstraw, white avens, cow parsnip, wood nettle, spotted touch-me-not, clearweed, woodland bluegrass, swamp buttercup, smooth hedge nettle, Virginia bluebells, common phlox, goldenglow, black snakeroot, common snakeroot, cup plant, and Missouri violet.

No plant species listed as threatened or endangered by the IESPB are known to occur in the wet-mesic floodplain forest natural community within the PPAA.

The major ecological problems associated with wet-mesic floodplain forests are changes in the flooding regime (including draining and flooding), severe grazing, exotic species introductions, clearing for agriculture, and logging. Among the common **exotic** species within wet-mesic floodplain forests is the **tree:** white mulberry, the **shrubs:** common buckthorn, amur honeysuckle, and multiflora rose, the **vine:** Japanese honeysuckle, the **herbs:** bitter dock, garlic mustard, creeping Charlie, dame's rocket, and moneywort, and the **grass:** reed canary grass.

Wet Floodplain Forest - There is no estimate of the proportion of the floodplain forest within the PPAA that is wet floodplain forest. A total of 32 acres has been identified as high-quality natural area (Grade B) within the PPAA by the INAI (Table 6). This is 1.1% of the total high-quality (Grades A and B) wet floodplain forest in Illinois. Compared with other floodplain forest communities, fewer tree species can be found in examples of this natural community because flooding frequency and duration, typically, are limiting for many species. There is generally a considerable amount of bare ground at the margins of the wet floodplain forest because of the scouring effect of floods, and in some cases there is little understory vegetation during portions of the year. The accumulation of seasonally floating debris is often very dense, providing understory plants little space to grow. Tree density varies greatly with flooding frequency. The bare ground along the river or stream is quickly colonized by opportunistic annuals as water levels drop. By autumn, river banks are often characterized by an abundance of giant ragweed, smartweeds, and water hemp.

Common to occasional **canopy trees** include silver maple, green ash, honey locust, sycamore and cottonwood. **Subcanopy trees** include box elder, river birch, sandbar willow, and black willow. **Shrubs** include elderberry. **Woody vines** include bristly greenbrier, poison ivy, and riverbank grape. **Groundcover** species include giant ragweed, false nettle, wood nettle, goldenglow, panicled aster, several sedges (e.g. *Carex grayi, Carex shortiana, Carex tribuloides*), dodder, blue lobelia, honewort, Virginia wild rye, annual bedstraw, white avens, spotted touch-me-not, clearweed, late boneset, creeping lovegrass, smooth

hedge nettle, bur cucumber, wild cucumber, rice cutgrass, fog fruit, heartsease, dotted smartweed, common smartweed, common cocklebur, tall water hemp, and Missouri violet.

One watch list species, Indian plantain (*Cacalia suaveolens*), may occur within this plant community within the PPAA in Will County where it has been recorded. Ponds on the floodplain within this community may harbour the state-endangered Vasey's pondweed (*Potamogeton vaseyi*) which may now be extinct in Illinois (Table 10). This species does not currently exist in the PPAA but there are historical records for it in Grundy and Will counties.

Ecological problems in the wet floodplain forest can include changes in the watershed (such as landfill, trenching) that can alter the flooding regime, the construction of barge or recreational facilities, severe grazing, and, to a lesser extent, agricultural development and the introduction of exotic species. Moneywort, creeping charlie, Osage orange, white mulberry, and reed canary grass are a few of the **exotic** species that can be particularly common in this community type.

Prairie

Prairies are dominated by warm-season grasses and forbs. Trees typically cover less than 10% of the area. Six prairie subclasses are recognized in Illinois: **prairie** (tallgrass prairie on silt-loam soils), **sand prairie, gravel prairie, dolomite prairie, hill prairie,** and **shrub prairie** (White and Madany 1978). Examples of all six prairie subclasses occur in or near the Prairie Parklands Assessment Area. The prairie subclasses (in a similar manner to forests) are further distinguished by characteristics of the soil-moisture regime (*dry, dry-mesic, mesic, wet-mesic*, and *wet*). Only a very few examples remain to document the characteristic species that were associated with undegraded natural prairie communities among these soil-moisture variations. Silt-loam prairies mostly have been destroyed for agricultural development; nevertheless, remnants have survived in the PPAA.

About 91% (858,580 acres) of the PPAA was prairie at the time of European settlement; however, only about 0.02% (181 acres) of the original prairie of the Assessment Area remains in a high quality (Grade A or B) condition, a slightly greater proportion compared with 0.01% of the remaining undegraded prairie statewide (White 1978). Most of the remaining prairie occurs as small remnants. Of the six prairie subclasses, only the gravel prairie is no longer represented by high-quality remnants within the PPAA, but there are high-quality remnants of gravel prairie present in Cook County outside of the PPAA but within the mapped area (e.g., Figure 3).

Common ecological problems associated with tallgrass prairie, in general, include fragmentation, fire absence (and woody plant encroachment), exotic species invasions, and habitat degradation. Small, isolated fragments tend to support many of the species at low population levels (which are, therefore, more susceptible to local extinction) too remote to be enhanced through natural mechanisms of species dispersal. Small, isolated prairie

remnants also may be lacking appropriate pollinators for successful sexual reproduction of many outcrossing species. The greater edge-to-volume ratios of small sites offer greater opportunities for exotic species invasions because surrounding areas typically are dominated by non-native vegetation. Highly fragmented and developed landscapes also lead to altered fire regimes often eliminating fire from prairie remnants until restoration efforts commence. Fire absence poses some of the most severe threats to the continued existence of high-quality prairie remnants in the PPAA. It results in ecological changes such as the encroachment of aggressive woody plants that can eliminate many shade-intolerant prairie species. Fire absence also can lead to a severe invasion of exotic species such as cool-season grasses like the ubiquitous meadow fescue, smooth brome, and Kentucky bluegrass. Overgrazing by domestic livestock typically degrades prairie remnants by eliminating many species and promoting the increase of several weedy native and non-native species. Soil disturbances such as past efforts at cultivation, or soil scraping (typical of many railroad rights-of-way) result in loss of species and opportunities for the establishment of weedy species. These factors tend to result in loss of species diversity and ecological integrity for all prairie community types.

Prairie

This prairie subclass includes the typical 'black-soil' prairies on deep fine-textured silt-loam or clay-loam soils formed in loess, glacial till, or sometimes alluvium. These prairies often are described as tallgrass prairies because of the typical dominance of such tall grasses as big bluestem and Indian grass. Examples of *dry-mesic, mesic, wet-mesic*, and *wet* tallgrass prairies have been described in the Assessment Area. Only *dry* prairies have not been found here. The majority of the high-quality prairie in the PPAA is within this subclass (74.3%, 134.6 acres). The characteristics of these tallgrass prairie communities are described below.

Dry-Mesic Prairie - Dry-mesic prairies most frequently occurred on crests and upper slopes of the major moraines on well-drained and somewhat permeable soils with moderate water-holding capacity. The total present and past extent is not known. About 4.2 acres of Grades A and B dry-mesic prairie remain in the Assessment Area in two of the INAI natural areas. The largest contiguous area of dry-mesic prairie (190 acres) in the PPAA is within the Goose Lake Prairie Nature Preserve, but it is Grade C quality.

Common **grass** species include side-oats grama, June grass, panic grass (*Panicum oligosanthes*), little bluestem, Indian grass, northern prairie dropseed, and porcupine grass. Common to occasional **sedge** species include copper-shouldered oval sedge, Mead's sedge, and umbrella sedge. Characteristic **forbs** (non-grass herbs) include: green milkweed, sky-blue aster, heath aster, false boneset, bastard toadflax, purple prairie clover, sessile-leaved tick trefoil, pale purple coneflower, flowering spurge, rough blazing star, wild bergamot, black-eyed Susan, hairy ruellia, rosinweed, showy goldenrod, and yellow pimpernel. **Shrubs** include leadplant, New Jersey tea, smooth sumac, and pasture rose.

One plant species listed as endangered, two listed as threatened, and one now thought to be extirpated from Illinois are recorded known from the PPAA (Table 10). Buffalo clover

(*Trifolium reflexum*, state endangered, and more of a savanna plant) is known from Will County. Hill's thistle (*Cirsium hillii*, state threatened) is currently known in Grundy and Will counties. The prairie buttercup (*Ranunculus rhomboideus*, state threatened) formerly occurred in Will County. Western wild lettuce (*Lactuca ludoviciana*, formerly listed as state endangered), now considered extirpated from Illinois, formerly occurred in Will County.

Typical ecological problems in dry-mesic prairie remnants include fire absence (and consequential woody plant encroachment), habitat degradation from soil disturbances, and exotic species invasion and establishment. Common exotic species invaders can include: asparagus, smooth brome grass, white sweet clover, yellow sweet clover, parsnip, Canada bluegrass, and Kentucky bluegrass.

Mesic Prairie - Mesic prairie occurs in an intermediate soil-moisture zone on the landscape between dry-mesic prairie and the wetland communities of wet and wet-mesic prairie. Soils can be moderately well drained but can be saturated during short periods of the growing season. Undegraded mesic tallgrass prairie is among the most species-dense plant communities in North America. Typical remnants contain from 15 to 30 species in a half-meter-square sampling quadrat. About 100 to 130 taxa of vascular plants can be found in individual small (5 acre) pioneer cemetery remnants in Illinois. About 106 acres of high-quality mesic prairie remain in the PPAA. This is the majority (58.8%) of all the high-quality prairie in the Assessment Area and 38.8% of all of the high-quality mesic prairie remaining in Illinois (Table 6), making this one of the most significant natural resources for the PPAA. The largest single remaining stand within the PPAA is located in the Grant Creek Prairie Nature Preserve in Will County where 76 acres of Grade B prairie and 28 acres of Grade C prairie are present.

Common **grass** species include big bluestem, panic grass (*Panicum oligosanthes*), prairie switchgrass, little bluestem, Indian grass, northern prairie dropseed, and porcupine grass. Common to occasional **sedge** species include copper-shouldered oval sedge, plains oval sedge, Mead's sedge, gray sedge, and common stiff sedge. Characteristic **forbs** include a diverse assemblage of species including candle anemone, prairie milkweed, butterfly weed, New England aster, white wild indigo, cream wild indigo, tall coreopsis, prairie coreopsis, prairie Indian plantain, white prairie clover, purple prairie clover, shooting star, pale purple coneflower, rattlesnake master, downy gentian, downy sunflower, prairie sunflower, bush clover, prairie blazing star, spiked lobelia, lance-leaved loosestrife, wild bergamot, American feverfew, lousewort, downy phlox, slender mountain mint, yellow coneflower, rosinweed, compass plant, prairie dock, blue-eyed grass, Missouri goldenrod, showy goldenrod, Ohio spiderwort, Missouri ironweed, Culver's root, prairie violet, and golden Alexanders. Common **shrubs** include leadplant, New Jersey tea, hazelnut, pasture rose, and prairie willow.

Two plant species listed as state endangered (one of which is also federally threatened), two listed as state threatened, and one now thought to be extirpated from Illinois are reported from this community type within the PPAA (Table 10). Buffalo clover (*Trifolium reflexum*,

state endangered) is known from Will County, and the prairie white fringed orchid (*Platanthera leucophaea*, state endangered, federally threatened) is known from Grundy and Will counties. The ear-leaved foxglove (*Tomanthera auriculata*, state threatened) occurs in Grundy and Will counties, and the prairie buttercup (*Ranunculus rhomboideus*, state threatened) has been reported from Will County but no current populations are known. Western wild lettuce (*Lactuca ludoviciana*, formerly listed as state endangered) is thought to be extirpated from Illinois but formerly was known in Will County.

Typical threats to mesic prairie remnants include agricultural expansion, off-road recreational vehicular traffic, fire absence (and consequential woody plant encroachment), soil disturbances, and exotic species invasion and establishment. Common **exotic** species in mesic tallgrass prairies, particularly those in pioneer cemeteries, include the following taxa: common yarrow, asparagus, smooth brome grass, Queen Anne's lace, cypress spurge, orange day lily, amur honeysuckle, white sweet clover, yellow sweet clover, parsnip, Canada bluegrass, Kentucky bluegrass, and white poplar. Control methods for many exotics are summarized in the Summary and Recommendations section. Evidence of leaf burn and mortality of plants at the edges of prairies bordering cropland suggests that herbicide drift can be a problem, at least to edge species, and may be an unrealized threat throughout prairie remnants where they occur adjacent to cropland. Other damage is caused by maintenance vehicles in railroad and highway rights-of-way.

Wet-Mesic Prairie - Wet-mesic (tallgrass) prairies are characterized by the presence of surface water after heavy rains, mainly in the winter and spring, and the water table is near the surface. Species composition includes many taxa found in mesic and wet prairies. The community generally is found on level ground. Several occurrences of high-quality (Grade B) examples of this type of prairie community (totaling 23 acres) are known in the PPAA. This is 18.4% of the remaining high-quality wet-mesic prairie remaining in Illinois, and so is a noteworthy natural resource of the PPAA. The largest continuous example of this prairie type is within the Goose Lake Prairie Nature Preserve, where 506 acres of Grade C quality wet-mesic prairie occurs.

Dominant plants include the **grasses** big bluestem, blue-joint grass, prairie switch grass, Indian grass, and prairie cordgrass. Other **characteristic** plants include awl-fruited sedge, hairy-fruited lake sedge, gray sedge, lance-leaved loosestrife, winged loosestrife, prairie sundrops, mild water pepper, prairie parsley, pale dock, compass plant, prairie dock, cup plant, prairie blue-eyed grass, Missouri goldenrod, Culver's root, smooth phlox, balsam groundsel, golden Alexanders, and common ironweed.

Five plant species listed as threatened or endangered by the IESPB (Table 10) have been found in the wet-mesic prairie natural community in the PPAA: western wild lettuce (*Lactuca ludoviciana*, previously listed as state endangered, now thought to be extirpated from Illinois), queen-of-the-prairie (*Filipendula rubra*, state endangered), known from Grundy County, the prairie white-fringed orchid (*Platanthera leucophaea*, state endangered, federally threatened), known from Grundy and Will counties, the grass-pink orchid

(*Calopogon tuberosus*, state endangered), known from Grundy and Will counties, and the white lady's slipper (*Cypripedium candidum*, state threatened), known from Will County.

Ecological problems in wet-mesic prairies primarily are associated with enhanced drainage from tile, fire suppression, habitat destruction, isolation, herbicide drift, overgrazing, and exotic species introduction. Fire absence can result in woody plant encroachment. **Exotic** species typical of wet-mesic prairie include smooth brome grass, white sweet clover, parsnip, reed canary grass, and curly dock.

Wet Prairie - Wet prairie often has surface water during the winter and spring and the soil typically is saturated. Species diversity is lower than in other prairie communities. Wet prairie typically is found on low areas on the landscape within larger prairie areas. There is 1.0 acre of high-quality (Grade B) wet prairie remaining in the PPAA, located in Will County, but there are an additional 470 acres of Grade C wet prairie in the Goose Lake Prairie Nature Preserve.

Dominant plants include several **graminoid species** (e.g., blue-joint grass, prairie cord grass, hairy-fruited lake sedge, gray sedge, spike rush, and Torrey's rush). Characteristic **forbs** include prairie Indian plantain, common boneset, blue flag, whorled-flower loosestrife, winged loosestrife, water smartweed, balsam groundsel, and water parsnip.

Ecological problems are similar to those for the mesic prairie and altered drainage, which probably ranks among the most serious threats.

Sand Prairie

Sand prairie communities are found on coarse-textured soils, such as sand, loamy sand, and sandy loam. Sand prairies form on sandy outwash plains and lake plains and may range in soil moisture characteristics. The communities within this subclass include *dry*, *dry-mesic*, *mesic*, *wet-mesic*, and *wet* sand prairies. No figures are available on the original acreage of sand prairies in the PPAA; all were and are limited to the Kankakee Sand Area section of the Grand Prairie Division. There are also no figures on the acreage of degraded sand prairie remnants still present. All of the five types of sand prairie are represented in the PPAA and high-quality remnants exist for all but the *dry- mesic* sand prairie (Tables 4 and 6). The total area of high-quality sand prairie is only 9.4 acres, which is 5.2% of the existing high-quality prairie in the Assessment Area.

Dry Sand Prairie - Dry sand prairies are characterized by grasses less than 1 m tall, and the soil is formed in rapidly-drained deep sand deposits with no dark A horizon. They occur on the crests of sand dune formations. Only 0.2 acres of high-quality (Grade B) dry sand prairie remain in Will County, 0.04% of the total high-quality dry sand prairie remaining in Illinois overall (Table 6).

Characteristic plants include the **grasses:** three-awned grass, fall witchgrass, mat sandbur, hairy panic grass, June grass, little bluestem, and porcupine grass. Typical **forbs** include

western ragweed, beach wormwood, flax-leaved aster, partridge pea, rough blazing star, horsemint, prickly-pear cactus, showy goldenrod, Ohio spiderwort, and birdfoot violet.

None of the T&E plant species (Table 10) found in the PPAA are known in the dry sand prairie natural community.

Ecological problems and threats include fire suppression, the commercial use of sand, disturbance from off-road vehicles, planting of non-native crops such as pine trees, melons, and rye, and the invasion of exotic species. Exotic species include cheat grass and Japanese brome. The harsh environment of the dry sand prairies tends to limit the success of exotic invasive species. However, one common result of sand disturbance is the increase in undesirable native plant species such as mat sandbur and Canada goldenrod.

Dry-Mesic Sand Prairie - Dry-mesic sand prairie is characterized by grasses and other vegetation generally taller than that of the dry sand prairie (approaching 1 m), and there is a dark A horizon in the soil. Dry-mesic sand prairies are well-drained, with slightly greater available water compared with dry sand prairie. The composition of plant species differs little between this and the dry sand prairie, but there is a greater density of vegetation in the dry-mesic sand prairie. No high quality dry-mesic sand prairie has been described within the PPAA and no information is available on its current or past extent.

Characteristic plants include the **grasses** three-awned grass, fall witchgrass, mat sandbur, hairy panic grass, June grass, little bluestem, Indian grass, and porcupine grass. Typical **forbs** include: western ragweed, beach wormwood, flax-leaved aster, partridge pea, sand milkweed, rough blazing star, horsemint, prickly-pear cactus, showy goldenrod, Ohio spiderwort, and birdfoot violet.

None of the T&E plant species (Table 10) found in the PPAA are known in the dry-mesic sand prairie natural community. Ecological problems are similar to dry sand prairie.

Mesic Sand Prairie - Mesic sand prairie, while moderately well-drained, has moisture generally available to plants. The sands are characteristically acid and have a deep A horizon. Low, widely-scattered shrubs may occur. The community typically is species-rich. About 7.8 acres of high-quality mesic sand prairie remain in the PPAA and this is 83% of the high-quality sand prairie remaining in the Assessment Area. These remnants are in southwestern Will County. This is 4.9% of the high quality mesic sand prairie known in Illinois (Table 6).

Characteristic **grasses** and **sedges** include big bluestem, panic grass (*Panicum oligosanthes)*, hairy panic grass, little bluestem, Indian grass, bead grass, sand bracted-sedge, fern flat sedge, and porcupine grass. **Forbs** include: colic root, Indian hemp, sand milkweed, tall green milkweed, western ragweed, narrow-leaved goosefoot, daisy fleabane, common peppergrass, heath aster, tall coreopsis, purple prairie clover, white prairie clover, rattlesnake master, flowering spurge, grass-leaved goldenrod, downy sunflower, western sunflower, prairie blazing star, wild bergamot, American feverfew, downy phlox, clammy

ground cherry, false dragonhead, common mountain mint, goat's rue, Ohio spiderwort, wild bean, and Culver's root. **Shrubs** include: leadplant, black chokecherry, chokeberry, New Jersey tea, dewberry, and prairie willow.

Four Illinois-listed endangered species and one threatened plant species have been reported from mesic sand prairie in the PPAA (Table 10). These are the state endangered bristly blackberry (*Rubus setosus*), known from Will County, the grass pink orchid (*Calopogon tuberosus*), known from Grundy and Will counties, the wood orchid (*Platanthera clavellata*), formerly known from Will County, and running pine (*Lycopodium clavatum*), known from Will County. The Illinois threatened ear-leaved foxglove (*Tomanthera auriculata*) is known from mesic sand prairies in Grundy and Will counties.

Ecological problems in mesic sand prairies primarily are associated with fire suppression, drainage, habitat destruction for development or agriculture, overgrazing, physical damage by off-road vehicles, and exotic species invasion. Fire absence can result in woody plant encroachment. **Exotic** species that invade sand prairies include Kentucky bluegrass, Canada bluegrass, smooth brome grass, cheat grass, meadow fescue, white sweet clover, parsnip, and curly dock. In addition, one common result of sand disturbance is the increase in undesirable native plant species such as mat sandbur and Canada goldenrod.

Wet-Mesic Sand Prairie - Wet-mesic sand prairie is characterized by the presence of surface water for short periods, and a deep, acid, dark A horizon is present. The water table may be near or at the surface for short-to-intermediate periods in some years. The mixture of species is transitional between the mesic and wet sand prairies, but is still very species-rich. Wetland grasses and sedges occur in greater frequency compared with the mesic sand prairie. Only 1.3 acres of high-quality wet-mesic sand prairie have been identified in the PPAA, which is 13.8% of the high-quality sand prairie area within the Assessment Area. This represents 3.1% of the Illinois total high-quality acreage for this community type (Table 6). Much of this community has been destroyed through drainage activities for agriculture.

Characteristic **graminoid** species (grasses, sedges, rushes) include big bluestem, blue-joint grass, sedge (*Carex lanuginosa*), common tussock sedge, savanna sedge, brown fox sedge, taperleaf flat sedge, red-rooted nut sedge, rush (*Juncus biflorus, J. brachycarpus, J. greenei),* Dudley's rush, prairie switch grass, Indian grass, and prairie cord grass. **Ferns** (and fern allies) include: common horsetail, smooth scouring rush, marsh fern, and cinnamon fern. **Forbs** include: false foxglove, water hemlock, late boneset, St. John's-wort, water smartweed, common mountain mint, and lance-leaved violet. **Shrubs** include: pale dogwood, red-osier dogwood, pussy willow, heart-leaved willow, and prairie willow.

This community type is especially significant in that it supports a large number of T&E plant species for the Prairie Parklands Assessment Area (about 10 of the 36 reported, nearly 28%, are reported in sand prairies ranging from mesic to wet). These include the state endangered bristly blackberry (*Rubus setosus*), grass pink orchid (*Calopogon tuberosus*), American burnet (*Sanguisorba canadensis*), running pine (*Lycopodium clavatum*), shore St.

John's wort (*Hypericum adpressum*), wood orchid (*Platanthera clavellata*), tubercled orchid (*Platanthera flava* var. *herbiola*), snake-mouth orchid (*Pogonia ophioglossoides*), and Carey's heartsease (*Polygonum careyi*). The Illinois threatened narrow-leaved sundew (*Drosera intermedia*) is known from excavated wet sites in Will County (Table 10). Environmental problems in wet-mesic sand prairies are similar to other sand prairie communities.

Wet Sand Prairie - Wet sand prairie is characterized by the presence of surface water for as much as one-third of the year. Some microhabitats in the community are characterized by dark organic sandy soils and may include peat accumulation. In these sites, occasionally, are plants typically found in bogs in more northern latitudes. Only 0.1 acre of high-quality (grade B) wet-mesic sand prairie has been identified in the PPAA within a single natural area. The Illinois total high-quality acreage for this community type is 163 acres (Table 6). Wet sand prairie sometimes merges gradually with other community types including wet-mesic sand prairie and sand ponds. Several of the sand prairie species cannot survive the continuously saturated soils; consequently, the species composition is not as diverse as the mesic or wet-mesic prairie. Most has been destroyed through drainage activities and cultivation for agriculture.

Characteristic plants include the **graminoid** species (grasses, sedges, rushes): blue-joint grass, sedge (*Carex lanuginosa*), common tussock sedge, red-rooted nut sedge, rush (*Juncus biflorus, J. brachycarpus, J. dudleyi)*, and prairie cord grass. **Ferns** (and fern allies) include: common horsetail, smooth scouring rush, marsh fern, and cinnamon fern. **Forbs** include: water hemlock, late boneset, whorled-flower loosestrife, St. John's-wort, pale dock, and water smartweed. **Shrubs** include: pale dogwood, pussy willow, heart-leaved willow, and prairie willow.

Five Illinois-listed endangered species and one threatened plant species (Table 10) have been reported from wet sand prairie in the PPAA. However, these taxa likely were (are) present mostly in wet-mesic to mesic sand prairie. These are the state endangered grass pink orchid (*Calopogon tuberosus*), shore St. John's wort (*Hypericum adpressum*), the tubercled orchid (*Platanthera flava* var. *herbiola*), snake-mouth orchid (*Pogonia ophioglossoides*), and Carey's heartsease (*Polygonum careyi*). The Illinois threatened false asphodel (*Tofieldia glutinosa*) was previously known in Will County (Table 10).

Environmental problems in wet sand prairies are similar to other sand prairie communities; however, fire may have been less important in this community type.

Gravel Prairie

The gravel prairie subclass includes prairies on gravelly soil. The soils are usually calcareous. Because gravel soils are very permeable, only *dry*, *dry-mesic*, and *mesic* gravel prairies are recognized in Illinois. Dry gravel prairies are not known in the vicinity of the PPAA. Dry-mesic and mesic gravel prairies have not been identified within the PPAA but

may have occurred, and examples of each are known nearby in Cook County near LaGrange and east of Chicago Ridge within the mapped area (Figure 3).

Dry-Mesic Gravel Prairie - Dry-mesic gravel prairies may be found on lower slopes of glacial kames and eskers and on the slopes of gravel terraces along major rivers. None have been identified within the PPAA, but degraded remnants may occur in the Northeastern Morainal Division portion in Cook and Will counties. One high-quality (Grades A and B) remnant is known near LaGrange nearby the PPAA. About 43.5 acres of high-quality dry-mesic gravel prairie occur in Illinois (White 1978).

Characteristic and dominant plants in this community include the **grasses:** little bluestem, Indian grass, northern prairie dropseed, and porcupine grass and the **forbs:** few-flowered goldenrod, scurf-pea, small skullcap, stiff sandwort, and yellow puccoon.

This community may support populations of the state endangered prairie buttercup (*Ranunculus rhomboideus*), the state endangered Tennessee milk vetch (*Astragalus tennesseensis*), thought to be locally extirpated, and the state threatened Hill's thistle (*Cirsium hillii*).

Environmental threats to this plant community include the quarrying of gravel for industrial use, fire absence, overgrazing by livestock, residential and commercial development, and exotic species invasion. Fire absence leads to woody encroachment (especially by the native trees black walnut, honey locust, eastern red cedar, and oaks and the native shrubs rough-leaved dogwood, common blackberry, and smooth sumac). Certain **exotic** species have increased and threaten the integrity of the prairies; most are thorny species avoided by livestock, grasses and forbs introduced for livestock, or aggressive opportunistic weeds. These exotic species include the **grasses:** smooth brome grass, Canada bluegrass, Kentucky bluegrass, and meadow fescue, the **shrubs:** autumn olive, glossy buckthorn, amur honeysuckle, and tartarian honeysuckle, and the **herbs:** white sweet clover, yellow sweet clover, woolly mullein, and bull thistle.

Mesic Gravel Prairie - Mesic gravel prairies may be found on valley deposits in low-lying areas. Soil moisture is relatively high because of the low topographic position. The grass height and plant diversity approach that of the mesic prairie. No remnants of this prairie type have been identified within the PPAA, but degraded remnants may occur in the Northeastern Morainal Division portion in Cook and Will counties. One high-quality (Grades A and B) remnant is known near LaGrange nearby in Cook County. Only 18.6 acres of high-quality mesic gravel prairie remain in Illinois.

Characteristic or dominant plants in the mesic gravel prairie include the **grasses** big bluestem, Indian grass, and northern prairie dropseed, and the **forbs** low calamint and common valerian. This community may support populations of the state endangered prairie buttercup (*Ranunculus rhomboideus*), formerly known in Will County. Environmental threats to this plant community are essentially the same as those for the dry-mesic gravel prairie, above.

Dolomite Prairie

Dolomite prairies occur where dolomite (a form of limestone), usually less than a few feet below the soil surface, strongly influences soil chemistry, permeability, and drainage. Dolomite prairies typically are calcareous habitats (soils and bedrock are basic with high pH) ranging in soil-moisture conditions. The following natural community types are recognized in Illinois: *dry, dry-mesic, mesic, wet-mesic,* and *wet dolomite prairie.* Typical dolomite prairies are a patchwork of all of these community types because of variable local conditions. All of these may occur within the Assessment Area as degraded remnants, but only four acres of *dry-mesic* dolomite prairie are high-quality, relatively undegraded natural areas in the PPAA (Table 6). Sites with high pH and shallow soils sometimes have relatively low species richness because the harsh environmental conditions limit the number of species. Those present are primarily calcium-loving species (calciphiles) and include some listed as threatened or endangered (Table 10). Dolomite prairies occur only locally in the PPAA, particularly near the Des Plaines and Kankakee rivers. About 42 acres of high-quality dolomite prairie remain in Illinois.

Dry Dolomite Prairie - Dry dolomite prairies occur where dolomite bedrock is at or near the surface and where soil is extremely shallow to absent. Patches of dolomite pavement are common and grasses and other herbs generally are less than three feet tall. The community is known from areas along the lower Des Plaines and Kankakee rivers, and high-quality remnants exist nearby in Kankakee County. No high-quality dry dolomite prairie has been identified within the PPAA, but there are several degraded remnants. About 11 acres of high-quality dry dolomite prairie exist in Illinois.

Representative species found in the dry dolomite prairies include the **grasses**: little bluestem, side-oats grama, prairie satin grass, tufted hair grass, and prairie switchgrass, and the **forbs**: low calamint, false pennyroyal, hairy beardtongue, yellow puccoon, nodding wild onion, field goldenrod, pagoda plant, false boneset, and hairy ruellia.

Four plant species listed as threatened or endangered by the IESPB may be found in the dry dolomite prairie natural community in the PPAA (Table 10). These include the state endangered Butler's quillwort (*Isoetes butleri*), known from Will County, false mallow (*Malvastrum hispidum*), known from Grundy and Will counties, and the Tennesee milk vetch (*Astragalus tennesseensis*), formerly known from Grundy and Will counties but thought to be locally extinct. The state threatened slender sandwort (*Arenaria patula*) is known in Grundy, Will, and Cook counties.

Environmental problems in this community type include quarrying, landfill and waste disposal, facility construction, overgrazing, and physical damage by off-road vehicles. The plant community is vulnerable due to the shallow soils and can be disturbed by soil scraping activities or addition of sediment on top of the existing shallow soils. Other problems include fire absence and exotic species invasion. Some of the significant **exotic** species that degrade this natural community are Canada bluegrass, Kentucky bluegrass, common St. John's-wort, and woolly mullein.

Dry-Mesic Dolomite Prairie - In the dry-mesic dolomite prairie the soil is slightly deeper over the bedrock than in the dry dolomite prairie, and the prairie is relatively lower in position allowing slightly more water retention in the soil. Grass height is taller and the diversity is generally greater. About four acres of grade B high-quality dry-mesic dolomite prairie are known within the Assessment Area, in the Des Plaines State Conservation Area, an area of great botanical significance (Figure 10). This is about half the total high-quality dry-mesic dolomite prairie known to exist in Illinois, making this one of the most significant natural community resources in the Assessment Area.

Representative species found in the dry-mesic dolomite prairies include the **grasses**: little bluestem, side-oats grama, prairie satin grass, tufted hair grass, porcupine grass, panic grass (*Panicum oligosanthes*), and prairie switchgrass, and the **forbs**: low calamint, bastard toadflax, Indian hemp, heath aster, Illinois bundleflower, marbleseed, purple prairie clover, small skullcap, narrow-leaved vervain, prairie sunflower, false pennyroyal, hairy beardtongue, yellow puccoon, nodding wild onion, field goldenrod, pagoda plant, false boneset, and hairy ruellia.

Seven plant species listed as threatened or endangered by the IESPB, including one that is federally endangered, may be found in the dry-mesic dolomite prairie natural community in the PPAA (Table 10). These include the state and federally endangered leafy prairie clover (*Dalea foliosa*), the state endangered Butler's quillwort (*Isoetes butleri*), the false mallow (*Malvastrum hispidum*), buffalo clover (*Trifolium reflexum*), and the Tennessee milk vetch (*Astragalus tennesseensis*). Western wild lettuce (*Lactuca ludoviciana*, formerly listed as state endangered) is thought to be extirpated in Illinois but was formerly known in Will County associated with dry-mesic dolomite prairie species. The state threatened slender sandwort (*Arenaria patula*) also occurs in this habitat type. Environmental problems in this community type are similar to dry dolomite prairie.

Mesic Dolomite Prairie - Mesic dolomite prairie generally has soils greater than one foot deep over the dolomite bedrock. As the bedrock depth increases, the natural community intergrades with mesic prairie, but deeply rooted forbs such as prairie dock and white wild indigo are absent from mesic dolomite prairie. Only four acres of high-quality mesic dolomite prairie, none of which are within the Assessment Area, are known to exist in Illinois. All are located along the lower Des Plaines and Kankakee river valleys.

Representative species found in the mesic dolomite prairies include the **grasses**: big bluestem, panic grass (*Panicum oligosanthes*), prairie switchgrass, Indian grass, northern prairie dropseed, little bluestem, porcupine grass, and the **forbs**: bastard toadflax, Indian hemp, heath aster, Illinois bundleflower, marbleseed, purple prairie clover, small skullcap, narrow-leaved vervain, prairie sunflower, nodding wild onion, and candle anemone. **Shrubs** may include lead plant and New Jersey tea.

None of the plant species listed as threatened or endangered by the IESPB currently are known in the mesic dolomite prairie natural community in the PPAA. Several T&E species found in the dry-mesic dolomite prairies also may occur in mesic dolomite prairie.

Environmental problems in this community type are similar to dry and dry-mesic prairie but include a greater problem of woody plant encroachment with fire absence. An additional problem can be created from either drainage and excavation which can alter the hydrology of the site.

Wet-Mesic Dolomite Prairie - Wet-mesic dolomite prairies have a soil depth to bedrock usually greater than one foot. Surface water is present for periods throughout the year. Fens may associate with this vegetation community if there is a dependable groundwater source and peat-forming processes occur. About 14 acres of high-quality wet-mesic dolomite prairie are known in Illinois in the Morainal Section of the Northeastern Morainal Natural Division, but none of these are within the PPAA; however, degraded remnants may be present.

Characteristic plant species found in the wet-mesic dolomite prairies include the **grasses**: little bluestem, blue-joint grass, tufted hair grass, Indian grass, and prairie cord grass, and the **forbs**: Ohio goldenrod, Riddell's goldenrod, Crawe's sedge, brown fox sedge, prairie parsnip, and spike rush.

None of the plant species listed as threatened or endangered by the IESPB are currently known in the wet-mesic dolomite prairie natural community in the PPAA. Environmental problems in this community type are essentially the same as those in the mesic dolomite prairie community.

Wet Dolomite Prairie- Wet dolomite prairies are rare communities in which the soil is relatively shallow, but usually saturated and surface water often is present. When the saturated soil is deeper over bedrock a sedge meadow community normally occurs. About five acres of wet dolomite prairie are known in Illinois in the Morainal Section of the Northeastern Morainal Natural Division, but none of these are within the PPAA. Somewhat degraded remnants may be present in the PPAA.

Characteristic plant species found in the wet dolomite prairies include the **grasses**: blue-joint grass, tufted hair grass, and prairie cord grass, and the **forbs**: Ohio goldenrod, Riddell's goldenrod, brown fox sedge, spike rush, and prairie Indian plantain.

None of the plant species listed as threatened or endangered by the IESPB currently are known in the wet dolomite prairie natural community in the PPAA. Environmental problems in this community type are similar to those in the mesic dolomite prairie community.

Hill Prairie

Hill prairies typically occur on slopes with exposures to the south or west. Soil moisture conditions are usually very dry on these well-drained sites. The classification of hill prairies is based upon substrate type rather than soil moisture variation. *Loess, glacial-*

drift, *gravel*, and *sand* hill prairies have been recognized in Illinois (White and Madany 1978). In the PPAA only glacial-drift hill prairies have been described, but gravel hill prairies may also occur (they are known from the Morainal Section of the Northeastern Morainal Natural Division). The flora of glacial-drift hill prairies in this region is similar to that of the gravel hill prairies. Because of this similarity and the lack of known examples in the PPAA, the gravel hill prairies have not been further described here. About 6.3 acres of high-quality hill prairies remain in the Assessment Area; this is about 3.5% of all of the remaining high-quality prairie in the PPAA.

Hill prairies often occur as openings within forested uplands. During long periods of fire absence, hill prairies often decline in area and many have been eliminated or severely reduced in size due to the encroachment of woody plants (McClain 1983, Robertson et al. 1995).

Glacial-Drift Hill Prairie - These hill prairies occur on eroded glacial drift, especially where a river valley cuts through glacial deposits resulting in deep, steep-sided slopes along drainages. Because of the steep slopes of these hill prairies, most have not been converted to agriculture. Instead, grazing or development has been their primary use. A total of 6.3 acres of high-quality (Grades A and B) glacial-drift hill prairie remains at four sites in the Prairie Parklands Assessment Area (Table 6) in Grundy and La Salle counties. This is 18.5% of all of the high-quality glacial-drift hill prairie remaining in Illinois (about 34 acres are known in the state), making this a significant natural resource in the area. Typical composition is listed below.

Common to occasional **grasses** include big bluestem, side-oats grama, Scribner's panic grass, June grass, little bluestem, rough dropseed, northern prairie dropseed, purpletop, and Indian grass. Characteristic **non-grass herbs** include candle anemone, little pussy toes, green milkweed, sky-blue aster, heath aster, aromatic aster, silky aster, false boneset, Mead's sedge, sand bracted sedge, umbrella sedge, purple prairie clover, white prairie clover, Illinois bundleflower, bastard toadflax, pale purple coneflower, daisy fleabane, flowering spurge, bush clover, grooved yellow flax, rough blazing star, yellow puccoon, spiked lobelia, marbleseed, prairie beardtongue, prairie alumroot, cleft phlox, scurf-pea, hairy mountain mint, blue-eyed grass, common prairie goldenrod, field goldenrod, Missouri goldenrod, and prairie violet. **Woody vines** include bittersweet. Occasional **shrubs** include leadplant, New Jersey tea, wafer ash, aromatic sumac, and smooth sumac. Eastern red cedar and white ash are occasional **trees**.

Two state threatened plant species, Hill's thistle (*Cirsium hillii*), and the prairie buttercup (*Ranunculus rhomboideus*) have been reported from glacial-drift hill prairies of the Assessment Area but are not currently known in the high-quality remnants remaining (Table 10). Ecological problems in glacial-drift hill prairies include fire absence, overgrazing by livestock, residential and commercial development, and exotic species invasion. Fire absence appears to be the most serious threat. Woody encroachment (especially by the native trees black walnut, honey locust, eastern red cedar, white ash, and oaks and the native shrubs common blackberry, gray dogwood, and smooth sumac) during periods of fire

absence, especially along their perimeters, reduces the prairie area. As hill prairies decline in area, the species diversity likewise declines (Robertson et al. 1995). The use of prescribed burning has been very effective throughout Illinois and the Midwest in restoring hill prairie communities. Overgrazing by livestock not only eliminates certain native grasses and herbs, but causes severe mechanical damage to slopes increasing erosion and resulting in loss of soil and habitat for the prairie species. Certain exotic species have increased and threaten the integrity of the hill prairies; most are thorny species avoided by livestock, grasses and forbs introduced for livestock, or aggressive opportunistic weeds. These **exotic** species include the **trees**: tree-of-heaven and Siberian elm, the **grasses**: smooth brome grass, Canada bluegrass, Kentucky bluegrass, and meadow fescue, the **shrubs**: autumn olive, common buckthorn, amur honeysuckle, and tartarian honeysuckle, the **vine**: Japanese honeysuckle, and the **herbs**: white sweet clover, yellow sweet clover, woolly mullein, and bull thistle.

Shrub Prairie

Shrub prairies are characterized by the co-dominance of shrubs and prairie grasses. Only one natural community type is recognized within this prairie subclass, the *shrub prairie* itself. Typically, shrub prairies occur in mesic to wet-mesic sites on acid, sandy soils. Shrub prairie can intergrade with mesic and wet-mesic sand prairies because the only essential difference is in the presence of native shrubs, and it can also intergrade with dry-mesic and mesic sand savannas which differ primarily in the tree component. Mosses (especially the haircap moss, *Polytrichum*) may form a nearly continuous groundcover in many shrub prairie remnants. The community is limited to northern Illinois, and occurs in the Kankakee Sand Area and Chicago Lake Plain; the former area is well represented in the PPAA in Grundy, Kankakee and Will counties.

Shrub Prairie - Characteristics of this natural plant community are those of the subclass, described above. There are about 27 acres of grade B shrub prairie in the PPAA, about 45% of the high-quality shrub prairie remaining in Illinois (Table 6), and so this is one of the most significant natural community resources within the Assessment Area.

Characteristic plants in the shrub prairie include the **shrubs**: black chokecherry, chokeberry, dwarf sumac, black huckleberry, swamp dewberry (a trailing 'shrub'), hardhack, meadowsweet, and low-bush blueberry. Common **grasses** include big bluestem, little bluestem, blue-joint grass (in wetter sites) and Indian grass. **Forbs** include lance- leaved violet, beach wormwood, bush clover, spreading dogbane, Canada hawkweed, common cinquefoil, narrow-leaved dayflower and the **mosses**: haircap moss and peat moss.

Five plant species listed as threatened or endangered by the IESPB (Table 10) are known in the shrub prairie natural community in the PPAA. These include the state endangered running pine (*Lycopodium clavatum*), the bristly blackberry (*Rubus setosus*), the shore St. John's-wort (*Hypericum adpressum*), and the tubercled orchid (*Platanthera flava* var. *herbiola*), all known from Will County. The state threatened narrow-leaved sundew (*Drosera intermedia*), is known from Grundy and Will counties.

Environmental problems in shrub prairies primarily are associated with fire suppression, drainage, habitat destruction for agriculture, overgrazing, physical damage by off-road recreational vehicles, and, to a lesser extent, with the introduction of exotic species. Fire absence can result in woody plant dominance that can eliminate the prairie species and the T&E species. **Exotic** species that may invade shrub prairies include Kentucky bluegrass, smooth brome grass, meadow fescue, white sweet clover, parsnip, Siberian elm, and curly dock.

Savanna

Savannas are characterized by scattered, open-grown trees, with or without shrubs, and a continuous herbaceous ground cover typically dominated by graminoid species (grasses and sedges) and numerous forbs. Savanna habitats occur throughout many parts of North America. The Midwest, located between the eastern forests and the grasslands of the Great Plains, has the environmental conditions and fire history that supported many savanna-like habitats (Anderson 1983, Taft 1997). The density and percent cover of trees varies and is intermediate between open prairie and closed woodland or forest; the canopy cover is less than 80% but greater than 10%. In the dissected terrain of major river valleys, savannas often occurred associated with a mixture of vegetation types including prairie, woodland, and forest. Midwestern savanna-like habitats have several unifying characteristics. These include: 1) open-canopied structure (relative to closed forest); 2) canopy dominance by a few species of oaks; 3) a groundcover usually rich in species associated with tallgrass prairie; 4) a majority of floristic diversity contained in the groundcover; and 5) dependence on fire and other disturbances for maintenance of diversity and stability. In a period of a few decades of fire absence, savannas in the Midwest were altered through vegetational changes and habitat destruction. There was a rapid conversion of open savanna to closed woodland and forest. The once widespread oak savannas have become among the rarest plant communities because of, in major part, the cessation of fires (e.g., Curtis 1959, White 1978, Nelson 1985). Presently in the Midwest former savanna and open-woodland areas can still be recognized locally by the open-grown form and low density of many of the oldest trees in closed woodland. Some small remnants persist where woody encroachment has been retarded (though not stopped) by droughty edaphic conditions. In addition, many savanna-like areas have been structurally maintained by livestock grazing. However, typically, under these circumstances the groundcover is dominated by non-native species.

Three savanna subclasses are recognized in Illinois: **savanna** (generally on fine-textured soils), **sand savanna,** and **barrens** (local inclusions of a prairie flora within an otherwise forested landscape; White and Madany 1978). Savanna subclasses are further distinguished to community type by soil-moisture characteristics. The savanna (*dry-mesic* and *mesic savanna* communities) and barrens (*dry-mesic barrens* community) subclasses have not been included within this report, though both have been described within the Assessment Area within the Hickory Creek Barrens Nature Preserve. Many sites described as barrens or savannas are difficult to distinguish from hill prairies or other prairie types that are losing their integrity because of tree and shrub encroachment. These communities are dynamic.

While high-quality savannas on fine-textured soils may have occurred in the PPAA prior to settlement, only high-quality *dry sand savannas* and *dry-mesic sand savannas* are known from the area today. These communities sometimes merge imperceptibly with open sand forest and sand prairie habitats.

Compared with other habitat types, relatively few threatened and endangered plant species appear to be dependent on savanna habitats. Floristically, savannas contain species of both prairie and open woodlands, though many taxa appear to reach their greatest frequency in transitional (ecotonal) areas such as savannas. Fire absence, fragmentation, habitat degradation (in particular, heavy grazing), and exotic species are primary ecological problems associated with savanna habitats. Areas of former savanna, and possibly barrens, may occur in the PPAA that could be restored or at least rehabilitated with vegetation management. The following community descriptions are generalized depictions of the (former) undegraded condition.

Sand Savanna

As the name implies, the soils in this community subclass are sandy. They sometimes are associated with dune and swale topography, either on ancient dunes or beach ridges. The undulating topography may have limited the severity of fires and allowed a savanna to develop instead of a sand prairie. The predominant tree on the local savannas is black oak, and, for this reason, the plant community is sometimes called the black oak savanna. The herbaceous cover is similar to that of sand and shrub prairies, and the community types can intergrade. A total of 84 acres of high-quality (Grades A and B) sand savanna remain in the PPAA (Table 6). This is about 6.8% of the high-quality sand savanna known in Illinois (1,232 acres total), most of which is located in the Kankakee River Assessment Area (Hill 1998). Sand savannas in the PPAA are restricted to the Kankakee Sand Area Section of the Grand Prairie Division (Figure 3).

Dry Sand Savanna - This community is found on the crests of the highest sand dunes. There is little or no dark A soil horizon present. Grasses and other herbaceous vegetation generally are shorter than three feet, and the plant diversity often is low. No high-quality (Grades A and B) dry sand savanna is known within the Assessment Area, but degraded remnants probably are present. An area of high-quality dry sand savanna occurs nearby the PPAA, near St. Anne in Kankakee County, within the mapped area (Figure 3).

Characteristic plants include the dominant **tree**: black oak, **graminoid** species poverty oat grass, June grass, little bluestem, porcupine grass, and Pennsylvania sedge. **Forbs** include partridge pea, narrow-leaved dayflower, Ohio spiderwort, prairie coreopsis, grass-leaved goldenrod, flax-leaved aster, rough blazing-star, bracken fern, hairy hawkweed, Canada hawkweed, wild lupine, horsemint, cleft phlox, and goat's rue. **Shrubs** include smooth sumac, dwarf sumac, aromatic sumac, and dewberry.

Two state threatened plant species may occur in the dry sand savanna natural community in the PPAA (Table 10); these are savanna blazing star (*Liatris scariosa* var. *nieuwlandii*) and ear-leafed foxglove (*Tomanthera auriculata*). Ecological problems in dry sand savannas include fire absence, habitat fragmentation, habitat degradation (in particular, heavy grazing), and exotic species introduction. Off-road recreational vehicles and the commercial use of sand also threaten this community, as they do most sand communities.

Dry-Mesic Sand Savanna - This community type typically occurs on a lower topographic position compared with dry sand savanna, and often on northern or eastern dune slopes. Compared with dry sand savanna, a darker A soil horizon generally develops and plant diversity is somewhat greater. A total of 84 acres of Grade B high-quality dry-mesic sand savanna occur within the PPAA (Table 6). This is about 16% of all of the high-quality dry-mesic sand savanna in Illinois.

Characteristic plants include the dominant **trees**: white oak, bur oak, black oak, and the **graminoid** species: little bluestem, Indian grass, porcupine grass, and Pennsylvania sedge. **Forbs** include flax-leaved aster, clammy false foxglove, and wild lupine. **Shrubs** can include New Jersey tea, smooth sumac, common blackberry, prairie willow, and low-bush blueberry.

Three state threatened or endangered plant species may occur in the dry sand savanna natural community in the PPAA (Table 10). These are the state endangered buffalo clover (*Trifolium reflexum*), and the state threatened savanna blazing star (*Liatris scariosa* var. *nieuwlandii*) and ear-leafed foxglove (*Tomanthera auriculata*). Ecological problems are as described for the dry sand savanna.

Wetland

The wetland community class includes natural communities that are flooded or have hydric soils and that also have a vegetative cover. There are about 22,247 acres of wetland within the PPAA (including forested wetlands, described previously), or about 2.4% of the total area (Table 3). The wetland community subclasses in Illinois, following the natural community classification of White and Madany (1978), include **marsh, swamp, bog, fen, sedge meadow, panne,** and **seep and spring**. Lake and Pond and Stream classes are open-water habitats described later. Wetlands in the PPAA are concentrated along the major river corridors, and are predominant near the confluence of the three major rivers in Grundy and Will counties (Figure 8). A total of 58 acres of the non-forested wetlands considered here within the PPAA have been identified as high-quality (Grades A and B) natural areas (Table 6).

Marsh

Marshes are palustrine wetlands characterized by having water at or near the surface during most of the growing season, dominance by herbaceous vegetation, with organic or mineral

soils (White and Madany 1978). Two marsh community types are recognized in Illinois: *marsh* and *brackish marsh.* Only *marsh* is found in the PPAA, although the only known brackish marsh in Illinois occurs at the western boundary of the Assessment Area near Starved Rock State Park. Community structure is controlled largely by water depth. Shallow-water zones are dominated by emergent, rooted herbaceous vegetation. In deeper-water zones, floating aquatics become more prominent and open water is prominent. In transitional zones a combination of these species exists and vegetation cover is intermediate between deep and shallow-water zones. Shores of marshes often are dominated by superior competitors such as cattail and common reed.

Marsh - Marshes in northeastern Illinois often co-occur with sedge meadow, wet prairie, and sometimes seep, shrub swamp, and open-water pond communities. These community types often gradually merge; consequently, distinguishing community boundaries can be somewhat arbitrary. In general, certain species signal each community type with cordgrass suggesting wet prairie, tussock sedge suggesting sedge meadow, marsh marigold, swamp wood betony, and sometimes the sedge *Carex sterilis* suggesting seep, buttonbush and willows suggesting shrub swamp, and presence of cattail, rice cut-grass, and common water plantain (and low abundance or absence of signal species for other community types) indicating marsh. However, an interpretation of natural community type based solely on these general indicator species must be done with caution. About 7,735 acres of emergent marsh (34% of the wetland area) is present within the PPAA (Table 3); however, an unknown proportion of this acreage includes sedge meadow and fen communities (described below). About 6.0 acres of the marsh vegetation is recognized by the INAI as high-quality (Grade B), or 0.06% of the wetland area (Table 6). This is only 0.3% of the high-quality marsh acreage known in all of Illinois.

Characteristic **grasses and grasslike** species include the **grasses**: prairie cord grass, blue-joint grass, barnyard grass, common reed, fowl manna grass, and rice cutgrass, the **rushes**: Dudley's rush, and soft rush, and the **sedges**: meadow sedge, common lake sedge, common fox sedge, spike rush, American bulrush, bulrush, river bulrush, and red bulrush. Common **forbs** include long-leaved ammannia, swamp milkweed, panicled aster, blue flag, swamp loosestrife, water hemlock, ditch stonecrop, common arrowhead, marsh skullcap, frog-fruit, water smartweed, dotted smartweed, sneezeweed, duckweed, swamp dock, common bur reed, narrow-leaved cattail, common cattail, common water plantain, marsh purslane, false aster, mermaid weed, fragrant water lily, American lotus, cursed crowfoot, tooth-cup, blue vervain, and Missouri ironweed. **Trees** commonly found in the vicinity of marshes include silver maple, green ash, cottonwood, sandbar willow, black willow, and peach-leaved willow all of which are tolerant of periodic inundation.

One plant species listed as endangered by the IESPB, the seaside crowfoot (*Ranunculus cymbalaria*), may still occur in or at the margins of marsh habitats in the PPAA (Table 10). Other T&E species are known from wet areas in the PPAA, but these generally are not described as marshes. Ecological problems in marshes include siltation, runoff of agricultural nutrients, altered flooding regimes, invasion of exotic species (though few in number), and an overabundance of aggressive, disturbance-tolerant species. When changes

in flooding dynamics result in increased frequency and/or duration of flooding, species intolerant of the new levels will decline and species tolerant of the new levels will increase. Compared with upland habitats, relatively few exotic species are present in wetland communities (Havera et al. 1994). **Exotic** species which have caused ecological problems in local marshes include reed canary grass and purple loosestrife. Native species which become aggressive under conditions of siltation, agricultural fertilizer runoff, and increased flooding often include the common reed, river bulrush, and common cattail.

Brackish Marsh - The brackish marsh is a rare natural community restricted to salty seepage areas. They are known only from a short segment of river bluff upstream from Starved Rock just west of the Assessment Area but on the western margin of the mapped area. Some artificial wetlands that have brackish marsh species as well as exotic salt tolerant species are found, in increasing numbers, along highways because of salt runoff from the pavement. These, however, are not natural communities. No remnants of this community are known within the PPAA, but the close proximity of existing examples suggests that they may occur. This community is not distinguished in Appendix 1.

Characteristic species include the **grass**: prairie cord grass, the **sedges**: American bulrush and spike rush, the **forb**: common cattail, and the weak **shrub**: swamp rose mallow. Only a limited number of native species can tolerate salty conditions.

One state endangered plant species, the alkali bulrush (*Scirpus paludosus*) is known from brackish marsh habitat. However, though listed as state endangered, this species has actually increased in numbers along disturbed highway wetlands, and is considered to be introduced within the PPAA. Few T&E species have increased their ranges in recent years in this manner. Ecological threats to this habitat include siltation, change in hydrology (especially drainage), fire suppression, and exotic species invasion. Several salt-tolerant species **exotic** species have become common in northeastern Illinois because of the common winter use of salt on the highways. These include saltmarsh aster, fat-hen saltbush, salt meadow grass, alkali grass, seaside goldenrod, lesser salt spurrey, and sea blite.

Swamp

This community subclass includes two semi-permanently flooded natural communities dominated by woody plants. The two communities are recognized on the basis of vegetation structure. These are *swamp* and *shrub swamp* (White and Madany 1978). Swamps are dominated by trees and are restricted to far southern Illinois in the Coastal Plain Natural Division; shrub swamps are shrub dominated and remnants are known within the PPAA.

Shrub Swamp - A shrub swamp is a wetland with at least 50% cover of shrubs (White and Madany 1978). A similar community with less shrub coverage would be assigned to the *pond* community. The combination of the Illinois Wetland Inventory categories shrub/scrub wetlands and "swamps" (Table 3) reveals that there are about 711 acres of shrub swamp

wetland in the PPAA. This is 7.0% of the non-forested wetland acreage, and 0.75% of the entire land cover in the Assessment Area. No high-quality (Grades A or B) shrub swamp remnants occur in the Assessment Area, but examples of Grade C shrub swamp are present, and at least one example of Grade A shrub swamp is known near the PPAA in Will County.

The plant species composition includes many grasses, sedges and forbs from the marsh community (Appendix I, and above). However, **shrubs** are dominant and include false indigo bush, buttonbush, pale dogwood, gray dogwood, black willow, elderberry, swamp rose, and heart-leaved willow. The aquatic **herbs** fragrant water lily and several species of pondweed are common in more open water.

Two plant species listed as endangered by the IESPB have been found in the shrub swamp natural community and may occur in this community in the PPAA. These are the state endangered tubercled orchid (*Platanthera flava* var. *herbiola*), and the state threatened arbor vitae (*Thuja occidentalis*) both known historically from Will County in calcareous swamps. Ecological problems are the same as those in the marsh community type described above.

Fen

The wetland subclass known as fen is characterized by peat accumulation with calcareous seepage, and most tend to have a pronounced slope. They often are closely associated with calcareous gravelly moraines and occur in both lake basins and stream valleys. Fens often include areas of spring runs, calcareous seeps, sedge meadows, and marshes. The five fen community types recognized in Illinois are restricted to the northern third of Illinois, extending down the Illinois river valley. These five communities include *calcareous floating mat*, *graminoid fen*, *low shrub fen*, *tall shrub fen*, and the *forested fen*. No high-quality (Grades A or B) fens have been identified within the Assessment Area, but one high-quality example of a *graminoid fen* is located nearby in Cook County near Palos Hills within the mapped area. Degraded fens may occur in the PPAA, and the species typical of fens do occur within the Assessment Area, and these have been indicated in Appendix 1.

Graminoid Fen - A graminoid fen is a natural community characterized by sloping peat at the edge of a moraine or as a raised island in a marsh or sedge meadow. Fens are sustained by a constant flow of calcareous artesian groundwater. The plant diversity can be rich and include many unique species. The dominant species often are grasses or sedges found in mesic prairie or sedge meadows. No high-quality graminoid fens are known within the PPAA.

Characteristic **grasses** include big bluestem, little bluestem, Indian grass, northern prairie dropseed, and marsh wild timothy. **Sedges** generally include Hayden's sedge, sterile sedge, and porcupine sedge. **Forbs** include marsh blazing star, Kalm's lobelia, whorled-flower loosestrife, grass-of-parnassus, fen thistle, swamp wood betony, bog goldenrod, Ohio goldenrod, and Riddell's goldenrod.

Fens are generally rich in T&E plant species and contain seven Illinois-listed plant species among fen remnants in the PPAA (Table 10). The fens can include the state endangered American burnet (*Sanguisorba canadensis*), known from Will County within 1 mile of the PPAA, grass pink orchid (*Calopogon tuberosus*), Queen-of-the-prairie (*Filipendula rubra*), and the snake-mouth orchid (*Pogonia ophioglossoides*). State threatened species in this community can include the false asphodel (*Tofieldia glutinosa*), arbor vitae (*Thuja occidentalis*), and the white lady's-slipper (*Cypripedium candidum*). An Illinois watch list species, sweet Indian plantain (*Cacalia suaveolens*), may also occur in the PPAA in Will County.

Ecological problems in fens are similar to those in marshes and include siltation, runoff of agricultural nutrients, altered flooding regimes, invasion of exotic species, and an overabundance of aggressive, disturbance-tolerant native species. Changes in flooding dynamics are generally not as problematic as in marshes, but drainage and impoundment continues to be a problem. **Exotic** species in local fens include reed canary grass and possibly purple loosestrife. Native species which become aggressive and can destroy a fen under conditions of siltation, agricultural fertilizer runoff, and increased flooding can include common reed, river bulrush, and common cattail.

Sedge Meadow

Only one natural community type occurs within this wetland subclass, the *sedge meadow*.

Sedge Meadow - A sedge meadow is a wetland dominated by sedges (e.g. *Carex* spp.) on peat, muck, or mineral soils. There is some floristic overlap between this and the wet prairie, wet dolomite prairie, and the graminoid fen communities due to the abundance of water as well as the exposure to full sunlight. A total of 47 acres of Grade B high-quality sedge meadow are known within the PPAA (Table 6). This is 6.8% of the high-quality sedge meadow acreage known from Illinois.

Plants include the characteristically dominant **sedges**: common tussock sedge, common lake sedge, as well as other sedges (e.g. *Carex lanuginosa, C. sartwellii, Eleocharis* spp.), the **grasses**: blue-joint grass and prairie cord grass, and the **forbs**: swamp aster, white turtlehead, bog willow herb, spotted Joe-Pye-weed, rough avens, rushes, common mountain mint, and marsh St. John's wort.

None of the Illinois-listed T&E plant species listed in Table 10 presently are known from sedge meadows in the PPAA. Ecological threats to sedge meadows are similar to those for fens.

Seep and Spring

The Seep and Spring wetland subclass includes the following natural communities distinguished by degree of water flow and type of substrate: *seep, acid gravel seep,*

calcareous seep, sand seep, and the *spring community* (White and Madany 1978). These communities are wetland communities characterized by a constant diffuse flow of groundwater where the water table comes to the surface, typically at the lower portions of slopes of glacial moraines, ravines, and terraces. Seeps are characterized by a diffuse water flow. Springs are characterized by a concentrated area of water flow from a distinct orifice. The water chemistry of the ground water controls species composition to some extent and is influenced by the material it flows through. A tree cover is often present at seeps. In Illinois the five different natural communities are further characterized as follows: *seeps* are circumneutral and occur where the ground water is not strongly influenced by bedrock or parent material chemistry; *acid (gravel) seeps* occur associated with sandstone bedrock or gravel; *calcareous seeps* occur where the ground water is mineralized by alkaline bedrock (e.g., limestone) and/or soil parent materials like glacial drift; *sand seeps* emerge from sand deposits and may be calcareous, acid, or neutral; and *spring communities* occur where a channel is formed.

In Appendix 1, seep and spring plants have not been distinguished. The presence of selected species such as yellow bartonia and the *Osmunda* ferns suggest that some remnant seeps in the Assessment Area have acid conditions, and the occurrence of the calciphiles false asphodel (historically) and grass-of-Parnassus indicates that some are calcareous. Most seep and spring species are not limited to this habitat, and generally include components from adjacent wetland habitats. Only seeps are known from within the PPAA. The spring community may also occur, but no high-quality examples are known within the Assessment Area; however, one high-quality spring is known within the mapped area near Romeoville in Will County (Table 5, within Romeoville Prairie Natural Area).

Seep - The seep community is the typical common seep characterized by circumneutral water, and it is commonly found on the lower slopes of glacial moraines, ravines and terraces. In the PPAA, 5 acres of high-quality (Grade B) seeps are present (INAI database, Table 6), and additional small remnants may occur in forested ravines. This represents 5.3% of the recorded acreage of high-quality seeps in all of Illinois.

Among the plants characteristic of seeps are the **grass** fowl manna grass, the **sedges** Emory's sedge and porcupine sedge, the **forbs** skunk cabbage, marsh marigold, spotted touch-me-not, cowslip, clearweed, angelica, and water parsnip, the **shrub** pale dogwood, and the **trees** black ash and box elder.

Six plant species listed as threatened, endangered, or included on the watch list by the IESPB are known to occur or to have once occurred in and around seeps in the PPAA. These are the state endangered running pine (*Lycopodium clavatum*), the state threatened arbor vitae (*Thuja occidentalis*), the false asphodel (*Tofieldia glutinosa*), and forked aster (*Aster furcatus*), and the watch list species butternut (*Juglans cinerea*), and sweet Indian plantain (*Cacalia suaveolens*). Ecological problems associated with seeps and springs may include degradation by overgrazing and alterations to the watershed (diversion or utilization of the water) that can influence ground water discharge.

Lake and Pond

Lakes and ponds are open-water habitats. In the PPAA there are both natural and artificial examples of lakes and ponds (Figure 9). The Lake and Pond natural community class includes the two subclasses, **Lake** and **Pond**. Only one natural community, *pond,* is recognized. The Lake subclass includes the *lake* and *Great Lake* natural communities. Lakes and ponds differ primarily by size; lakes exceed 20 acres (Suloway and Hubbell 1994). Both ponds and lakes are found within the Assessment Area and are locally important for industry, recreation, and fishing. However, the lakes are artificial and do not include any Lake Michigan boundary, so only ponds have been described below as a natural community. Lake plants are similar to pond.

The area of shallow lakes in the Assessment Area is about 114.5 acres (0.012% of the land cover; Table 3); however, the total open water within the Assessment Area (Table 2) is about 20,223 acres (2.1% of the land cover). The largest open bodies of water in the Assessment Area are the artificial power-plant cooling lakes La Salle Lake (La Salle County), Heidecke Lake (Grundy County), Dresden Lake (Grundy and Will counties), and the various strip mine lakes (Grundy and Will counties). A few small natural ponds are found along and associated with the Illinois and Kankakee rivers in Goose Lake Prairie Nature Preserve in Grundy County and nearby in Kankakee and Will counties. None of the ponds or lakes within the PPAA are considered to be high quality; the Goose Lake Prairie ponds, however, include 66 acres of Grade C pond. The vegetation of the natural ponds is characterized below. Appendix 1 does not separately distinguish the lake and pond species, but includes them both within the category of pond, including several typical shore species.

Pond (natural)

Only the single *pond* community is recognized within the Lake and Pond subclass, as described below.

Pond - Natural ponds are shallow-water, nonseasonal wetlands that are not excavated or impounded and are less than 20 acres. These still bodies of water are usually shallow enough to allow rooted aquatic plants across nearly their entire basins. Most ponds in the PPAA have been incorporated into artificial lakes, and/or degraded by livestock or other agricultural activities.

Plants characteristic of ponds and lakes can be sorted into three categories: shore and mud-flat species, emergent wetland species (that grow in water most of the season), and aquatics. Typical **shore and mud-flat** species are not associated only with lakes and ponds but also include plants characteristic of disturbed lands. Many are listed in Appendix 1 as floodplain forest and cultural land species, and they include the **grasses**: barnyard grass, creeping love grass, rice cutgrass, and prairie cordgrass, the **sedges**: river bulrush, common nut sedge, and spike rushes, the **forbs**: giant ragweed, nodding beggar ticks, false nettle, American bindweed, water hemlock, common horsetail, late boneset, soft rush, ditch stonecrop, fog

fruit, marsh cress, and common cocklebur, the **shrub**: buttonbush, and the **trees**: green ash, cottonwood, silver maple, sandbar willow, and black willow. Common to occasional **emergent wetland** species include the **shrub**: halberd-leaved rose mallow, and the **forbs**: yellow pond lily, common cattail, marsh purslane, false loosestrife, American lotus, water smartweed, mild water pepper, cursed crowfoot, swamp dock, common arrowhead, lizard's tail, and common bur reed. Typical **aquatics** include coontail, naiad, common bladderwort, pondweed, fennel-leaved pondweed, leafy pondweed, duckweed, water meal, and water milfoil.

One plant species, Vasey's pondweed (*Potamogeton vaseyi*), formerly listed as endangered by the IESPB but now considered to have become extirpated in Illinois (Table 10), was formerly known from natural ponds in the Assessment Area, where it was reported from Grundy and Will counties. Ecological problems include drainage, pollution from agricultural chemicals, acids from coal mines, and heat from industrial power plants, the degradation from livestock use, the degradation from impoundment and recreational use, the spread of a few exotic species (e.g. curly pondweed), and siltation.

Stream

Streams are flowing waters. The Stream natural community class includes **Creek** and **River** as two subclasses. The two subclasses are distinguished on the basis of size; a *creek* has a watershed < 200 sq. mi. (520 sq. km.) and a *river* has a watershed > 200 sq. mi. (520 sq. km.). The individual natural communities within the subclasses are described according to gradient and size, and include the *low-gradient creek, medium-gradient creek, high-gradient creek, low-gradient river, medium-gradient river*, and *major river*. Instead of acreage, streams are generally measured in terms of miles. Six biologically significant stream segments have been identified by the INAI within the PPAA (Table 8). These segments have a combined total length of 66.58 miles. While these streams are extremely significant for many animal groups, plants are generally infrequent in this natural community due to the scouring effects of rushing floods. The aquatic plants generally inhabit the calm waters in backwaters along creeks and rivers that would generally be classified as ponds. River banks are generally classified as part of floodplain forests, and include the woody plants as well as many herbs adapted to inundation. Large streams occur in the PPAA, the most prominent being the Illinois, Des Plaines, Mazon, and Kankakee rivers and their tributaries (Figures 1, 2, 9). These rivers are an extremely important natural resource within the PPAA and are crucial to the wildlife in the area. Numerous named creeks exist in the Assessment Area, and their drainage basins are indicated in Figure 2. The plants which grow associated with rivers and other streams are listed in Appendix 1 within the River category, but many species associated with rivers are actually within the floodplain forests, and lakes and ponds. A few species are characteristic of streams and their immediate margins, and these are listed below.

Plants characteristic of streams and their immediate margins include the **forbs**: tamarisk water hemp, tall water hemp, nodding beggar ticks, common beggar ticks, panicled aster,

round-fruited hedge hyssop, water willow, American bulrush, winged monkey flower, sessile-flowered yellow cress, dotted smartweed, common arrowhead, and smooth hedge nettle. Slower moving areas along the river may have typical marsh plants such as the halberd-leaved rose mallow, common burreed and common cattail. **Trees** include species listed as typical of wet floodplain forest above, particularly sandbar willow and silver maple.

Primary

This community class includes natural communities where soil is thin or absent and bedrock is near the surface. The subclasses of include **Cliff, Glade,** and **Lake Shore** (White and Madany 1978). There are no glades in northeastern Illinois, nor is the Assessment Area close enough to Lake Michigan to include the lake shore natural community. Cliffs occur locally in and near the Assessment Area; however, none has been identified as undegraded natural area.

Cliff

This natural community subclass includes vertical exposures of resistant bedrock as well as unconsolidated associated materials. The communities are distinguished from one another based upon the type of rock present. Only the *dolomite cliff* community is known within the mapped area (Figure 3).

Dolomite cliff community - The substrate of the dolomite cliff community is dolomite, a hard form of limestone (calcium-magnesium carbonate with other minerals). These are limited to stream valleys in the northern part of Illinois and are exposed to some extent along the Kankakee and Des Plaines rivers within and near the PPAA. No examples of high-quality dolomite cliff community are known within the Assessment Area; however, examples are known near Altorf in Kankakee County and near Lemont in Cook County within the mapped area. Plant species tend to be adapted to drought, high pH, and must be able to root in crevices of the rock.

Characteristic plants include the **ferns**: walking fern, berry bladder fern, smooth cliff-brake, the **forbs**: columbine, smooth rock cress, Short's aster, three-leaved stonecrop, broadleaf goldenrod, the **shrub**: ninebark, the **vine**: poison ivy, and the occasional **trees**: red oak and basswood.

One state threatened species, slender sandwort (*Arenaria patula*) known in Grundy and Will counties, and one state endangered species, corn salad (*Valerianella chenopodiifolia*), known from Will county, are known from the dolomite cliffs and associated sediments within the PPAA.

Few exotic species pose problems in dolomite cliff communities. However, the quarrying of dolomite for industrial and agricultural use is a major physical destructive force, and rock climbing may degrade the community and damage species populations as well.

Cave

A *cave* is a feature formed by a geological collapse or solution of bedrock. There are twilight zones and in most a total dark zone. Twilight zones in caves can support a few shade-tolerant plants near the cave interest including many taxa listed for dolomite cliff. There are no vascular plants listed as threatened or endangered by the IESPB from this community type. No significant caves are known within the Prairie Parklands Assessment Area, but a cave system with its representative terrestrial cave community is located near Altorf in Kankakee County.

Cultural

Rather than representing a natural community group, the cultural community class results from the destruction of natural communities by human disturbance. This class is not formally subdivided into subclasses, but includes *cropland, pastureland, successional fields, developed land, tree plantations, artificial lakes and ponds,* and *prairie reconstructions*. In terms of natural quality, these subdivisions are all extremely poor. This is the major community class in the PPAA comprising more than 850,000 acres, or nearly 90% of the total land area (Table 2, Figures 4, 6, 7). Cropland alone occupies 628,296 acres where prairie once dominated and this is 66.5% of the total acreage of the Prairie Parklands Assessment Area.

The cultural areas, by isolating natural habitats, interrupting landscape-level processes, and providing a habitat for weedy native and non-native plants, impose some of the most challenging ecological problems for natural habitats in the PPAA (see discussion below). One exception is the prairie reconstruction, termed prairie restoration by the INAI (White and Madany 1978). This is the only community type mentioned below (briefly) since it is the only example in the cultural community class that represents an effort to create a natural community.

Characteristic plants of this community class are non-native species (designated by * in Appendices 1 and 2) and native species with weedy characteristics. It is not unusual for one-third of the plant species of an agricultural region such as the PPAA to be non-native species. An estimated total of 1,051 vascular plant species (72.3%) are native to the Assessment Area and 402 (27.7%) are introduced. Statewide, 29% of the kinds of plants known are introduced species and 71% are native. A very small number of exotic species (such as corn, *Zea mays,* soybeans, *Glycine max,* and Kentucky bluegrass, *Poa pratensis*) are those that dominate the landscape.

One state endangered plant species, alkali bulrush (*Scirpus paludosus*), is known from "cultural" habitats in the PPAA. This species is native in Illinois only to a very rare plant community for the state (brackish marsh); however, it has expanded its occurrences along roadsides in northeastern Illinois because of the use of roadway deicing salt. Consequently, alkali bulrush occasionally is established in the artificially created salty marshes.

Prairie reconstruction - Typically, prairie reconstructions are plantings of prairie species on grassland soils where the original natural community has been destroyed. Prairie species are planted in an effort to produce a warm-season grassland or with the goal of attempting to recreate the original prairie community. Prairie reconstructions often are species poor and are strongly dominated by a few aggressive species. An unknown area of prairie reconstructions exist within the PPAA. None have developed into communities that mimic undegraded tallgrass prairie in species richness or structure. Major restoration efforts are underway in the Midewin Tallgrass Prairie and Goose Lake Prairie State Park.

Summary and Recommendations

Trends in the Prairie Parklands Assessment Area (PPAA) among all natural communities combined indicate that the total proportion remaining in an undegraded, high-quality condition is about 0.06% of the area, just slightly less than the statewide estimate of 0.07% (White 1978). However, there is variation in degree of habitat loss and degradation among community classes. For forests, while only about 9% of the original land cover of the PPAA, present total cover of forest is about 71% of the original total. This is noteworthy considering that only about 30% of the original forest cover remains statewide. Considering habitat quality, about 0.3% of the original forest area in the PPAA is high-quality natural area while statewide the figure is only about 0.08%. For prairie, a slightly greater proportion of prairie remains in a high-quality condition (0.02%) compared with statewide trends (0.01%). However, with so little remaining in the Assessment Area, there is little reason for optimism in this regard. For savannas and wetlands, the trends appear to be more negative. Only about 84 acres of high-quality savanna remain in the Assessment Area although there are no data available on the original extent in the PPAA. A lower percent of the original estimated wetland area remains in the PPAA (6.7%) compared with statewide (11%). Only about 0.05% of the original estimated total area and 0.7% of remaining area is high-quality, essentially undegraded, natural area. Statewide, about 0.07% and 0.65% remain of original and existing wetlands, respectively, that are high quality. Additional survey efforts in the PPAA may identify noteworthy and/or restorable remnants of natural communities and new populations of threatened or endangered species.

In addition, removal of key ecological processes in the few intact fragments have resulted in some dramatic changes in community composition and structure since the time of European settlement of the region. A top priority from the points of view of vegetation conservation, the preservation of our natural heritage for our heirs, and general resource management should be to carefully manage and rehabilitate the vegetation remnants, to

protect and encourage the reproduction of the threatened and endangered plant species, to search for and study any declining plant species and natural community remnants not yet inventoried, and to add additional buffer zones of significant acreage to all remaining natural areas.

Despite the availability of a great deal of descriptive information regarding natural communities in the PPAA, there remain many knowledge gaps, particularly the distribution, abundance, qualitative condition, and ecological trends among remnants. This is particularly true for wet prairies, shrub prairies, barrens, swamps, ponds, dolomite cliffs, and savannas. Much more information is available for floodplain forests, upland forests, hill prairies, mesic prairies, marshes, and rivers. Although floristic information is available for the few remnants, there is a general lack of quantitative data. Further, because remnants tend to have floristic differences (no two sites are the same) and because only a very limited area of prairie remains, it appears that we have a poor resolution of the original (presettlement) species diversity proportions for the PPAA. Additional survey efforts in the PPAA may identify new populations of threatened or endangered species and noteworthy remnants of dolomite prairie and tallgrass prairie.

Many of the most challenging conservation issues in the PPAA are addressed primarily at the community and ecosystem levels. There are serious ecological problems that threaten the long-term maintenance of biodiversity in the PPAA. Throughout the natural community descriptions for the PPAA are consistent references to a set of related ecological problems. These are habitat fragmentation, habitat degradation, exotic species invasion, and, for several community types, fire absence. The following six steps are recommended as an approach for gaining further insights into the natural communities in the PPAA and developing a plan for the long-term maintenance of biodiversity.

1. General Inquiry and Prioritization

Do the citizens of the Assessment Area and the state wish to restore any of the land currently in use for agricultural or other commercial use to a natural (presettlement) condition? Is there a desire to expand and preserve the existing natural areas? A plan of priorities should be drawn up that reflects the partnership goals. If there is a desire to protect and/or expand the natural heritage within the Assessment Area, then the next five steps can be followed.

2. Inventory

The Illinois Natural Areas Inventory (INAI) provides data on the distribution and abundance of statewide-significant natural communities. However, many natural communities occur in Illinois that, though they do not meet the critical qualitative standards of the INAI for undegraded and statewide-significant natural areas, contain regionally noteworthy and exceptional natural features. Many natural communities in the PPAA, though somewhat degraded, retain relatively high levels of ecological integrity and have potential for further improvement through restoration efforts. Since the INAI sites are few, and small in total area, the somewhat degraded but restorable natural communities that remain are critical for the long-term maintenance of biodiversity in the region. Remnants

among all community classes (e.g., forest, prairie, savanna, wetland) need to be identified. For example, since no high-quality gravel prairies and dry, mesic, wet-mesic or wet dolomite prairie remnants (among others) are known from the PPAA, identification of any degraded remnants is central to any recovery effort for these community types. Floristic Quality Assessment, a method for evaluating the natural quality of habitat remnants that employs several parameters of community characteristics, is one recommended technique for identifying remnants of native vegetation that have restoration potential (Taft et al. 1997). Moreover, funding for basic field inventories of the remaining plant species in the area should be increased to insure that there is accurate data on what plants actually occur in the Assessment Area today. Habitat management cannot be conducted properly without being aware of all of the species that are present and are likely to be affected by such management.

3. Map

All results from natural community inventory efforts should be categorized and mapped to provide a spatial context for the locations of habitats with differing ecological condition. This will aid in identifying concentrations of noteworthy natural communities which can serve as focus areas. Trends in total area of each community class among qualitative units would serve as an aid in measuring success in restoration efforts (see below).

4. Protection

The natural communities with the greatest integrity need to be protected from further human-caused degradation (e.g., damaging levels of grazing, off-road vehicle impacts, soil grading in railroad rights-of-way). Inventory and mapping will aid in the prioritization of protection efforts. Highly isolated remnants pose distinct conservation and protection challenges compared with clusters of restorable natural communities. The addition of buffer land and corridors around and/or connecting high-quality natural areas may allow the communities to increase in size and may discourage, with proper management, the influx of exotic species. The establishment of conservation easements or outright purchase of undegraded communities and buffers is needed for long-term protection. Staff of the Illinois Nature Preserves Commission are familiar with the various protection options and incentives for private landowners.

5. Identification and prioritization of the ecological problems

As previously indicated, a host of related ecological problems consistently are present among remnant natural communities in the PPAA (habitat fragmentation, habitat degradation, exotic species invasion, and fire absence). Some problems can be addressed more readily than others.

Habitat fragmentation is a widespread problem with potentially devastating consequences for ecological integrity often resulting in an interruption of biological interactions, ecological processes, species migrations, and a reduction in habitat heterogeneity (Wilcove et al. 1986). A consequence, typically, is loss of species diversity. However, "solutions" to restoring biological connectivity and ecosystem-level process are extraordinarily complex and costly if the goal is to recreate corridors for all species among regional habitats. High

levels of fragmentation may impose limits on maintaining or enhancing biodiversity in the long-term.

In contrast, *habitat degradation* is a widespread problem that can be slowed and/or minimized at many sites by removing the degradation factor (e.g., grazing, soil disturbances), although restoration to pre-disturbance condition in severe cases may require intensive vegetation management. It is difficult to find a private woodland in Illinois that does not bear indications of past cattle grazing. The effects of overgrazing can be persistent. Certain species (e.g., many ferns, orchids, trilliums, lilies, bellflower, bloodroot, several grass and sedge species) appear to be sensitive to grazing disturbance and are often absent while certain grazing increasers (e.g., unpalatable species, thorn-bearing species, plants with bristly fruits, and generally obnoxious and poisonous plants) are dominant. For instance, a typical situation in northeastern Illinois woodlands is a groundcover and shrub flora dominated by white snakeroot, introduced honeysuckles, buckthorns, Missouri gooseberry, hawthorns, poison ivy, and multiflora rose. Usually, destructive influences such as grazing or other soil disturbances are involved.

Exotic species invasion can be considered both a species-level and a community-level problem. Some community-level management activities address more than one ecological problem. For example, in northern Illinois, garlic mustard (*Alliaria petiolata*) invasion can be reversed with appropriately timed applications of fire (Nuzzo 1991, Schwartz and Heim 1996). Other serious exotic pests in northern Illinois, such as purple loosestrife (*Lythrum salicaria*), require direct treatment or biological control (Thompson et al. 1987, Malecki et al. 1993). These and other species have invaded the PPAA and pose severe ecological problems in the Assessment Area. Recommended control measures are summarized in Table 12 (adapted from Solecki 1997).

Fire is an ecological force that historically influenced many aspects of natural communities in the PPAA. Many of these fires were set by the indigenous peoples of the area. Several community types require fire for the maintenance of community characteristics and diversity. Fire absence has resulted in changes in forest structure, composition, and diversity in natural remnants. Invasion of mesophytic species such as sugar maple into oak-hickory forests is a statewide phenomenon related to fire absence and is noticeable in the PPAA. Many forests in Illinois are dominated in the canopy by oaks but have few oak saplings. Rather, shade-tolerant (and fire intolerant) species like sugar maple often are conspicuously more common and dense than early records indicated. An obvious consequence of this change is the possible loss of oak woodlands and the plant and wildlife species that depend on them. A rich assemblage of spring wildflowers can still be found in some woodlands because these spring ephemerals largely escape the ensuing shade of the dense overstory and thus selectively persist while typically only a few shade-tolerant species can be found in the summer and fall. Also, the spring flora often has been spared direct effects of cattle grazing because livestock historically were rotated to fescue pastures during spring months. Infrequent applications of prescribed fire appear unlikely to reverse these trends. Rather, a long-term program of repeated applications of prescribed fire is often necessary before compositional stability is achieved. Nevertheless, prescribed fires

can be implemented to a wide variety of remnants and community types, at little cost, and achieve measurable improvements in many parameters of ecosystem integrity.

6. Application of appropriate vegetation management

Once the ecological problems for a natural community are identified and prioritized, and once restoration efforts are underway, a program of vegetation management needs to be implemented. Record keeping is vital to tracking the activities and levels of success in implementing each treatment plan. Floristic Quality Assessment (Taft et al. 1997) methods may provide a framework useful in measuring progress of each restoration activity.

Table 12. List of selected invasive non-native plant species known or suspected to occur in the Prairie Parklands Assessment Area and recommended eradication methods.

Common Name[1]	Scientific Name[1]	Cut & Apply Stump-Treatmt Herbicide	Foliar Herbicide Application[2]	Prescribed Fire	Cut &/or Hand pull (get root)	Dig Root	Biological Control	Cover w/ Black Plastic
asparagus	*Asparagus officinale*	X				X		
beggars' lice	*Lappula echinata*		X					
bouncing bet	*Saponaria officinalis*		X					
buckthorn, common	*Rhamnus cathartica*	X	X		X			
buckthorn, glossy	*Rhamnus frangula*	X	X		X			
bull thistle	*Cirsium vulgare*		X					
Canada thistle	*Cirsium arvense*		X					
cheat grass	*Bromus tectorum*		X					
common yarrow	*Achillea millefolium*		X		X			
crown vetch	*Coronilla varia*	X	X	X				
cypress spurge*	*Euphorbia cyparissias**		X		X*	X*		
dock	*Rumex spp.*		X		X			
field garlic	*Allium vineale*		X					
garlic mustard	*Alliaria petiolata*		X	X	X			
honeysuckle, amur	*Lonicera maackii*	X	X					
honeysuckle, Japanese	*Lonicera japonica*		X					
honeysuckle, tartarian	*Lonicera tatarica*	X	X		X			
Japanese barberry	*Berberis thunbergii*	X	X	X		X		
Kentucky bluegrass	*Poa pratensis*			X				
meadow fescue	*Festuca pratensis*		X	X		X		
moneywort	*Lysimachia nummularia*		X					
motherwort	*Leonurus cardiaca*		X		X	X		
multiflora rose	*Rosa multiflora*	X	X	X				
mustards	*Brassica spp.*		X		X			
orange day lily	*Hemerocallis fulva*		X			X		X
Osage orange	*Maclura pomifera*	X						
parsnip*	*Pastinaca sativa**		X		X*	X*		
purple loosestrife	*Lythrum salicaria*		X		X		X	
quack grass	*Agropyron repens*		X	X				
Queen Anne's lace*	*Daucus carota**		X					
reed canary grass	*Phalaris arundinacea*		X					
Siberian elm	*Ulmus pumila*	X						
smartweed; knotweed	*Polygonum spp.*		X					
smooth brome grass	*Bromus inermis*		X					
sweet clover, white	*Melilotus alba*			X	X			
sweet clover, yellow	*Melilotus officinalis*			X	X			
tree-of-heaven	*Ailanthus altissima*	X			X			
white mulberry	*Morus alba*	X						
white poplar	*Populus alba*	X		X				
white willow	*Salix alba*	X						

[1] Asterisks (*) indicates species can cause skin rashes. Direct skin contact should be avoided.

[2] Recommended herbicide is typically Round-up (glyphosate) (Solecki 1997).

Birds

Introduction

Information in this section is derived from standard references of Illinois, including the Illinois Natural Heritage Database (Illinois Department of Natural Resources 1998), The Illinois Breeding Bird Atlas (Illinois Department of Natural Resources, in prep), Avian Ecological Investigations (Illinois Department of Natural Resources, unpublished reports), and the results of extensive field work by personnel from the Illinois Natural History Survey (much of it ongoing and not yet published).

The Prairie Parklands Assessment Area (PPAA) is notable primarily for its rich potential for grassland and wetland bird communities; otherwise it has a species list typical of some of the more urbanized sections of the northern tip of the state. At least 271 of the 309 species that regularly occur in the state (exclusive of vagrants) can be found in the area (Table 13). Of these 271 species, 148 breed or formerly bred there (Table 13). Of these, 53 are either locally extinct, or are rare during the breeding season (species with a "r" in Table 13), which suggest that some habitats may be in short supply in the PPAA. Several globally extinct species (Passenger Pigeon - *Ectopistes migratorius* and Carolina Parakeet - *Conuropsis carolinensis*) formerly occurred in the basin as did the locally extirpated Sharp-tailed Grouse, Greater Prairie-Chicken, Ruffed Grouse, and possibly the Black Rail. Wild Turkeys have been seen in the PPAA and have probably come from nearby reintroductions.

Most forest patches in the PPAA are small and narrow (<500 acres), except for the forested corridors along the Kankakee and Illinois River valleys and the Marseilles State Fish and Wildlife Area. All of these areas are unlikely to have successful breeding populations of many species (Brawn and Robinson 1996), which suggests that restoration of grassland, savanna, and shrubland bird communities may be more productive in these areas. For this reason, grassland and wetland habitats should be the primary focus of conservation efforts in the region, especially those with adjacent forest habitats to buffer them from surrounding agricultural and residential areas. We know little, however, about the effects of fragmentation on wetland habitats. Some species of grassland birds appear to be area sensitive, including such state endangered birds as Upland Sandpiper and Henslow's Sparrow (Herkert 1994). The use by migratory birds of the forested corridor along the Illinois and Kankakee Rivers may be intense.

The bird species that live in the PPAA are ecologically diverse and, although some species are able to live in a variety of habitats, many species occupy only one or a few habitats (Table 13). The following sections describe the bird communities typically found in the major habitat types of the PPAA as well as the habitat-specific environmental problems

and management solutions for bird communities in each habitat. The list has also benefited from the activities of many excellent bird watchers in the area, including Cindy and John McKee and Joe Milosevich. As a result, we know far more about the birds of this area than we do about any other primarily urban and agricultural partnership area and we have a far better grasp of how we can improve habitat even in areas that will always be primarily urban and agricultural. Many of the more uncommon to rare forest, grassland, and wetland nesting species appear on this list as a result of two intensive nesting bird surveys contracted out by the Illinois Department of Natural Resources (formerly Illinois Department of Conservation) on state owned properties (Milosevich and Olson 1982, Birkenholz 1995).

Table 13. Bird species that regularly occur in the Prairie Parklands Assessment Area. These are species that are likely to be present all or most years. This list excludes extinct species and the many wandering or "vagrant" species that have been recorded in the area. The purpose is to list only those species that have or could have significant populations in the area. The table also lists the habitats that are most likely to be occupied during each season.

Species[1, 2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Common Loon *Gavia immer*			L
Pied-billed Grebe - ST *Podilymbus podiceps*	L W		L W
Eared Grebe *Podiceps nigricollis*	L		
Horned Grebe *Podiceps auritus*			L
Double-crested Cormorant *Phalacrocorax auritus*			L
American Bittern - SE ***Botaurus lentiginosus***	W[r]		W
Least Bittern - ST ***Ixobrychus exilis***	W[r]		W
Great Blue Heron *Ardea herodias*	L W Fs F	L W	L W
Great Egret *Ardea alba*			L W
Snowy Egret – SE ***Egretta thula***			W
Little Blue Heron - SE ***Egretta caerulea***			L W
Cattle Egret *Bubulcus ibis*			C G W
Green Heron *Butorides virescens*	L W Fs		L W Fs
Black-crowned Night-Heron - SE ***Nycticorax nycticorax***			Fs W

Table 13. Continued.

Species[1,2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Yellow-crowned Night-Heron - SE *Nycticorax violacea*			Fs
Turkey Vulture Cathartes aura	F G C Fs Sav[r]		F G C S Sav Fs
Snow Goose *Chen caerulescens*			L W C
Canada Goose *Branta canadensis*	L W C	L W C R	L W C R
Mute Swan *Cygnus olor*	L W[r]	LW	L W
Tundra Swan *Cygnus columbianus*			L W
Wood Duck *Aix sponsa*	Fs W		Fs W L
Gadwall Anas strepera			W L
American Wigeon *Anas americana*			W L
American Black Duck *Anas rubripes*			W L Fs C
Mallard *Anas platyrhynchos*	W C L Fs G	W C L Fs	W C L Fs
Blue-winged Teal *Anas discors*	W G		W L
Northern Shoveler Anas clypeata	W[r]		W L
Northern Pintail Anas acuta	W[r]		W C L
Green-winged Teal *Anas crecca*	W[r]		W L
Canvasback *Aythya valisineria*			L W
Redhead *Aythya americana*			L W
Ring-necked Duck *Aythya collaris*			L W
Greater Scaup *Aythya marila*			L W
Lesser Scaup *Aythya affinis*			L W
Surf Scoter *Melanitta perspicillata*			L
White-winged Scoter Melanitta fusca			L
Oldsquaw *Clangula hyemalis*			L

Table 13. Continued.

Species[1, 2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Bufflehead *Bucephala albeola*		L	L W
Common Goldeneye *Bucephala clangula*		L	L
Hooded Merganser *Lophodytes cucullatus*	L Fs W[r]		L Fs W
Common Merganser *Mergus merganser*		L	L
Red-breasted Merganser *Mergus serrator*			L W
Ruddy Duck *Oxyura jamaicensis*			L W
Osprey - SE ***Pandion haliaetus***			L
Bald Eagle - ST ***Haliaeetus leucocephalus***		L	L
Northern Harrier - SE ***Circus cyaneus***	G W[r]	G C W	G C W
Sharp-shinned Hawk *Accipiter striatus*		F S R Fs Sav	F S R Fs Sav
Cooper's Hawk *Accipiter cooperii*	F S Sav	F S R Sav	F S R Sav
Northern Goshawk *Accipiter gentilis*		F S	F S W L
Red-shouldered Hawk - ST *Buteo lineatus*	Fs[r]	Fs	Fs
Broad-winged Hawk *Buteo platypterus*	F[r]		F
Red-tailed Hawk *Buteo jamaicensis*	F C G R S	F C G R S	F C G R S
Rough-legged Hawk *Buteo lagopus*		C G	C G
American Kestrel *Falco sparverius*	R C G Sav	R C G Sav	R C G Sav
Merlin *Falco columbarius*			All
Peregrine Falcon - SE, FE *Falco peregrinus*			All
Gray Partridge* *Perdix perdix*	C G S[r]	C G S	C G S
Ring-necked Pheasant* *Phasianus colchicus*	C G S	C G S	C G S
Wild Turkey *Meleagris gallopavo*	F Fs S Sav	F Fs S Sav C	F Fs S Sav C
Northern Bobwhite *Colinus virginianus*	S G C Sav	S G C Sav	S G C Sav

Table 13. Continued.

Species[1, 2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Yellow Rail *Coturnicops noveboracensis*			G W
Black Rail – SE ***Laterallus jamaicensis***			G W
King Rail - SE ***Rallus elegans***	G W[r]		G W
Virginia Rail *Rallus limicola*	W[r]		G W
Sora *Porzana carolina*	W[r]		G W
Common Moorhen - ST ***Gallinula chloropus***	W[r]		W
American Coot *Fulica americana*	W[r]	L	W L
Sandhill Crane - ST ***Grus canadensis***			W G C
Black-bellied Plover *Pluvialis squatarola*			L W
American Golden-Plover *Pluvialis dominica*			W L C G
Semipalmated Plover *Charadrius semipalmatus*			W
Killdeer *Charadrius vociferus*	W R G C		W R G C
Greater Yellowlegs *Tringa melanoleuca*			W
Lesser Yellowlegs *Tringa flavipes*			W
Solitary Sandpiper *Tringa solitaria*			W
Willet *Catoptrophorus semipalmatus*			W
Spotted Sandpiper *Actitis macularia*	L		W
Upland Sandpiper - SE ***Bartramia longicauda***	G[r]		G
Hudsonian Godwit *Limosa haemastica*			W
Ruddy Turnstone *Arenaria interpres*			W
Sanderling *Calidris alba*			W
Semipalmated Sandpiper Calidris pusilla			W
Western Sandpiper *Calidris mauri*			W

Table 13. Continued.

Species[1, 2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Least Sandpiper			W
Calidris minutilla			
White-rumped Sandpiper			W
Calidris fuscicollis			
Baird's Sandpiper			W G
Calidris bairdii			
Pectoral Sandpiper			C W G
Calidris melanotos			
Dunlin			W
Calidris alpina			
Stilt Sandpiper			W
Calidris himantopus			
Buff-breasted Sandpiper			W G
Tryngites subruficollis			
Short-billed Dowitcher			W
Limnodromus griseus			
Long-billed Dowitcher			W
Limnodromus scolopaceus			
Common Snipe	W G[r]		W G
Gallinago gallinago			
American Woodcock	F Fs S		F Fs S
Scolopax minor			
Wilson's Phalarope - SE			L W
Phalaropus tricolor			
Red-necked Phalarope			L W
Phalaropus lobatus			
Franklin's Gull			L W C
Larus pipixcan			
Bonaparte's Gull			L W C
Larus philadelphia			
Ring-billed Gull	L[r]	L W C	L W C
Larus delawarensis			
Herring Gull	L[r]	L	W L C
Larus argentatus			
Thayer's Gull		L	
Larus thayeri			
Glaucous Gull		L	
Larus hyperboreus			
Caspian Tern			L
Sterna caspia			
Common Tern - SE			L
Sterna hirundo			
Forster's Tern - SE			L W
Sterna forsteri			
Black Tern - SE			L W
Chlidonias niger			

Table 13. Continued.

Species[1,2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Rock Dove* *Columba livia*	R C	R C	R C
Eurasian Collared-Dove* *Streptopelia decaocto*	R	R	R
Ringed Turtle-Dove* *Streptopelia "risoria"*	R	R	R
Mourning Dove *Zenaida macroura*	R C S	R C S	R C S
Black-billed Cuckoo *Coccyzus erythropthalmus*	S		F S Sav
Yellow-billed Cuckoo *Coccyzus americanus*	F S Fs Sav		F S Fs Sav
Barn Owl - SE ***Tyto alba***	C G Sav[r]	C G Sav	C G Sav
Eastern Screech-Owl *Otus asio*	R S Sav	R S Sav	R S Sav
Great Horned Owl *Bubo virginianus*	F C R Fs Sav	F C R Fs Sav	F C R Fs Sav
Snowy Owl *Nyctea scandiaca*		C	
Barred Owl *Strix varia*	F Fs	F Fs	F Fs
Long-eared Owl *Asio otus*		F S	F S
Short-eared Owl – SE ***Asio flammeus***	G[r]	G	G
Northern Saw-whet Owl *Aegolius acadicus*	F[r]	F S	F S
Common Nighthawk *Chordeiles minor*	R Sav		R G C
Whip-poor-will *Caprimulgus vociferus*	F Sav		F Sav
Chimney Swift *Chaetura pelagica*	R F S Fs Sav		All
Ruby-throated Hummingbird *Archilochus colubris*	F S R Fs Sav		F S R Fs Sav
Belted Kingfisher *Ceryle alcyon*	L W	L W	L W
Red-headed Woodpecker *Melanerpes erythrocephalus*	Fs R C	F Fs Sav	F Fs C R Sav
Red-bellied Woodpecker *Melanerpes carolinus*	F Fs S R Sav	F Fs S R Sav	F Fs S R Sav
Yellow-bellied Sapsucker *Sphyrapicus varius*		F Fs R Sav	F Fs R Sav
Downy Woodpecker *Picoides pubescens*	F Fs R S Sav	F Fs R S Sav	F Fs R S Sav

Table 13. Continued.

Species[1,2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Hairy Woodpecker *Picoides villosus*	F Fs Sav R	F Fs R S Sav	F Fs R S Sav
Northern Flicker *Colaptes auratus*	S F R Sav Fs	S F R Sav Fs	S F R Sav Fs
Pileated Woodpecker *Dryocopus pileatus*	F Fs[r]	F Fs	F Fs
Olive-sided Flycatcher *Contopus cooperi*			F Fs R S Sav
Eastern Wood-Pewee *Contopus virens*	F Fs R Sav		F Fs R Sav
Yellow-bellied Flycatcher *Empidonax flaviventris*			F S Fs
Acadian Flycatcher *Empidonax virescens*	F Fs[r]		F Fs
Alder Flycatcher *Empidonax alnorum*			W S Sav
Willow Flycatcher *Empidonax traillii*	W S		W S Sav
Least Flycatcher *Empidonax minimus*	F S Fs Sav[r]		F S R Fs Sav
Eastern Phoebe *Sayornis phoebe*	R Fs		R Fs
Great Crested Flycatcher *Myiarchus crinitus*	F Fs Sav		F Fs S R Sav
Eastern Kingbird *Tyrannus tyrannus*	S G C Sav		S G A F C Sav
Loggerhead Shrike - ST *Lanius ludovicianus*	S G C[r]		S G C
Northern Shrike *Lanius excubitor*		S G C	
White-eyed Vireo *Vireo griseus*	S Fs Sav[r]		S Fs Sav
Bell's Vireo *Vireo bellii*	S G[r]		S G
Yellow-throated Vireo *Vireo flavifrons*	F Fs		F Fs R
Blue-headed Vireo *Vireo solitarius*			F Fs Sav
Warbling Vireo *Vireo gilvus*	S Fs R Sav		S F Fs R Sav
Philadelphia Vireo *Vireo philadelphicus*			S F R Sav
Red-eyed Vireo *Vireo olivaceus*	F Fs Sav		S F Fs R Sav
Blue Jay *Cyanocitta cristata*	S F Fs R C Sav	S F Fs R C Sav	S F Fs R C Sav

Table 13. Continued.

Species[1, 2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
American Crow *Corvus brachyrhynchos*	All	All	All
Horned Lark *Eremophila alpestris*	G C	G C	G C
Purple Martin *Progne subis*	L R W G		L W G
Tree Swallow *Tachycineta bicolor*	L W Fs G		L W Fs G
Northern Rough-winged Swallow *Stelgidopteryx serripennis*	L W Fs G		L W G
Bank Swallow *Riparia riparia*	L W G		L W G
Cliff Swallow *Petrochelidon pyrrhonota*	L W G[r]		L W G
Barn Swallow *Hirundo rustica*	C R L W G S		C R L W G S
Black-capped Chickadee *Poecile atricapillus*	S F Fs R Sav	S F Fs R Sav	S F Fs R Sav
Tufted Titmouse *Baeolophus bicolor*	F Fs R Sav	F Fs R Sav	F Fs R Sav
Red-breasted Nuthatch *Sitta canadensis*		F R	F R
White-breasted Nuthatch *Sitta carolinensis*	F R Fs Sav	F R Fs Sav	F R Fs Sav
Brown Creeper - ST ***Certhia americana***	F Fs[r]	F Fs R	F Fs R
Carolina Wren *Thryothorus ludovicianus*	S F Fs R Sav	S F Fs R Sav	S F Fs R Sav
Bewick's Wren *Thryomanes bewickii*	S R[r]		S R
House Wren *Troglodytes aedon*	S F R Sav		S F R Sav
Winter Wren *Troglodytes troglodytes*		F Fs W	F Fs W
Sedge Wren *Cistothorus platensis*	W G		W G
Marsh Wren *Cistothorus palustris*	W		W
Golden-crowned Kinglet *Regulus satrapa*		F Fs R Sav	F Fs R Sav
Ruby-crowned Kinglet *Regulus calendula*			F S Sav
Blue-gray Gnatcatcher *Polioptila caerulea*	F Fs S Sav		F Fs S Sav
Eastern Bluebird *Sialia sialis*	S G R C Sav	S F R C Sav	S F G R C Sav

Table 13. Continued.

Species[1,2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Veery *Catharus fuscescens*	F Fs[r]		F Fs R Sav
Gray-cheeked Thrush *Catharus minimus*			F Fs R Sav
Swainson's Thrush *Catharus ustulatus*			F S R Fs Sav
Hermit Thrush *Catharus guttatus*			S F R Fs Sav
Wood Thrush *Hylocichla mustelina*	F		F R Fs Sav
American Robin *Turdus migratorius*	S F Fs R Sav	S F Fs R Sav	S F Fs G R C Sav
Gray Catbird *Dumetella carolinensis*	S Fs R Sav		S Fs R Sav
Brown Thrasher *Toxostoma rufum*	S G R C Sav		S R C Sav
Northern Mockingbird *Mimus polyglottos*	S[r]		S
European Starling* *Sturnus vulgaris*	F Fs R C Sav	R C	R C
American Pipit *Anthus rubescens*			C W
Cedar Waxwing *Bombycilla cedrorum*	S F Fs R Sav	S F Fs R Sav	S F Fs R Sav
Blue-winged Warbler *Vermivora pinus*	S		S F Fs R Sav
Golden-winged Warbler *Vermivora chrysoptera*			S F Fs R Sav
Tennessee Warbler *Vermivora peregrina*			S F Fs R Sav
Orange-crowned Warbler *Vermivora celata*			S F Fs R Sav
Nashville Warbler *Vermivora ruficapilla*			S F Fs R Sav
Northern Parula *Parula americana*	F Fs[r]		F Fs R Sav
Yellow Warbler *Dendroica petechia*	S W		S Fs W R Sav
Chestnut-sided Warbler *Dendroica pensylvanica*	S[r]		S F Fs R Sav
Magnolia Warbler *Dendroica magnolia*			S F Fs R Sav
Cape May Warbler *Dendroica tigrina*			F Fs R Sav
Black-throated Blue Warbler *Dendroica caerulescens*			F Fs R Sav

Table 13. Continued.

Species[1,2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Yellow-rumped Warbler *Dendroica coronata*		F Fs Sav	S F FsR Sav
Black-throated Green Warbler *Dendroica virens*			F Fs R Sav
Blackburnian Warbler *Dendroica fusca*			F Fs R Sav
Yellow-throated Warbler *Dendroica dominica*	F Fs[r]		F Fs
Pine Warbler *Dendroica pinus*			F Fs R Sav
Prairie Warbler *Dendroica discolor*			S
Palm Warbler *Dendroica palmarum*		S F Fs R W G Sav C	
Bay-breasted Warbler *Dendroica castanea*			S F Fs R Sav
Blackpoll Warbler *Dendroica striata*			S F Fs R Sav
Cerulean Warbler *Dendroica cerulea*	F Fs[r]		S F Fs R Sav
Black-and-white Warbler *Mniotilta varia*	F Fs[r]		S F Fs R Sav
American Redstart *Setophaga ruticilla*	F Fs		S F Fs R Sav
Prothonotary Warbler *Protonotaria citrea*	Fs[r]		Fs
Worm-eating Warbler *Helmitheros vermivorus*	F[r]		F
Ovenbird *Seiurus aurocapillus*	F		F R S Sav
Northern Waterthrush *Seiurus noveboracensis*			Fs R
Louisiana Waterthrush *Seiurus motacilla*	F[r]		F Fs
Kentucky Warbler *Oporornis formosus*	F[r]		F Fs Sav
Connecticut Warbler *Oporornis agilis*			S F Fs R Sav
Mourning Warbler *Oporornis philadelphia*			S F Fs R Sav
Common Yellowthroat *Geothlypis trichas*	S G C W R Sav		S G C W R Sav
Hooded Warbler *Wilsonia citrina*	F[r]		F R
Wilson's Warbler *Wilsonia pusilla*			S F Fs R Sav

Table 13. Continued.

Species[1, 2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Canada Warbler *Wilsonia canadensis*	F[r]		S F Fs R Sav
Yellow-breasted Chat *Icteria virens*	S		S Sav
Summer Tanager *Piranga rubra*	F Sav[r]		F R Sav
Scarlet Tanager *Piranga olivacea*	F Fs Sav		F Fs R Sav
Eastern Towhee *Pipilo erythrophthalmus*	S F	S F	S F Fs R
American Tree Sparrow *Spizella arborea*		S G C R W Sav	S G C R W Sav
Chipping Sparrow *Spizella passerina*	F R Sav		S F R Sav G
Clay-colored Sparrow *Spizella pallida*			S
Field Sparrow *Spizella pusilla*	S G C Sav	S G W Sav	S G C W Sav
Vesper Sparrow *Pooecetes gramineus*	G C		G C
Lark Sparrow *Chondestes grammacus*	S G[r]		S G C
Savannah Sparrow *Passerculus sandwichensis*	G		G C W
Grasshopper Sparrow *Ammodramus savannarum*	G		G
Henslow's Sparrow - SE ***Ammodramus henslowii***	G[r]		G
Le Conte's Sparrow *Ammodramus leconteii*			G W
Nelson's Sharp-tailed Sparrow *Ammodramus nelsoni*			W
Fox Sparrow *Passerella iliaca*		S F Fs	S F Fs R Sav
Song Sparrow *Melospiza melodia*	S W G C R	S W G C R	S W G C R
Lincoln's Sparrow *Melospiza lincolnii*			S Fs W R
Swamp Sparrow *Melospiza georgiana*	W	S Fs G W	S Fs W G
White-throated Sparrow *Zonotrichia albicollis*		S F Fs R Sav	S F Fs R Sav
White-crowned Sparrow *Zonotrichia leucophrys*		S R G	S R G
Dark-eyed Junco *Junco hyemalis*		S F Fs R G C Sav	S F Fs R G C Sav

Table 13. Continued.

Species[1, 2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Lapland Longspur *Calcarius lapponicus*		G C	G C
Snow Bunting *Plectrophenax nivalis*		G C	
Northern Cardinal *Cardinalis cardinalis*	S F Fs R C Sav	S F Fs R C Sav	S F Fs R C Sav
Rose-breasted Grosbeak *Pheucticus ludovicianus*	S F Fs Sav		S F Fs R Sav
Blue Grosbeak *Guiraca caerulea*	S[r]		S Sav
Indigo Bunting *Passerina cyanea*	S F Fs Sav		S F Fs C Sav
Dickcissel *Spiza americana*	G C		G C
Bobolink *Dolichonyx oryzivorus*	G		G W
Red-winged Blackbird *Agelaius phoeniceus*	S W C R G Sav	F Fs C G	S W C R G Sav
Eastern Meadowlark *Sturnella magna*	G C	G C	G C
Western Meadowlark *Sturnella neglecta*	G C[r]		G C
Yellow-headed Blackbird - SE *Xanthocephalus xanthocephalus*	W[r]		W
Rusty Blackbird *Euphagus carolinus*		F Fs C	Fs R C W
Brewer's Blackbird *Euphagus cyanocephalus*			G C
Common Grackle *Quiscalus quiscula*	F Fs R W	F Fs C R	F Fs C R Sav
Brown-headed Cowbird *Molothrus ater*	All	F Fs C R	All
Orchard Oriole *Icterus spurius*	S R W Sav		S F Fs R W Sav
Baltimore Oriole *Icterus galbula*	S F Fs R Sav		S F Fs R Sav
Purple Finch *Carpodacus purpureus*		F Fs R	S F Fs R Sav
House Finch *Carpodacus mexicanus*	S R	S R	S F Fs R Sav
Red Crossbill *Loxia curvirostra*		F R	F R
White-winged Crossbill *Loxia leucoptera*		F R	F R
Common Redpoll *Carduelis flammea*		S F R G	

Table 13. Continued.

Species[1,2]	Breeding[3,6,7]	Winter[4,6]	Migrant[5,6]
Pine Siskin *Carduelis pinus*	S F R^{r}	S F R	S F R
American Goldfinch *Carduelis tristis*	S R G	S F Fs R G Sav	S F Fs R G Sav
Evening Grosbeak *Coccothraustes vespertinus*		F Fs R	F Fs R
House Sparrow* *Passer domesticus*	R C	R C	R C

[1] Bold type indicates an Illinois threatened (ST), Illinois endangered (SE), and/or federally endangered (FE) species.

[2] * = an introduced species.

[3] Breeding = species that currently or historically have bred in the area.

[4] Winter = species present from December through February.

[5] Migrant = species present during the March-May and late August-November periods.

[6] The following habitat codes are used:

L = Lakes, ponds, impoundments, rivers, larger streams
C = Crops
G = Grassland (including pasture and hayfield)
W = Wetland (seasonally flooded, open habitats such as marshes and sedge meadows)
Fs = Forested swamp (forested wetland, including wet floodplain forest)
Sav = Savannah
F = Upland and mesic forest
R = Residential areas (including urban centers and the "urban forest")
S = Shrublands (open habitats dominated by shrubs, including old fields).

[7] (r) designates a species that is currently a rare and local breeder and may be locally extirpated. Some of these species are good candidates for reestablishment in restored habitats.

Forest

Most of the remaining forest habitat is found along the Illinois and Kankakee rivers and the I &M Canal (Figure 5). Although there are very few contiguous tracts of forest remaining, a few tracts with small remnant populations of forest nesting species deserve special mention. This includes the mostly forested Marseilles State Fish and Wildlife Area (F&WA) and Pilcher Park near Joliet, a much smaller area, but with a very diverse and regularly occurring group of forest interior breeding species. Probably the largest and most contiguous tract of upland forest in the region, the Marseiles Training Area (and surrounding privately owned forest), was recently censused and found to have at least a dozen forest interior species with high area sensitivity (Birkenholz 1995). Many uncommon to rare forest interior species have been documented at Pilcher Park over the years as well (see Milosevich and Olson 1981, Milosevich 1993). Considering the number of major river systems that are found in this region, the small amount (<10,000 acres or 1.1% of the total land area) of bottomland forest suggests that most of this forest type is

found as very narrow corridors along these rivers and probably contain only remnant populations of typical species of forested bottomlands, from what was once most likely a much more extensive habitat type in the PPAA.

Regularly Occurring Species

Typical Species - Typical breeding species of forest habitats in the PPAA include: Turkey Vulture, Cooper's Hawk (uncommon but increasing), Wild Turkey (common at Marseilles F&WA), Yellow-billed Cuckoo (erratic), Black-billed Cuckoo (erratic), Great Horned Owl, Barred Owl (common at Marseilles F&WA) Ruby-throated Hummingbird, Red-headed Woodpecker, Red-bellied Woodpecker, Downy Woodpecker, Hairy Woodpecker, Northern Flicker, Eastern Wood-Pewee, Great Crested Flycatcher, Blue Jay, Black-capped Chickadee, Tufted Titmouse, White-breasted Nuthatch, House Wren, Blue-gray Gnatcatcher, Veery (uncommon), Wood Thrush, American Robin, Yellow-throated Vireo, Red-eyed Vireo, Ovenbird, Kentucky Warbler (rare; regular at Pilcher Park), Louisiana Waterthrush (common at Marseilles F&WA), American Redstart, Scarlet Tanager, Northern Cardinal, Rose-breasted Grosbeak, Indigo Bunting, Baltimore Oriole (mostly in more open forests) and Brown-headed Cowbird. Rarer forest species that also nest within the PPAA include Yellow-crowned Night-Heron, Broad-winged Hawk (Pilcher Park & Marseilles F&WA), Whip-poor-will (Marseilles F&WA), Carolina Wren (Marseilles F&WA), Acadian Flycatcher, Least Flycatcher, Northern Parula, Cerulean Warbler (DPCA), Worm-eating Warbler (Marseilles F&WA), Prothonotary Warbler (DPCA; mostly a southern species), Hooded Warbler (mostly a southern species), and Summer Tanager (regular near Braidwood R.A).

Threatened and Endangered Species - Few state threatened (ST) and endangered (SE) species occur in forests in the PPAA. Yellow-crowned Night-Herons (SE), Red-shouldered Hawks (ST), and possibly Brown Creepers (ST) all have occurred in forested wetlands in the area (see below).

Exotic Species - European Starlings were introduced into the U.S. in 1890-1891 and spread to Illinois by 1922 (Bohlen and Zimmerman 1989). They are now one of the most abundant species in Illinois and may be detrimental to native species because they complete with residents for nesting cavities, especially in smaller woodlots.

There are few stands of pine in this area. Pines are not native to the PPAA, but pine plantations do have unusual bird communities. In addition to more generalized forest species, pine (and other evergreen) plantations in nearby areas such as Morton Arboretum occasionally attract nesting Pine Siskins, Golden-crowned Kinglets, Red-breasted Nuthatches, and Red Crossbills. Chipping Sparrows are often the most abundant species nesting in pine plantations. In winter, pines provide roosting and feeding areas for Sharp-shinned Hawks, Cooper's Hawks, Northern Goshawks, Long-eared and Northern Saw-whet Owls, winter finches (e.g., both crossbills, Pine Siskins, Common Redpolls), Yellow-bellied Sapsuckers, Hermit Thrushes, and Red-breasted Nuthatches.

Population Dynamics and Management

Many bird species are declining across part or all of their breeding range in the Midwest (Peterjohn et al. 1994). The causes of such changes are likely related to problems with reproduction in highly fragmented landscapes. The primary factors controlling productivity of birds in the PPAA are predation on eggs or young in nests, and brood parasitism by Brown-headed Cowbirds. Cowbirds lay their eggs in the nests of other species, and often destroy one of the host's eggs when they lay their own. Cowbird young also grow faster than their host young and out-complete them for food, often leading to the starvation of the host young. Rates of nest predation and brood parasitism generally increase as a habitat becomes more fragmented, creating more feeding habitat for cowbirds and travel corridors for mammalian predators, such as raccoons, that often inhabit the edges of open country (Robinson et al. 1995). Given the relatively small size of most forest tracts, it is likely that levels of nest predation and brood parasitism by Brown-headed Cowbirds are extremely high (Robinson et al. 1995). In general, nest predation rates in Illinois forests of less than 500 acres average 70-90% and parasitism levels for cowbird hosts average 70-80%. These levels are so high that woodlots in this region are very likely to be population "sinks" (Brawn and Robinson 1996) in which reproduction is far below rates necessary to sustain regional populations. Urban developments may increase abundance of some predators.

Remarkably, in spite of low productivity, many species nest commonly in regional woodlots and are not obviously declining. This strongly suggests that their populations are being "rescued" by the settlement of individuals from much larger forest tracts outside of the region, or even outside of the state (Brawn and Robinson 1996). Therefore, to understand the population dynamics of breeding forest birds, it is necessary to monitor both population size and nesting success. Previous research on this subject in Illinois (Robinson et al., in press) suggests that the best candidates for forest restoration are tracts that are, or can be 500 acres or larger. Few forests in the PPAA are large enough to escape extreme levels of parasitism and predation. As will be described below, savanna restoration may be the best strategy for many sites given the high value of oaks to migrant birds (Graber and Graber 1983) and as source of mast and the fact that most forest tracts are too small to have anything but maximal rates of nest predation and brood parasitism. The north-south orientation of the wooded Kankakee River floodplain and the nearby Fox, DuPage, and Des Plaines Rivers which all join in this area to form the Illinois River, may lead to intensive use by migrating forest songbirds.

Wetland

Although historically there had been considerably more wetlands in the PPAA (wet prairie, shallow, and deep marsh), wetland habitats still represent one of the most significant avian habitats in the area, especially areas like Goose Lake Prairie State Natural Area, (GLP) and smaller areas at the Des Plaines Conservation Area (DPCA) and the Midewin National Tallgrass Prairie (hereafter Midewin). In fact, at GLP, several extremely rare wetland bird

species, not found as breeding species in most other areas of the state, have nested regularly since at least 1971 (Birkenholz 1975). These species include American (SE) and Least (ST) Bitterns, Northern Harrier (SE), King Rail (SE), and Common Snipe. These sites contain, sometimes large, areas of most wetland types to be found in Illinois including palustrine, riverine, forested, emergent, shallow marsh/wet meadow, deep marsh, open water, and scrub/shrub, as well as other deep water habitats associated with large reservoirs (Suloway and Hubbell 1994). The diversity and relatively large amount of wetland habitats still left in the area make for an equally diverse array of wetland bird species, many of which are uncommon to rare over most of Illinois.

Regularly Occurring Species

Typical species - These include the Pied-billed Grebe (ST), Least Bittern (GLP), Great Blue Heron, Great Egret (ST), Green Heron, Canada Goose, Wood Duck, Mallard, Killdeer, American Woodcock, Belted Kingfisher, Red-headed Woodpecker (forested), Northern Flicker (forested), Acadian Flycatcher (forested), Willow Flycatcher (shrubby), Purple Martin, Tree Swallow, Northern Rough-winged Swallow, Barn Swallow, Sedge Wren, Marsh Wren, Blue-gray Gnatcatcher (forested), Veery (forested), Gray Catbird (shrubby), Warbling Vireo (forested), Yellow Warbler (shrubby), American Redstart (forested), Common Yellowthroat, Song Sparrow, Swamp Sparrow, Red-winged Blackbird, Common Grackle, and Baltimore Oriole (forested). Rarer species might include the American Bittern (rare but regular at GLP), Cattle Egret, Mute Swan, Blue-winged Teal, Hooded Merganser (forested), King Rail (SE), Virginia Rail, Sora, American Coot, Spotted Sandpiper, Common Snipe (rare but regular at GLP), and Prothonotary Warbler (forested). Alder Flycatchers may occasionally breed along the edges of bogs and other wetlands. Ring-billed Gulls (and possibly a few Herring Gulls) have recently established nesting colonies at both the Dresden Nuclear Power Plant and the Heidecke Lake (Commonwealth Edison Collins Station) cooling lakes, on boulder and grass-lined dikes, near both the lakes and the Illinois River (Milosevich 1994). Clearly, the convergence of several major rivers in this area, the presence of one of the larger, intact wetland ecosystems (GLP) in the state, as well as the presence of several large, warm-water (e.g. power plant) lakes including the above mentioned lakes as well as the LaSalle Nuclear Power Plant Lake, makes this one of the premier areas for wetland birds in the state.

Threatened and Endangered Species - The wetlands of the PPAA have many State Threatened (ST) and State Endangered (SE) species that breed here including several that regularly breed in few other places in the state. There are records of breeding Pied-billed Grebes (ST), American Bitterns (SE), Least Bitterns (SE), Yellow-crowned Night-Herons (SE), Northern Harriers (SE), Red-shouldered Hawks (SE), King Rails (SE), Common Moorhens (ST), Short-eared Owls (SE), and Yellow-headed Blackbirds (ST). In addition, Double-crested Cormorants (ST), Great Egrets (ST), and Black-crowned Night-Herons (SE) are commonly seen in large numbers throughout the breeding season in many areas including GLP, DPCA, and Midewin. Although these are probably from the nearby colony at Lake Renwick, there may be a few small, isolated colonies nesting somewhere along the

Illinois, Des Plaines or Kankakee Rivers or the I&M Canal. Sandhill Cranes (SE) have been seen in the area during the breeding season and could eventually nest. Black Rails (SE) historically probably nested in the area and should always be considered as a possible breeding species. Protection of remaining wetlands, especially marshes, should be an extremely high priority for this area, and should be an integral part of prairie restoration plans.

Exotic Species - The only non-native wetland species is the Mute Swan, which is rare in the area but may be increasing in nearby areas to the northeast. If this species numbers continue to grow, possible control measures may have to be undertaken, as this species is very aggressive towards other nesting waterfowl within it's territory and may have a negative impact on some native species (Ciaranca et al. 1997).

Population Dynamics and Management

Currently, the main problem for birds inhabiting wetlands is habitat loss and suburban encroachment. Some forested wetland species likely suffer from the same problems associated with fragmentation that affect other forest species (cowbird parasitism and nest predation). We know little, however, about the effects of fragmentation on other wetland habitats. In fact, there have been no published studies of the population dynamics and nesting success of wetland birds in the region. Potentially, wetland species are more resistant to fragmentation, which may make this habitat a good target for conservation efforts in this landscape. However, even wetlands need buffer areas, as populations of several wetland species have diminished when urban developments encroach right up to the very edge of a wetland. The effects of siltation and changes in the water table from the continuing encroachment of suburban housing developments are unstudied but undoubtedly change the hydrology of a wetland, and thus can have a potential negative impact on species which may be adversely affected by even slight changes in a wetland's water level.

Wetland habitats are also used heavily by migrating waterfowl, shorebirds, rails and long-legged waders (herons, bitterns, and egrets). These habitats therefore have the potential to be important stopover sites for birds during migration. Wetland conservation should be the highest priority in the region for birds for reasons outlined above.

Savanna

Savanna habitats were once widespread in the Midwest, but due to habitat destruction and the absence of fire they are now rare in the PPAA (see chapter on Natural Vegetation Communities above).

Regularly Occurring Species

Typical Species - Savannas share many species with forest habitats. Perhaps the most typical species of savannas would be: Red-headed Woodpecker, Great Crested Flycatcher,

Eastern Wood-Pewee, Blue Jay, American Crow, House Wren, American Robin, Yellow-throated Vireo, Baltimore Oriole, Rose-breasted Grosbeak, Indigo Bunting, American Goldfinch, Field Sparrow, and Chipping Sparrow. Other forest species remain common in savannas, including the Great Horned Owl, Northern Flicker, Red-bellied, Downy, and Hairy Woodpeckers, Black-capped Chickadee, White-breasted Nuthatch, House Wren, Brown-headed Cowbird, Scarlet Tanager, and Northern Cardinal. The open, parklike structure of some savannas also attracts some species that are more characteristic of grassland habitats, such as the Red-tailed Hawk, Eastern Bluebird, and Eastern Kingbird. A few of the rarer species that you may find in this habitat might include Whip-poor-will, Least Flycatcher, Tufted Titmouse, and Summer Tanager (Braidwood R.A.). For many of these species, Illinois contains a significant portion of their global population.

Threatened and Endangered Species - None of the species inhabiting savannas in this area are threatened or endangered, although the Barn Owl (SE) may have been a bird of very open savannas and has occurred in the region.

Exotic Species - European Starlings are now one of the most abundant species in Illinois, and they are detrimental to native savanna species because they compete with resident birds (especially woodpeckers) for nesting cavities.

Population dynamics and Management

Savannas may be associated with high levels of cowbird abundance and parasitism levels, although some species may have higher nesting success in savanna restorations than in unburned forest (J.D. Brawn, unpubl. data). Many of the species that are most abundant in savannas are resistant to cowbirds (e.g., cavity nesters, American Robins, Baltimore Orioles). Unlike many forest birds, these species are able to recognize cowbird eggs and either eject them from their nests or rebuild the nests over them (Rothstein and Robinson 1994). A detailed study of the effects of savanna restoration on bird populations, ecology, and nesting success is underway in adjacent watersheds (J.D. Brawn, unpubl. data). This study should be fully applicable to savannas in the PPAA.

Savannas also appear to be very favorable habitat for migrants. The heavy use of oaks by spring migrants (Graber and Graber 1983) and by mast-consuming species suggests that savanna restoration should be a high priority for birds in this region.

Prairie/Grassland

Although native prairie habitat is rare in Illinois, the PPAA (see the chapter on Natural Vegetation Communities) contains the largest remaining native prairie tract left in Illinois (GLP). With additional large areas of grassland habitat at the nearby Des Plaines Conservation Area, as well as what is the largest single grassland tract left in the state at Midewin (with prairie restoration one of the main management goals at that site), grassland bird species and their habitats should be the most important concern for any management

strategy that is developed for this region. In addition, many bird species that historically lived in prairies are also able to live in grassland habitat such as hay fields, and sometimes pastures. These habitats are also relatively common in the PPAA compared to many areas of the state. The 166,000 acres of "grassland" in the basin (more than 17% of the land area) is a relatively large amount when compared with most other similar sized areas of the state. The very large Midewin site (19,000+ acres) has considerable potential for prairie restoration and already contains some of the largest concentrations of many typical grassland species, including several that are uncommon to rare over most of the state. Populations of Upland Sandpiper, Loggerhead Shrike (outside southern Illinois), Bobolink, Grasshopper Sparrow, and Henslow's Sparrow are some of the largest remaining in the state. Pastures in the area are mostly heavily grazed and little-used by grassland birds. They are also favored sites for foraging Brown-headed Cowbirds. The many sod farms in the area also attract those species that prefer shortgrass type "grassland" areas.

Regularly Occurring Species

Typical Species - In these habitats, typical species include a subset of those found on larger grasslands throughout the state: Mallard, Blue-winged Teal (near wetlands), Red-tailed Hawk, American Kestrel, Northern Bobwhite, Ring-necked Pheasant, Upland Sandpiper, Eastern Kingbird (w/scattered trees), Willow Flycatcher (shrubs), Horned Lark (recently burned), Bell's Vireo (shrubs), Barn Swallow, Brown Thrasher (shrubs), Sedge Wren, Common Yellowthroat, Eastern Meadowlark, Western Meadowlark (rare; local) Red-winged Blackbird, Dickcissel, Savannah Sparrow, Song Sparrow, Henslow's Sparrow, Grasshopper Sparrow, Vesper Sparrow, Field Sparrow, Bobolink, Orchard Oriole (shrub) and American Goldfinch. See Table 13 for a more complete list of grassland species found in the Prairie Parklands region.

Threatened and Endangered Species - Several State Endangered (SE) and State Threatened (ST) species are known to breed in grasslands in the area and include the Northern Harrier (SE), Short-eared Owl (SE), Upland Sandpiper (SE), King Rail (SE), and Henslow's Sparrow (SE). In addition, Black Rail (SE) may also nest in grasslands, especially where there are wet areas in or nearby the grasslands. Loggerhead Shrikes (ST) also use grasslands with scattered shrubs to forage over, and are locally common (at Midewin) in the region. This area would also probably be the best area to try and reestablish another breeding population of the state endangered Greater Prairie Chicken, although inherent problems with nest parasitism by the introduced Ring-necked Pheasant would make this a difficult management challenge.

Exotic Species - Two introduced species are found in the grasslands of the PPAA. The Ring-necked Pheasant, which is native to Asia, was first released in Illinois in about 1890 (Bohlen and Zimmerman 1989) and they continue to be released. European Starlings feed in grasslands following grazing, mowing, or burning. The introduced Gray Partridge occurs in the region but this area is at the southeastern limit of their range in Illinois (Farris 1970).

Population Dynamics and Management

Certain species, such as the Grasshopper Sparrow and Bobolink, have declined precipitously as grasslands have been converted to row crops (Herkert 1991). Large grassland areas such as GLP and Midewin may actually act as local "source" populations for some grassland species and these areas still contain regular breeding populations of most prairie species. For example, the Northern Harrier (SE) and possibly the Short-eared Owl (SE), both highly area-sensitive species requiring large grasslands, may actually maintain a small but regular breeding population in the area. Henslow's Sparrows (SE) are regularly found at GLP, DPCA and Midewin, and are a species that is also area-sensitive and requires taller, ranker grass that has not recently been burned (Herkert 1994). Barn Owls (SE) would also be good candidates for reestablishment in restored grasslands in this area.

In two breeding bird censuses conducted by the same field observer at Goose Lake Prairie, ten years apart, 19 of 21 (90%) grassland bird species declined while numbers of shrubland species did not decline appreciably and some increased (Birkenholz 1982). Hence, the removal of woody vegetation may be beneficial to grassland bird species. Shrubland species that would be lost are of little or no regional concern because they have large global populations and are common throughout Illinois (e.g., Gray Catbird, Brown Thrasher, House Wren). Perhaps the best way to maintain desired shrubland birds (Bell's Vireo, Willow Flycatcher, Yellow Warbler) would be to allow willow thickets to grow in low, wet areas that would not burn in most areas. Natural hazel thickets may also have provided habitat for these species historically. The guidelines provided by Herkert et al. (1993) for grassland management should be followed. In particular, dense, tall stands of prairie grasses are rarely used by grassland birds and should be avoided in most areas.

Migrant birds use grasslands as stopover habitat, especially Smith's and Lapland Longspurs, various rails, bitterns, American Golden Plovers, Pectoral Sandpipers and Buff-breasted Sandpipers, as well as a large array of sparrow species, especially Lincoln's and Swamp Sparrows.

Lakes, Ponds, and Impoundments

There are several natural lakes or ponds in the PPAA (see chapter on Aquatic Biota), as well as a number of impoundments. Some of the areas most attractive to migrating waterfowl, gulls, and shorebirds include LaSalle Lake, Heidecke Lake, Dresden Cooling Lake, and numerous smaller natural and strip-mine ponds. Artificial nesting platforms, which have been used at the nearby Lake Renwick, could be used to help establish new nesting colonies of herons and cormorants in or near some of these areas. Ring-billed Gulls have established nesting colonies on grass and boulder-lined dikes along or jutting out into the three large power plant lakes.

Regularly Occurring Species

Typical Species - Spotted Sandpipers may occasionally breed around lakes, ponds, and impoundments. Willow Flycatchers (willows), Common Yellowthroats, Common Grackles, Red-winged Blackbirds, Swamp Sparrows, and Song Sparrows likely nest along ponds, especially those with gradual shorelines and some emergent vegetation (e.g., *Typha, Scirpus,* and *Juncus*) along the edge. Red-headed Woodpecker (dead snags; especially at Herrick Lake), Northern Rough-winged Swallows, Bank Swallows, Barn Swallows, Cliff Swallows, Purple Martins, and Tree Swallows forage over the open-water habitats as long as nest sites are available. Green Herons often nest along ponds lined with dense, woody vegetation. Other species which have been known to nest locally in such areas, most on a regular basis, include Pied-billed Grebe, Double-crested Cormorant, Great Blue Heron, Great Egret, Cattle Egret, Black-crowned Night-Heron, Mute Swan, Canada Goose, and Mallard, and Ring-billed Gull.

Exotic Species - The Mute Swan is the only non-native species that occurs in the area. These birds appear to be increasing locally in the area and could have a negative impact on local nesting waterfowl.

Population Dynamics and Restoration

One of the most important roles of lakes, ponds, and impoundments is as resting habitat for migrating waterbirds. These open-water habitats are often the only deepwater habitat available for loons, grebes, scaup, Common Goldeneyes, Buffleheads, and mergansers, all of which dive to catch food. Similarly, gulls and terns often forage over open water, and rest on gravel or mud "beaches" or "islands" during migration. At low water, the edges of lakes are also used by shorebirds, herons, and egrets. All species of swallows use open-water for foraging, especially during cold weather.

A comparative study of the use of various ponds, lakes, and impoundments by migrating birds might help improve their design and management, but probably the most useful way to enhance these habitats is by increasing the amount of emergent vegetation along their edges. This essentially involves creating shallow wetlands along the edges of open water. Also, colonies of waterbirds nesting along the edges of lakes should be protected from disturbances. Nesting platforms have attracted increasing numbers of Double-crested Cormorants and herons to breed at the nearby Lake Renwick and could do so in this area. Artificial nesting platforms have also been shown to attract breeding Ospreys and could do so locally as well.

Creeks and Rivers

The Illinois, Des Plaines, and Kankakee Rivers have all been considerably altered by human activities, but still has some associated river species. The I & M Canal also has suitable habitat for many of the same species, although the nesting success of species along

such narrow corridors has not been studied. Many of the larger lakes, parks and preserves in the PPAA are located along or very near the Des Plaines, Kankakee, or Illinois Rivers; major migration corridors for virtually all species of birds that migrate into and through the PPAA. There are also more than 66 miles of biologically significant stream segments including portions of the aforementioned rivers as well as significant portions of the Mazon River and Johnny Run Creek.

Regularly Occurring Species

Typical Species - Among the species found along creeks and rivers are the following: Canada Goose, Mallard, Wood Duck (forested), Cooper's Hawk (forested corridors), Great Blue Heron, Green Heron (forested), Killdeer, Great Horned Owl (forested), Barred Owl (forested), Eastern Screech Owl (woody corridors), Belted Kingfisher, Eastern Phoebe (especially near bridges), Barn Swallow, Northern Rough-winged Swallow, Bank Swallow, Cliff Swallow (rare), House Wren (in woody debris), Cedar Waxwing, Warbling Vireo (woody corridors, especially cottonwoods and willows), Yellow Warbler (shrubby corridors), Common Yellowthroat (grassy and shrubby streamsides), Common Grackle, Red-winged Blackbird, Baltimore Oriole (woody corridors), Indigo Bunting, Song Sparrow (shrubby streamsides).

Population Dynamics and Management

We lack data on populations and nesting success of birds in riparian corridors of varying widths and of their use by migrants. However, increasing the amount of woody riparian corridor habitat should enhance populations of many species, and would help restore natural hydrology. Restoring the hydrology would, in turn, improve wetland habitat in the floodplain, both in woody backwaters and in oxbows (see above). It would also be interesting to measure the movements of migrants along corridors to determine if they act as flyways.

Cultural Habitats: Cropland

Agricultural areas generally provide poor quality habitat for most birds - diversity in cropland is much lower than in the original habitats. However, it is nonetheless important to consider the role of agricultural habitats for supporting bird populations in the PPAA because most land within the PPAA has been usurped for agricultural purposes. Fully two thirds (628,000 acres) of the PPAA acreage is currently used for crop production (Table 2, Figure 4).

Regularly Occurring Species

Typical Species - Cropland bird communities in the PPAA have about the same bird species that are common statewide in this structurally simple habitat: Mallard (foraging; nesting in

Conservation Reserve Program [CRP] fields), Red-tailed Hawk (foraging), American Kestrel, Ring-necked Pheasant, Killdeer, Rock Dove, Mourning Dove, Great Horned Owl (foraging), Eastern Phoebe [farmsteads], Horned Lark, Barn Swallow, American Crow, Eastern Bluebird (where nest boxes are provided), Loggerhead Shrike (ST), European Starlings, House Sparrow, Common Grackle, Brown-headed Cowbird, Red-winged Blackbird, Chipping Sparrow (farmsteads), Savannah Sparrow (grassy strips), Grasshopper Sparrow (grassy strips), Vesper Sparrow, and Field Sparrow.

Threatened and Endangered Species - Some species characteristic of recently burned and heavily grazed, dry grasslands have adapted to croplands, including the Horned Lark, Vesper Sparrow, and Loggerhead Shrike (ST). The shrike, however, also requires spiny hedgerows for nesting; it is now mostly absent from the area, except at Midewin.

Exotic Species - Introduced species thrive in the agricultural habitats of the PPAA. In fact, four of the most abundant species in the cropland of the PPAA, Ring-necked Pheasant, Rock Dove, European Starling and House Sparrow, were all introduced from Europe or Asia.

Intensively farmed areas usually offer little in the way of stopover habitat except around farmsteads. However, wet fields in the spring will attract shorebirds, especially American Golden Plovers and Pectoral Sandpipers, as well as flocks of American Pipits and Lapland Longspurs. Gulls will occasionally forage in recently plowed fields, especially in spring.

Population Dynamics and Management

Warner (1994) documented the low populations and extremely low nesting success of birds in Ford County, an area of very intensive agriculture. On the other hand, increasing grassy cover along roadsides, drainage ditches, and around farmsteads can substantially increase grassland bird habitat. Within an agricultural landscape, the CRP can also benefit cropland birds by providing nesting cover and attracting such species as Henslow's, Grasshopper, and Savannah Sparrows.

Cultural Habitat: Successional Fields

Successional habitats, such as abandoned fields and pastures, are relatively uncommon in the PPAA. These habitats, which are often dominated by non-native plant species of shrubs and vines, may be structurally similar to native successional habitats that historically occurred along the edges of meandering rivers or in large treefall gaps. There are relatively large areas of this type of habitat remaining at DPCA and at Midewin. Management plans at Midewin call for the removal of the non-native species of shrubs, and replacement with native crabapple and hawthorne. Such habitats usually have dense, protective cover and are often rich in fruit producing plants, and therefore offer rich habitat for breeding and migratory birds. However, given the scarcity of natural shrublands in the Midwest, we

know little about "natural" shrublands. Nonetheless, many local species that use shrubby vegetation now depend almost entirely on anthropogenic disturbances to set back succession.

Regularly Occurring Species

Typical Species - Northern Bobwhite, Ring-necked Pheasant, American Woodcock (wet areas), Mourning Dove, Yellow-billed Cuckoo, Black-Billed Cuckoo (erratic), Ruby-throated Hummingbird, Northern Flicker, Downy Woodpecker, Eastern Kingbird, Willow Flycatcher (wet thickets), Blue Jay, Black-capped Chickadee, House Wren, Carolina Wren (rare this far north), Gray Catbird, Brown Thrasher, American Robin, Eastern Bluebird, Cedar Waxwing, White-eyed Vireo (rare this far north), Bell's Vireo (common at Midewin), Blue-winged Warbler (rare this far north), Yellow Warbler, Common Yellowthroat, Yellow-breasted Chat (uncommon), Red-winged Blackbird, Northern Cardinal, Rose-breasted Grosbeak (older thickets), Blue Grosbeak (Braidwood R.A.), Indigo Bunting, House Finch, Orchard Oriole, American Goldfinch, Eastern Towhee, Lark Sparrow (Braidwood R.A.), Field Sparrow, and Song Sparrow. Successional habitats add greatly to local diversity, although only a few of these species have nationally declining populations (Yellow-breasted Chat, Field Sparrow, Blue-winged Warbler).

Threatened and Endangered Species - No threatened or endangered species are known to depend on successional habitats in the PPAA, although this is the type of habitat which was formerly occupied by Bewick's Wren (SE), which has bred in the area.

Exotic Species - Most species found in successional habitats are native, although Ring-necked Pheasants use early successional fields, and House Finches breed in shrubbery. Gray Partridge apparently still occur in the area in small numbers, but this area is historically near the edge of their range in Illinois (Farris 1970).

Population Dynamics and Management

Although nest predation rates appear to be very high in successional habitats, brood parasitism levels are generally moderate or low (Robinson et al., in press). Some species nesting in these habitats eject cowbird eggs (Gray Catbird, Brown Thrasher, Cedar Waxwing, Eastern Kingbird, Baltimore Oriole, American Robin), nest in cavities that are inaccessible to cowbirds (both wrens, chickadees, Eastern Bluebird), abandon many parasitized nests (Yellow Warbler, Field and Chipping Sparrows), defend their nests aggressively (Red-winged Blackbird, Eastern Kingbird, Willow Flycatcher, Common Grackle), have inappropriate diets for cowbird nestlings (House Finch, American Goldfinch), or continue nesting until very late in the season when cowbirds have stopped laying (Mourning Dove, Yellow-billed Cuckoo, Gray Catbird, Cedar Waxwing, White-eyed Vireo, Northern Cardinal, Indigo Bunting, American Goldfinch, and Eastern Towhee). As a result, early successional species may be able to thrive even in small patches in agricultural landscapes. An intensive study of habitat requirements, nesting success, and population

dynamics of shrubland birds is now underway (S.K. Robinson, J.D. Brawn, and E.J. Heske, unpubl. data). The results of this study should be applicable to shrubland birds in the PPAA. Shrubland species may be excellent target species for lands managed to promote game species, especially Northern Bobwhites.

In addition to use during the breeding season, shrublands are very heavily used by migrating species, especially in habitats mingled with scattered trees. Shrubland-preferring migrants include, Northern Saw-whet Owl (mainly in evergreens), Yellow-bellied Flycatcher, Alder Flycatcher, Least Flycatcher, Philadelphia Vireo, Golden-winged Warbler, Orange-crowned Warbler, Nashville Warbler, Chestnut-sided Warbler, Mourning Warbler, Connecticut Warbler, Wilson's Warbler, Palm Warbler, Canada Warbler, Clay-colored Sparrow, White-crowned Sparrow and Lincoln's Sparrow. Shrubland habitats therefore provide real benefits to migrant birds and greatly increase local biodiversity.

Cultural Habitats: Developed Land

Residential and urban areas represent only a little more than 6% of the PPAA (Table 2, Figure 6). These areas, scattered with lawns, parks, and other manicured vegetation, offer suitable breeding habitat for relatively few bird species.

Regularly Occurring Species

Typical Species - Breeding species include: Red-tailed Hawk (in more sparsely inhabited areas), American Kestrel (especially farmsteads), Killdeer, Rock Dove, Mourning Dove, Ringed Turtle-Dove, Eurasian Collared-Dove, Eastern Screech-Owl, Great Horned Owl, Common Nighthawk, Chimney Swift, Ruby-throated Hummingbird, Northern Flicker, Red-bellied Woodpecker ("urban forests"), Eastern Wood-Pewee, Eastern Phoebe, Barn Swallow, Purple Martin, Blue Jay, American Crow, Black-capped Chickadee, Tufted Titmouse (uncommon), White-breasted Nuthatch, House Wren, Carolina Wren (uncommon this far north), Gray Catbird, Brown Thrasher, American Robin Eastern Bluebird (farmsteads), European Starling, Warbling Vireo, Common Yellowthroat, House Sparrow, Common Grackle, Brown-headed Cowbird, Baltimore Oriole, Northern Cardinal, House Finch, American Goldfinch, Chipping Sparrow, and Song Sparrow.

Developed lands contain an unusual mix of species that can use ornamental shrubs (e.g., Northern Cardinal and Song Sparrow), shade trees (e.g., Baltimore Oriole, Warbling Vireo, Black-capped Chickadee, Tufted Titmouse, Eastern Wood-Pewee), short mowed grass (e.g., American Robin, Common Grackle, Northern Flicker, American Crow, Brown-headed Cowbird, Mourning and Rock Doves, European Starling, and Chipping Sparrow), and can nest safely in human structures (e.g., American Kestrel, Killdeer (roofs, roads), Common Nighthawk (roofs), Chimney Swift, Eastern Phoebe, Barn Swallow, Purple Martin, House and Carolina Wrens, American Robin, Eastern Bluebird, European Starling, House Sparrow and House Finch). This community has no parallel in the natural world.

Threatened and Endangered Species - There are no threatened or endangered species found in residential or urban areas other than the Loggerhead Shrike (ST), which often forages in mowed grass of rural farmsteads.

Exotic Species - Many species in developed areas are introduced. Huge populations of introduced European Starlings, House Sparrows, Rock Doves, and House Finches compete with native species for nest sites and food at bird feeders. House Finches are native to the western United States but after a population was released on Long Island in the 1940s, they spread west from New York and are now common in the urban and rural areas of Illinois. Eurasian Collared Doves and Ringed Turtle-Doves are fairly recent but established nesters in some residential and urban neighborhoods, especially in the Joliet area. Monk Parakeets have been sighted in the area and could eventually become established as well.

Migrating birds make heavy use of shade trees in developed areas and, when available, also use shrubs. Typical migrants of "urban forests" include: Cooper's and Sharp-shinned Hawks (both forage at bird feeders), Common Nighthawk, Ruby-throated Hummingbird (especially at feeders), Northern Flicker, Yellow-bellied Sapsucker, Red-breasted Nuthatch (conifers), Brown Creeper, Hermit Thrush, Golden-crowned Kinglet, Ruby-crowned Kinglet, Cedar Waxwing, Red-eyed Vireo, Tennessee Warbler, Cape May Warbler (conifers), Black-throated Green Warbler, Blackburnian Warbler, Bay-breasted Warbler, Blackpoll Warbler, American Redstart, Rusty Blackbird, Evening Grosbeak (feeders), Purple Finch (feeders), Pine Siskin (feeders, conifers), American Goldfinch (feeders), Eastern Towhee (feeders), Dark-eyed Junco (feeders), American Tree Sparrow, White-crowned Sparrow, and White-throated Sparrow.

Population Dynamics and Management

Developed areas are characterized by abnormally high population densities of species that occasionally or regularly depredate nests (e.g., Blue Jay, American Crow, House Wren, Gray Catbird, Common Grackle, and Brown-headed Cowbird). Bird feeders further augment populations of many species in rural or urban areas, especially the House Finch, Monk Parakeet, Eurasian Collared Dove, and Ringed Turtle-Dove, by increasing winter survival.

Nesting success of species of developed areas has not been systematically studied. Such studies could lead to recommendations for enhancing populations of the native species that have adapted to human developments. However, high populations of predatory birds, domestic cats, and other mammalian predators may make it difficult for many species that build open-cup nests in accessible locations to nest successfully.

Management Recommendations

The PPAA contains several rich wetland bird communities and an important migration corridor in the Des Plaines, Kankakee, and Illinois Rivers. Wetland and prairie

conservation should clearly be of the highest priority in the PPAA because of relatively large populations of many state threatened and endangered species. Grassland restoration, especially around existing wetlands, would provide habitat for declining grassland birds, as well as help buffer wetlands from surrounding development, and provide nesting habitat for many wetland species. Similarly, wooded buffer strips around wetlands can perform some of the same functions. This coordinated management of wetland habitats, especially large wetlands, or complexes of nearby smaller wetlands, offers the best hope for sustaining populations of endangered and threatened species.

Most forest sites in the PPAA are small and have little potential to be enlarged sufficiently to create tracts large enough to avoid extremely high levels of nest predation and brood parasitism. For these areas, restoration of native plant communities, especially savanna areas, coupled with judicious consideration of the needs of migrant birds (some shrubby areas and oak trees) might be the best management strategy.

Developed areas, especially urban forest and parks, can be managed to improve habitat by encouraging oaks and leaving shrubby areas for migrants.

Agricultural areas benefit from increased cover provided by Conservation Reserve Program fields, shrub-lined drainage ditches, and unmowed roadsides.

Mammals

Introduction

Information in this section was compiled largely from range maps and historical records in Hoffmeister (1989). The Illinois Natural Heritage Database (INHD) (Illinois Department of Natural Resources [IDNR], Division of Natural Heritage) was checked for recent records (as of August 1998) of threatened and endangered species. Taxonomy follows Wilson and Reeder (1993).

Mammal species known or likely to occur in the Prairie Parklands Assessment Area (PPAA) are listed in Table 14. The 43 species in this table represent 73% of the 59 mammal species that currently occur in Illinois (Hoffmeister 1989). Eight species of bats are included in the table, but the silver-haired bat may be present only during spring and autumn migration periods and only the big brown bat is likely to remain in the PPAA during the winter. Of the eight mammal species listed as endangered or threatened in Illinois (Illinois Endangered Species Protection Board 1999, U.S. Fish and Wildlife Service 1991), only two, the federally endangered Indiana bat (*Myotis sodalis*) and state threatened river otter (*Lontra canadensis*) are widely distributed (Herkert 1992). There are no confirmed records of endangered or threatened mammals in the PPAA, but the river otter has been reported from Du Page County, NE of Lemont, about 10 miles north of the PPAA (Illinois Department of Natural Resources 1998). Given the apparent recent increase in numbers and distribution of the (formerly state threatened) bobcat (*Lynx rufus*) in Illinois (Woolf 1996), it would not be surprising to have a bobcat reported somewhere along the forested parts of the Illinois River or upper Kankakee River soon. The population status of many mammal species in the PPAA is unknown; in these cases designations in Table 14 are projections based on their status in other parts of Illinois.

The majority (66.5%) of the PPAA consists of cropland, and urban areas, including Joliet, Mokena, New Lenox, Frankfort, and Morris, occupy an additional 6.3% of the area. Many mammals are generalists that use a variety of habitat types and have adapted to living in areas that have been altered by humans. Larger mammals that now commonly occur in agricultural and urban areas include the Virginia opossum, eastern cottontail, fox and gray squirrels, coyote, red fox, raccoon, striped skunk, and white-tailed deer. Several species of small mammals, including the eastern mole, northern short-tailed shrew, deer mouse, and meadow and prairie voles, can occupy the hayfields, pastures, and fencerows in agricultural areas and other maintained areas such as roadsides, cemeteries, and lawns. Big brown and little brown bats commonly roost in buildings and other small mammals (such as the white-footed mouse) sometimes enter buildings in search of food and shelter. Forested habitats occupy only 6.5% of the PPAA, are extremely fragmented, and occur primarily along river systems. Thus, the PPAA is unlikely to provide extensive habitat for species of mammals

associated primarily with forest. In contrast, 17.6% of the PPAA is grassland, and the Midewin National Tallgrass Prairie, Des Plaines Conservation Area, and Goose Lake Prairie offer exceptional opportunities for conservation of mammal species associated with grasslands.

The Norway rat and house mouse are the only exotic, non-domesticated mammals that occur regularly in Illinois. These species are strongly associated with human structures (e.g. houses, barns, warehouses), but both can be found in natural habitats near buildings. The house mouse, in particular, can sometimes reach substantial numbers in grasslands near structures (Hoffmeister 1989). These species are now so widespread that they are part of the mammalian fauna throughout the United States. They could not be eliminated easily from natural habitats and their presence is not a matter of great concern. Large numbers of free-roaming and feral domestic cats (*Felis silvestris*) occur in Illinois as elsewhere (Warner 1985, Coleman and Temple 1996). They can have a negative impact on populations of birds (especially ground-nesting birds) and small mammals and reduce prey availability for native predators (Warner 1985, Churcher and Lawton 1987, Coleman and Temple 1996). There is also the potential for unvaccinated cats to transmit diseases to wild mammals or humans (Coleman and Temple 1996).

Table 14. List of mammal species known or likely to occur in the Prairie Parklands Assessment Area.[1]

Common name[2]	Order Scientific name	Habitat[3]	Population status[4,5]
Marsupials	Didelphimorphia		
Virginia opossum	*Didelphis virginiana*	F, W, G	C
Insectivores	Insectivora		
masked shrew	*Sorex cinereus*	G, F, W	C
northern short-tailed shrew	*Blarina brevicauda*	F, G, W	C
least shrew	*Cryptotis parva*	G	C?
eastern mole	*Scalopus aquaticus*	F, G	C
Bats	Chiroptera		
little brown bat	*Myotis lucifugus*	F, caves, buildings	C
northern long-eared bat	*Myotis septentrionalis*	F, caves, buildings	U
silver-haired bat	*Lasionycteris noctivagans*	F, caves (hibernation)	U
eastern pipistrelle	*Pipistrellus subflavus*	F, caves	U?
big brown bat	*Eptesicus fuscus*	F, caves, buildings	C
red bat	*Lasiurus borealis*	F	C
hoary bat	*Lasiurus cinereus*	F	U
evening bat	*Nycticeius humeralis*	F, buildings	U?
Rabbits	Lagomorpha		
eastern cottontail	*Sylvilagus floridanus*	G, F (edges)	C
Rodents	Rodentia		
eastern chipmunk	*Tamias striatus*	F	C
woodchuck	*Marmota monax*	G, F (edges)	C
thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*	G	C

Table 14. Continued.

Common name[2]	Order Scientific name	Habitat[3]	Population status[4,5]
Franklin's ground squirrel	*Spermophilus franklinii*	G	R?
gray squirrel	*Sciurus carolinensis*	F, urban	U, C (urban)
fox squirrel	*Sciurus niger*	F	C
southern flying squirrel	*Glaucomys volans*	F	C?
beaver	*Castor canadensis*	W	C
western harvest mouse	*Reithrodontomys megalotis*	G	C?
deer mouse	*Peromyscus maniculatus*	G	C?
white-footed mouse	*Peromyscus leucopus*	F, G, W (mostly F)	C
meadow vole	*Microtus pennsylvanicus*	G	C
prairie vole	*Microtus ochrogaster*	G	C
woodland vole	*Microtus pinetorum*	F	U?
muskrat	*Ondatra zibethicus*	W	C
southern bog lemming	*Synaptomys cooperi*	G, W	U?
Norway rat*	*Rattus norvegicus*	buildings	C
house mouse*	*Mus musculus*	mostly buildings	C
meadow jumping mouse	*Zapus hudsonius*	G, F, W	U?
Carnivores	Carnivora		
coyote	*Canis latrans*	F, G, W	C
red fox	*Vulpes vulpes*	G, F, W	C
gray fox	*Urocyon cinereoargenteus*	F	R?
raccoon	*Procyon lotor*	F, W, G	C
least weasel	*Mustela nivalis*	G, W	C
long-tailed weasel	*Mustela frenata*	F, W, G	C
mink	*Mustela vison*	W, G, F	C
badger	*Taxidea taxus*	G	U?
striped skunk	*Mephitis mephitis*	F, G, W	C
Even-toed ungulates	Artiodactyla		
white-tailed deer	*Odocoileus virginianus*	F, W, G	C

[1] Compiled from range maps and known records reported in Hoffmeister (1989) and Illinois Department of Natural Resources (1998).
[2] * = introduced species.
[3] Habitats: W = wetland, G = grassland, F = forest.
[4] Population status: C = common, U = uncommon, R = rare, ? = status uncertain
[5] Subjective estimate based on personal experience of E.J. Heske and J.E. Hofmann in Illinois.

Forest

Typical Species

Mammal species known or likely to occur in the PPAA that are restricted to forested habitats are the hoary bat, eastern chipmunk, southern flying squirrel, woodland vole, and gray fox. Species that are primarily associated with forests but also utilize other types of

habitat include the Virginia opossum, red bat, fox and gray squirrels, white-footed mouse, raccoon, and white-tailed deer. The little brown bat, big brown bat, northern long-eared bat, eastern pipistrelle, and evening bat forage in forested habitats, but roost in buildings or other man-made structures as well as trees. Some species, such as the eastern cottontail and woodchuck, specialize in the use of forest edges. Additional habitat generalists that would typically occur in forests in the PPAA are listed in Table 14.

Most species of mammals associated with forests are not restricted to a specific type of forest (i.e. upland or bottomland forest). Species that hibernate (e.g. woodchucks, eastern chipmunks) or are primarily fossorial (e.g. eastern moles, woodland voles) need sites with well-drained, uninundated soils. The gray fox requires extensive forest cover and has become less common in parts of Illinois (Hoffmeister 1989). The total amount of forest in the PPAA is small, and there are no confirmed records of gray fox for this area. However, sizeable forest tracts remain in a few places, such as along the Illinois River, and may support gray foxes. The bobcat has also recently increased in numbers in Illinois (Woolf 1996) and may eventually immigrate into these areas. Gray squirrels require extensive tracts of mature forest with a dense understory, whereas fox squirrels can occupy open forests, woodlots, and fencerows (Hoffmeister 1989). Consequently, gray squirrel numbers also have declined in Illinois. Nixon et al. (1978) considered gray squirrels absent from most of the PPAA, being common only in urban areas around Joliet and rare in riparian forests along the Illinois and Kankakee Rivers. Towns away from the rivers in the PPAA are occupied by fox squirrels rather than gray squirrels (Nixon et al. 1978). Tree squirrels, flying squirrels, and chipmunks tend to be most abundant in forests containing large numbers of mast-producing trees such as oaks and hickories. Raccoons and opossums are most abundant in forest tracts in proximity to water (Hoffmeister 1989).

Threatened and Endangered Species

None of the mammal species known or likely to occur in the PPAA is listed as threatened or endangered. A specimen of the federally endangered Indiana bat was collected in Cook County (near the lakefront in Chicago) during September 1928 (Hoffmeister 1989). This individual would have been a migrant. Indiana bats hibernate in Blackball Mine in LaSalle County, but maternity colonies have been found only as far north as Henderson and Ford counties (Gardner et al. 1996). PPAA is probably beyond the range of this species, but surveys of potential habitat should be conducted.

Information Gaps

Data on the distribution and population status of several forest-dwelling species in the PPAA are not available. Surveys should be conducted to determine the status of the gray fox in the PPAA. The Illinois Natural Heritage Database (Illinois Department of Natural Resources 1998) contains no records of the bobcat (formerly a state threatened species) in the PPAA, but Woolf (1996) compiled eight records of recently reported sightings for Cook and Will counties. Surveys should also be conducted to determine the status of this species

in the PPAA. Until recently only two specimens of the pygmy shrew (*Sorex hoyi*) had been collected in Illinois, one near Palatine in Cook County (Hoffmeister 1989). At least four specimens have been collected in Cook and McHenry counties during the 1990s (Mierzwa 1991, Sliwiski 1994, INHS Mammal Collection). It would be interesting to determine if this species' range extends into the PPAA. There are no records for the eastern pipistrelle and few records for the northern long-eared bat, hoary bat, and evening bat in the PPAA (Hoffmeister 1989, INHS Bat Survey Database); therefore, information on the distribution and abundance of these species would be of interest. Bat surveys in the PPAA might also detect the presence of the Indiana bat. Flying squirrels and eastern chipmunks appear to be absent from small, isolated patches of forest in east-central Illinois (Rosenblatt et al. 1999). Because forest habitat in the PPAA is fragmented, it would be valuable to assess the ability of forest species to maintain viable populations and to disperse between forested tracts in an agricultural landscape. The distribution of flying squirrels, chipmunks, and woodland voles, in particular, should be determined.

Prairie/Grassland

Typical Species

Mammal species occurring in the PPAA that are restricted to grassland habitats are the least shrew, thirteen-lined and Franklin's ground squirrels, western harvest mouse, deer mouse, prairie and meadow voles, and badger. Other species strongly associated with grassland habitats include the masked shrew, northern short-tailed shrew, eastern cottontail, woodchuck, southern bog lemming, meadow jumping mouse, and red fox. Additional habitat generalists of the PPAA that use grasslands are listed in Table 14.

Most mammals designated as grassland species are not restricted to native or undisturbed grasslands. Rather, the vegetative composition and structure of rights-of-way, hayfields, pastures, crop field edges, old fields, and prairie restorations provide suitable habitat for many of these species. The masked shrew, meadow vole, southern bog lemming, and meadow jumping mouse generally prefer more mesic grasslands (Hoffmeister 1989). Eastern cottontails and woodchucks are most abundant where grassland habitat is adjacent to forested areas and can be considered edge species. The white-footed mouse, which is a forest species, can be found in grasslands if scattered trees or shrubs are present.

Threatened and Endangered Species

None of the mammal species primarily associated with grasslands in the PPAA is listed as a threatened or endangered species in Illinois.

Information Gaps

Information is needed on the current distribution and abundance of several grassland mammals in the PPAA. Franklin's ground squirrel is known historically from locations in the PPAA, but this species is thought to have declined in the eastern portion of its range, including Illinois (Lewis and Rongstad 1992). In a recent survey only one Franklin's ground squirrel was caught at 15 sites in Champaign, Piatt, and Vermilion counties (Hofmann 1998). The status of this species in the PPAA should be studied further. The Midewin National Tallgrass Prairie, Des Plaines Conservation Area, and Goose Lake Prairie offer potential sites for reestablishing this species if it no longer occurs there. The status of the badger in Illinois was investigated by Warner and Ver Steeg (1995) who documented its presence in each of the counties in the PPAA, but its population status in the PPAA should be determined more precisely. Although the red fox is not strictly a grassland species, it is most often associated with open habitats. It has been suggested that recent increases in the abundance of coyotes may have negatively affected populations of red fox; therefore, the status of the red fox in the PPAA should be evaluated. The PPAA contains several prairie remnants and restorations that are somewhat isolated in a landscape dominated by row crops. The persistence of grassland small mammal populations in these prairies and the ability of small mammals to travel between such habitat islands should be investigated.

Wetland

Typical Species

Mammal species in the PPAA that require wetlands or aquatic habitats (lakes, ponds, streams, and rivers) are the beaver, muskrat, and mink. Beaver and muskrat are highly specialized for aquatic life and need open water, whereas mink are more terrestrial but typically occur in proximity to water. Raccoons and opossums are most abundant in areas near water. Bats occurring in the PPAA could utilize wetlands as well as aquatic habitats for foraging. The masked shrew, northern short-tailed shrew, southern bog lemming, and meadow jumping mouse use emergent wetlands (marshes, sedge meadows, and wet meadows) extensively in addition to other types of habitats. Small mammals such as these are not adapted for aquatic life and occupy the vegetation along the edges of wetlands or sites where standing water is not present. Additional habitat generalists that use wetlands opportunistically are listed in Table 14.

Threatened and Endangered Species

There are no records for the state endangered river otter in the PPAA prior to 1998 (Hoffmeister 1989, Illinois Department of Natural Resources 1998). Otters were sighted at Waterfall Glen Forest Preserve in Du Page County, about 10 miles north of the PPAA, in 1988 (Illinois Department of Natural Resources 1998).

The main breeding population of native river otters in Illinois inhabits the backwaters and tributaries of the Mississippi River in the northwestern corner of the state (Anderson 1995). Smaller populations occur in the Cache and Big Muddy river systems in southern Illinois and the numbers of reports along the Rock River and the middle section of the Mississippi River have been increasing (Anderson 1995). Since 1994 the IDNR has released 346 river otters at 15 locations in the Kaskaskia, Wabash, and Illinois river systems (Bluett 1997). Increased numbers of sightings of river otters and sightings of young otters (indicating successful reproduction by released otters) have prompted the Illinois Endangered Species Board to change the status of river otters from state endangered to state threatened. If the number of otters in the state continues to increase, they could reach the PPAA.

Information Gaps

Aquatic habitat in the PPAA should be monitored regularly for river otters. The presence of beavers is considered favorable for otters, but the impact of beaver populations on the physical structure of riparian systems in the PPAA should be evaluated. Prior to European settlement much of Will and Grundy counties consisted of wetlands (Suloway and Hubbell 1994), but only 1.1% of the PPAA remains as nonforested wetland. It would be interesting to determine if these wetlands are used by small mammal species other than those occupying surrounding habitat types and assess the ability of these mammals to move between wetlands.

Enhancement and Restoration Potential

The preservation of upland and floodplain forests would enhance the suitability of the PPAA as habitat for a variety of forest-dwelling species, including the bobcat and gray fox. Retaining large snags with exfoliating bark would provide potentially suitable roost trees for Indiana bats if any were to occupy the area. Preservation and restoration of riparian forests also is necessary if the PPAA is to provide potential habitat for the river otter. Reduction of silt and chemical runoff into aquatic habitats and wetlands would enhance their ability to support river otter and mink.

The ongoing preservation and restoration of grassland and prairie habitats seems the clear priority for conservation of mammals in the PPAA. Preservation of native prairie remnants and other types of grassland habitats would provide habitat for the badger and red fox. Franklin's ground squirrels could be introduced into suitable grasslands on federal, state, or county property. Vegetation along abandoned railroad rights-of-way in the PPAA should be preserved or restored to provide habitat and dispersal or travel corridors for mammals. In particular, the Midewin National Tallgrass Prairie offers some unique opportunities to establish species like bison (*Bison bison*). The mammalian fauna of the Midewin, Des Plaines Conservation Area, and Goose Lake Prairie should be thoroughly surveyed and monitored, and the full component of prairie mammals restored or maintained.

Amphibians and Reptiles

Introduction

Information in this section has been compiled from range maps in Smith (1961), the Illinois Natural Heritage Database (Illinois Department of Natural Resources 1998), the Illinois Amphibian and Reptile Vouchered Database (an INHS computer database that contains information on specimens from museum, university, and private collections), unvouchered records from the literature, and unvouchered records taken from reliable biologists and naturalists. There has not been a systematic survey of the amphibians and reptiles of the Prairie Parklands Assessment Area (PPAA), but Redmer and Anton (1993) and Redmer (1994) conducted surveys of the amphibians and reptiles of the former Joliet Training Area and Joliet Army Ammunition Plant, now the Midewin National Tallgrass Prairie. The PPAA contains portions of two of Smith's (1961) eleven Herpetofaunal Divisions for the state; Grand Prairie and Woodlands of the Grand Prairie.

Amphibian and reptile species that are known or likely to occur in the PPAA are listed in Table 15. The 14 amphibian species and 22 reptile species in Table 15 represent 35% of the amphibian species and 37% of the reptile species of the State. The state threatened Blanding's turtle - *Emydoidea blandingii* occurs in the PPAA and the state threatened Kirtland's snake - *Clonophis kirtlandii*, and the state endangered massasauga - *Sistrurus catenatus* are known to exist just east of the PPAA, but are probably not found within its borders. One other state endangered species, the spotted turtle - *Clemmys guttata*, is known from the vicinity of Lockport, just north of the PPAA.

There have been no reports of exotic reptile species in the PPAA.

When referring to the habitat designations in Table 15, keep in mind that most amphibian and reptile species are not restricted to a single habitat type. For example, all but two of Illinois' amphibians require some type of aquatic habitat (wetland, pond, creek ,or river) for breeding but the adults can also be found in a variety of terrestrial habitats. Some species require a combination of two habitat types throughout their life. For example, the Smooth Green Snake requires prairie or forest habitat, but wetlands must be present. On the other hand, some species have narrower habitat requirements than the designations in Table 15 might suggest. For example, the Queen Snake is listed as occurring in rivers and creeks, but it is only found in medium-sized creeks with rocky substrates.

Table 15. Amphibian and reptile species known or likely to occur in the Prairie Parklands Assessment Area with an indication of habitat preference and relative abundance.

Common Name[1, 2]	Scientific Name	Habitat[3]	Abundance[4]
Amphibians			
blue-spotted salamander	*Ambystoma laterale*	F,W	U
smallmouth salamander	*Ambystoma texanum*	F,W,P	U
tiger salamander	*Ambystoma tigrinum*	F,W,P	U
two-lined salamander	*Eurycea cirrigera*	F,R	U
mudpuppy	*Necturus maculosus*	L,R	?
American toad	*Bufo americanus*	U	C
Fowler's toad	*Bufo fowleri*	F,P,W	U
cricket frog	*Acris crepitans*	W,L,R	?
gray treefrog complex	*Hyla versicolor- chrysoscelis*	F,L,W	C
western chorus frog	*Pseudacris triseriata*	U	C
plains leopard frog	*Rana blairi*	F,L.P,W	U
bullfrog	*Rana catesbeiana*	W,L,R	C
green frog	*Rana clamitans*	F,W,R	C
northern leopard frog	*Rana pipiens*	F,W,L,R	C
Reptiles			
snapping turtle	*Chelydra serpentina*	W,L,R	C
painted turtle	*Chrysemys picta*	W,L,R	C
Blanding's turtle - ST	***Emydoidea blandingii***	**W**	**U**
map turtle	*Graptemys geographica*	R,L	R
western box turtle	*Terrapene ornata*	P	R
red-eared slider	*Trachemys scripta*	W,L,R	R
musk turtle	*Sternotherus odoratus*	W,L,R	?
spiny soft-shell turtle	*Apalone spinifera*	L,R	C
glass lizard	*Ophisaurus attenuatus*	P	?
six-lined racerunner	*Cnemidophorus sexlineatus*	P	U
racer	*Coluber constrictor*	F,P	C/U
fox snake	*Elaphe vulpina*	W,P,C	C
hognose snake	*Heterodon platirhinos*	F,P,W	U
eastern milk snake	*Lampropeltis triangulum*	F,W,P	U
northern water snake	*Nerodia sipedon*	W,L,R	C
smooth green snake	*Opheodrys vernalis*	P	U/R
bullsnake	*Pituophis melanoleucus*	P	U/R
queen snake	*Regina septemvittata*	W,R	R
brown snake	*Storeria dekayi*	F	U
western ribbon snake	*Thamnophis proximus*	F,L,R,W	U
plains garter snake	*Thamnophis radix*	U	C
eastern garter snake	*Thamnophis sirtalis*	U	C

[1] Nomenclature follows Collins (1990) unless noted.
[2] Bold type indicates an Illinois threatened (ST) species.
[3] F = forest W = wetland P = prairie and savanna L = lakes, ponds, impoundments R = rivers & creeks C = cultural U = ubiquitous (all habitats)
[4] C = common U = uncommon R = rare ? = status uncertain

Forest

Typical Species

Amphibian species of the PPAA that are typical of forested habitats include the northern leopard frog and both species of gray treefrog. As outlined above, some amphibians also require aquatic habitats for breeding. The gray treefrogs and leopard frog breed in forested wetlands and upland forested ponds. Among the reptiles of the PPAA, the brown snake is typical of forested areas.

Enhancement and Restoration Potential

Maintaining small, temporary, fishless ponds in forests of the PPAA would benefit many of the reptiles and amphibians of the PPAA as well as other species groups that depend on them for food. Creating or restoring small ponds in upland forests is particularly valuable because these habitats are among the rarest in the PPAA and the state. The tiger salamander, blue-spotted salamander, American toad, gray treefrog, and northern leopard frog are among the amphibians that breed in this habitat. The musk turtle, brown snake, red-bellied snake, and northern water snake would benefit from restoration or creation of woodland ponds.

Wetland

Typical Species

Amphibian species of the PPAA that are typical of wetland habitats include the green frog and northern leopard frog. As outlined above, almost all amphibians require some type of aquatic habitat for breeding and most breed in wetlands. Among the reptiles of the PPAA, the painted turtle, Blanding's turtle, and common garter snake are typical of wetlands. These species reach their greatest abundance in wetland habitats. The Blanding's turtle was recently listed as a state threatened species by the IESPB (1999).

Enhancement and Restoration Potential

Maintaining even small, temporary wetlands in the PPAA would benefit almost all of the reptiles and amphibians of the region, as well as other groups that depend on them for food. The importance of cattail marshes under one acre should not be underestimated. Mowing in the vicinity of wetlands should be avoided.

Information Gaps

One of the most pressing questions concerning wetland amphibians and reptiles in the PPAA is the status of Blanding's turtle (ST). This large aquatic turtle was once very common in the upper Illinois River valley, but wetland destruction and contamination have reduced its numbers dramatically. In the PPAA, the Blanding's turtle is at home in prairie marshes and floodplain sloughs of the Illinois River. It is most commonly found in shallow (10-20 cm) open water areas of cattail marshes, sloughs, ponds, and flooded ditches. Aquatic plants, especially emergent vegetation and a mud bottom are important habitat components. The activity period in northern Illinois is probably late March to October. Nesting occurs in June in sandy, well drained soil near the aquatic habitat. Hatching usually takes place in September.

Some Blanding's turtle surveys have been done in the PPAA. They are quite common at Goose Lake, in fact, it is probably one of the largest populations in the state. They are also known to occur at Hitts Siding Prairie - probably a much smaller population. Further work should be done to determine the status of this species in the PPAA, so that appropriate management action can be taken.

Prairie/Grassland

Typical Species

Of the amphibian species listed in Table 15, the tiger salamander and western chorus frog are typical of prairie habitats in the PPAA. The tiger salamander requires fishless ponds and wetlands for breeding. Because of the destruction and degradation of these habitats, the tiger salamander has declined in the PPAA. The striped chorus frog has a shorter larval period and therefore can breed in more temporary aquatic habitats such as flooded fields and ditches. Reptile species in the PPAA that are typical of prairie habitats include the fox snake and plains garter snake. Both of these snakes can tolerate disturbed habitats such as mowed right-of-way, pasture, oldfield, and agricultural edge. The Blanding's turtle was once common in wet prairie habitats of the PPAA.

Enhancement and Restoration Potential

Restoring native prairie, especially wet prairie, in the PPAA would benefit a variety of amphibians and reptiles especially the tiger salamander and the Blanding's turtle.

Lakes, Ponds, and Impoundments

Typical Species

Of the amphibian species listed in Table 15, the bullfrog and American toad are typical of lakes, ponds, and impoundments in the PPAA. Both of these species have developed strategies for coexisting with fish and are usually more widely distributed than other amphibians. Among the reptiles of the PPAA the snapping turtle, painted turtle, common garter snake, and northern water snake are typical of lakes, ponds, and impoundments.

Enhancement and Restoration Potential

Restoration of fishless, forested ponds in upland areas would benefit the tiger salamander and gray treefrogs. Leaving at least part of the shore around ponds, lakes and impoundments unmowed and providing forest or grassland connections among ponds, lakes and impoundments in the PPAA would benefit a variety of amphibians and reptiles.

Creeks and Rivers

Typical Species

The green frog is typical of creeks and small rivers in the PPAA, while the mudpuppy is a typical inhabitant of the Illinois River. Among the reptiles of the PPAA, the northern water snake is typical of creeks and small rivers while the snapping turtle, map turtles, soft-shell turtles, and northern water snake are typical of the Illinois River.

Enhancement and Restoration Potential

Restoring the riparian zone and associated floodplain forests and wetlands along the Illinois River and its tributaries would benefit a variety of amphibians and reptiles. Water quality must also be improved if any significant progress is expected.

Cultural Habitats

Typical Species

Of the amphibian species listed in Table 15, the American toad, western chorus frog, and bullfrog are typical of cultural habitats in the PPAA. These species can be found in cropland, pasture, successional field, developed land, and tree plantations providing that adequate breeding sites (ditches, flooded fields, stock tanks, remnant marshes) are present. Among the reptiles of the PPAA, the plains garter snake, common garter snake, brown snake, and northern water snake are typical of cultural habitats in the PPAA.

Enhancement and Restoration Potential

The American toad, western chorus frog, and bullfrog do well in patches of cattail marsh under one acre, even when the marsh is surrounded by developed land. It is always best to strive for larger size and connectivity of habitat, but the utility of these smaller areas should not be underestimated. It is important to leave a moderate buffer of unmowed grass around these habitats.

Overall Habitat Quality

Overall, opportunities for amphibians and reptiles in the PPAA are poor. Compared to presettlement, the present landscape of the PPAA lacks a significant amount of wet prairie and the riparian zone and backwater sloughs along the Illinois River have been destroyed or degraded.

Current Management Concerns for Partnership

The most critical management concern for the Prairie Parkland Assessment Area Partnership is restoration of the riparian zone and backwater sloughs along the Illinois River and its tributaries. Intact riparian zones may act as dispersal corridors for many amphibians and reptiles, thus reducing the effects of habitat fragmentation.

Aquatic Biota

Introduction

The Prairie Parklands Assessment Area (PPAA) is located in northern Illinois and comprises parts of seven counties: Cook, Grundy, Kankakee, Kendall, LaSalle, Livingston, and Will. The area encompasses two natural divisions - Northeastern Morainal (Morainal Section) and Grand Prairie (Kankakee Sand Area and Grand Prairie sections) (Schwegman 1973). The Assessment Area contains portions of the Des Plaines River basin, the Kankakee River basin, the Mazon River basin, the Aux Sable River basin, and a segment of the upper Illinois River basin (Page et al. 1992)(Figure 2).

The Des Plaines River watershed is part of the greater Chicago metropolitan region and has been extensively developed for urban and industrial use. Over-enrichment of the water from treated and untreated sewage is a major problem. At least 100 waste treatment plants empty into the basin (Vidal 1969). The lower Des Plaines River has exposed bedrock with riffles of cobble and gravel, and pools with sandy or muddy bottoms. The Des Plaines River joins the Kankakee River to form the Illinois River in Grundy County.

The lower Kankakee River changes from gravel and cobble with numerous riffles, shallow pools, and small islands in the upstream areas, to silted pools separated by extensive runs of solid bedrock. Near its confluence with the Des Plaines River, the Kankakee River is wide, deep, and heavily silted (Graham et al. 1984).

The Mazon River rises in northeastern Livingston County, flows northwest across Grundy County and empties into the Illinois River near Morris. It drains an area of 548 square miles, is 33 miles long, and averages ten feet in width. Throughout most of its length, the river system is shallow with a rocky substrate; the lower part of the river has deep runs and pools. Aux Sable Creek is a shallow rocky stream with deep pools found in the lower stretch. All streams in the area suffer from siltation and pollution associated with agriculture and urbanization.

The Illinois River and its valley has been and remains subject to human disturbances. Until the turn of the century the Illinois River remained relatively unblemished and provided livelihood for many adjacent communities. In 1908, 2500 commercial fishermen took nearly 24 million pounds of fish from the Illinois (Havera and Bellrose 1985). The river was one of the most productive mussel streams per mile in the United States; in 1910, over 2600 mussel-fishing boats plied the Illinois River (Coker 1919). Abundant waterfowl in the fall made the valley a mecca for commercial and sport hunters. As the human population increased in the basin, the prolific days of the river were ended.

The opening of the Chicago Sanitary and Ship Canal in 1900 diverted water from Lake Michigan to the Illinois River, resulting in thousands of acres of bottomland forests being flooded. Vast quantities of untreated sewage and industrial waste were flushed into the Illinois River through the Chicago Sanitary and Ship Canal to prevent contamination of Lake Michigan. By 1923 the river contained very little oxygen as far downstream as Peoria (Havera and Bellrose 1985). Between 1920-1940 forty-one drainage and levee districts were developed and six dams were built. These slowed the flow of water, increased flooding, and destroyed many of the backwaters in the Lower River. By 1938 the large scale changes of the Illinois River and the valley were complete (Havera and Bellrose 1985).

Today the Illinois River basin includes 46% of the state's agricultural land, 28% of its forests, 37% of its surface waters, and 95% of its urban areas (Talkington 1991). Sedimentation is the major pollutant of the river and causes increased flooding, filling in of backwater lakes, and a reduction in aquatic vegetation. The sediment also carries pesticides, herbicides, and fertilizers that further degrade the water quality. Disappearances of benthic diversity and aquatic vegetation combined with increasing turbidity, pollution, and draining of breeding and feeding habitats have taken their toll on the river. Within the Assessment Area, the Illinois River consists of deep runs and pools and a has a substrate of mostly sand with patches of gravel and muddy backwaters.

Statewide Comparison of Aquatic Biota

The Prairie Parklands Assessment Area supports a large diversity of aquatic species including 112 species of fishes, 39 species of mussels, and 13 species of malacostracans (large crustaceans). Some species have disappeared from the drainage in recent decades; however, with improvements in water quality, species that have been extirpated could return and natural communities could become reestablished in areas where they have been eliminated or altered.

Two rivers within the PPAA have been assessed for their aquatic macroinvertebrate populations. The Des Plaines River appears to support, at best, a moderate diversity of aquatic macroinvertebrate species, most likely because of high levels of both suspended solids (60 to 100 mg L^{-1}) and phosphorus (100 to 200 µg-P L^{-1}) (Mitch 1995). Existing data on the distribution and natural community associations of these species, however, are inadequate to summarize typical, unique, or rare species, or to identify exotic species. Several surveys for aquatic macroinvertebrates have been conducted in the upper as well as the lower Des Plaines River basin. The scope of each of these surveys, and the sampling methodologies and analyses implemented during each study, varied enough from one another that comparison of data would not be practical. Nonetheless, important drainage basin and distributional information was generated by these surveys.

In 1975, Schacht and Matsunaga (1977a) surveyed aquatic macroinvertebrate populations at 133 stream sites in the Des Plaines River basin between the Wisconsin/Illinois state line

and Joliet, Illinois; most of the sites, however, were located upstream of the PPAA. The predominant aquatic macroinvertebrate groups collected by Schacht and Matsunaga from the Des Plaines River basin included Chironomidae, Oligochaeta, Ephemeroptera, and Trichoptera. Schacht and Matsunaga concluded that: most tributaries in the basin and a large portion of the main stem river show severe impact of urbanization and industrialization; tributary streams with headwaters in urban and industrial areas were most seriously affected; urban point and non-point sources of pollution were prominent causes of degraded stream quality; sewage treatment effluents in the main stem of the Des Plaines could not always be pinpointed as sources of degradation; substantial degradation was found at stations in the main stem of the Des Plaines River as it enters Illinois near Russell, as well as in the lower reaches of the river, from Riverside to Joliet; a substantial number of tributary streams were found to be semi-polluted; and sewage treatment plant discharges, sewer bypass and combined sewer overflow, and urban runoff are major causes of the observed degraded conditions.

In 1977 and again in 1984, Ecological Analysts, Inc. (1984) conducted surveys for benthic macroinvertebrates in the lower Des Plaines River. Benthic macroinvertebrate samples taken along transects during each survey were dominated by tubificid oligochaetes, with smaller populations of naidid oligochaetes and chironomid midges - indicating that the Des Plaines River was organically polluted.

Sparks et al. (1986) surveyed aquatic macroinvertebrates at several sites on the lower Des Plaines River during 1985 and 1986 as part of a pilot study to assess the feasibility of a long-term aquatic resource monitoring program. They concluded that distributions of many macroinvertebrate taxa were highly habitat-specific; ponar grabs were inadequate for sampling macroinvertebrate communities of the three major habitat types found in the Des Plaines River; factors other than habitat limit macroinvertebrate communities in the lower Des Plaines River; some areas in the lower Des Plaines River that were surveyed had exceptionally low species diversity and abundance; and that toxicants in the water and sediments, and disturbance by boat traffic, were causal agents.

The Kankakee River supports a high diversity of aquatic macroinvertebrate species. Existing data on the distribution and natural community associations of these species, however, are inadequate to summarize typical, unique, or rare species, or to identify exotic species. Two related surveys for aquatic macroinvertebrates occurring in the Kankakee River were conducted during the late 1970s by Illinois Natural History Survey personnel, both to assess the effects of sedimentation on aquatic life of the Kankakee River. The first of these (Page et al. [undated {1979}) was conducted during 1978; the second (Brigham et al. 1981) was conducted during 1979. Several other small surveys for aquatic macroinvertebrates occurring in the Kankakee River basin were conducted during the 1980s and 1990s; records of specimens taken during the above surveys are deposited in the permanent Illinois Natural History Survey collections in Champaign.

Common Species

One hundred twelve species of fishes are known from the Prairie Parklands River Assessment Area (Tables 16 and 17). Common fishes in the large rivers are gizzard shad, emerald shiners, spotfin shiners, striped shiners, sand shiners, and carp. The most common fishes in creeks and small rivers are sand shiners, red shiners, bigmouth shiners, striped shiners, central stonerollers, bluntnose minnows, creek chubs, white suckers, quillbacks, black bullheads, grass pickerel, green sunfish, slenderhead darters and johnny darters. Clean streams have moderate populations of smallmouth bass.

Thirty-nine species of freshwater mussels have been reported from this Assessment Area (Tables 18 and 19). Common species include the cylindrical papershell, ellipse, giant floater, fat mucket, and mucket (Cummings and Mayer 1997, INHS Mollusk Collection data). Of the 39 mussel species known from the Assessment Area, 23 have been collected alive in the past 20 years. Further information about the mussels of the rivers included in this area is available in Wilson and Clark 1912, Lewis and Brice 1980, Suloway 1981, and Kwak 1993.

Thirteen species of crayfishes, isopods, and amphipods are found in the basin (Tables 20 and 21). The most common crayfish is the virile crayfish, which usually is found over rocky substrates or around woody debris or vegetation. The northern clearwater crayfish, which is found over rocky substrates in fast current, is also common. The most common isopod is *Caecidotea intermedia*, which lives in rocky areas and on woody debris. The most common amphipod is *Hyalella azteca*, which is found on vegetation, usually filamentous algae growing on rocks or logs.

Historical as well as recent faunal studies for aquatic macroinvertebrates occurring in Illinois include those for Coleoptera (beetles) (Wooldridge 1967; W. Brigham, unpubl. - INHS Insect Collection), Ephemeroptera (mayflies) (Burks 1953), Plecoptera (stoneflies) (Frison 1935), Trichoptera (caddisflies) (Ross 1944), Hemiptera (true bugs) (Lauck 1959, Taylor 1996), Diptera (Malloch 1915a, b; Ross 1947; Ross and Horsfall 1965; Pechumen et al. 1983), and Annelida (segmented worms) (Wetzel 1992).

In general, the aquatic macroinvertebrate populations of the Prairie Parklands Assessment Area appear to be as diverse as those of many other watersheds in Illinois; unfortunately, available information to date is limited to those a few surveys that focused primarily on the Des Plaines and Kankakee rivers proper. A list of aquatic macroinvertebrate taxa known or thought likely to occur within the Prairie Parklands Assessment Area is presented in Table 22; this information is based upon records from the literature cited herein. Most of these species are considered relatively common in the state of Illinois. Many of the species listed in Table 21 occur in both standing and running water; limited ecological information make it difficult to associate these taxa with specific habitat types, such as headwaters, larger streams, small or medium reaches of rivers, or with standing water habitats such as ponds, lakes, and reservoirs.

Table 16. Freshwater fishes recorded from the Prairie Parklands Assessment Area[1].

FAMILY *Scientific Name*[2,3,4]	Common Name	Headwaters	Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
LEPISOSTEIDAE						
Lepisosteus osseus	longnose gar				X	
Lepisosteus platostomus	shortnose gar				X	
AMIIDAE						
Amia calva	bowfin				X	X
HIODONTIDAE						
Hiodon alosoides	goldeye				X	
Hiodon tergisus	mooneye				X	
ANGUILLIDAE						
Anguilla rostrata	American eel				X	
CLUPEIDAE						
Alosa chrysochloris	skipjack herring				X	
*Alosa pseudoharengus**	alewife				X	X
Dorosoma cepedianum #	gizzard shad			X	X	X
Dorosoma petenense	threadfin shad				X	X
CYPRINIDAE						
Campostoma anomalum #	central stoneroller	X	X	X		
Campostoma oligolepis	largescale stoneroller		X	X		
*Carassius auratus**	goldfish		X	X	X	X
Cyprinella lutrensis #	red shiner		X	X	X	
Cyprinella spiloptera #	spotfin shiner		X	X	X	
Cyprinella whipplei	steelcolor shiner		X	X	X	
*Cyprinus carpio** #	common carp			X	X	X
Ericymba buccata	silverjaw minnow		X	X	X	
***Hybopsis amnis* - SE**	**pallid shiner**			**X**	**X**	
Luxilus chrysocephalus #	striped shiner	X	X	X	X	
Luxilus cornutus	common shiner		X	X	X	
Lythrurus umbratilis	redfin shiner		X	X	X	
Macrhybopsis aestivalis	speckled chub				X	
Macrhybopsis storeriana	silver chub				X	
Nocomis biguttatus	hornyhead chub		X	X		
Notemigonus crysoleucas	golden shiner			X	X	X
Notropis atherinoides #	emerald shiner				X	
Notropis blennius	river shiner				X	
***Notropis boops* - SE**	**bigeye shiner**		**X**	**X**		
Notropis buchanani	ghost shiner			X	X	
Notropis dorsalis #	bigmouth shiner		X	X	X	
Notropis hudsonius	spottail shiner				X	
Notropis ludibundus #	sand shiner		X	X	X	
Notropis rubellus	rosyface shiner		X	X	X	
Notropis shumardi	silverband shiner				X	
Notropis volucellus	mimic shiner				X	
Opsopoeodus emiliae	pugnose minnow		X	X		X
Phenacobius mirabilis	suckermouth minnow		X	X	X	

Table 16. Continued.

FAMILY *Scientific Name*[2,3,4]	Common Name	Headwaters	Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
Phoxinus erythrogaster	southern redbelly dace	X				
Pimephales notatus #	bluntnose minnow	X	X	X	X	
Pimephales promelas	fathead minnow		X	X		
Pimephales vigilax	bullhead minnow			X	X	
Rhinichthys atratulus	blacknose dace	X	X			
*Scardinius erythrophthalmus**	rudd			X		X
Semotilus atromaculatus #	creek chub	X	X			
CATOSTOMIDAE						
Carpiodes carpio	river carpsucker			X	X	
Carpiodes cyprinus #	quillback		X	X	X	
Carpiodes velifer	highfin carpsucker			X	X	
Catostomus commersoni #	white sucker		X	X	X	
Erimyzon oblongus	creek chubsucker	X	X	X		
Erimyzon sucetta	lake chubsucker		X			X
Hypentelium nigricans	northern hog sucker		X	X	X	
Ictiobus bubalus	smallmouth buffalo				X	
Ictiobus cyprinellus	bigmouth buffalo				X	
Ictiobus niger	black buffalo				X	
Minytrema melanops	spotted sucker		X	X		
Moxostoma anisurum	silver redhorse			X	X	
***Moxostoma carinatum* - ST**	**river redhorse**			**X**	**X**	
Moxostoma duquesnei	black redhorse		X	X	X	
Moxostoma erythrurum	golden redhorse		X	X	X	
Moxostoma macrolepidotum	shorthead redhorse			X	X	
***Moxostoma valenciennesi*-SE**	**greater redhorse**				**X**	
ICTALURIDAE						
Ameiurus melas #	black bullhead		X	X	X	X
Ameiurus natalis	yellow bullhead		X	X	X	X
Ameiurus nebulosus	brown bullhead					X
Ictalurus punctatus	channel catfish			X	X	X
Noturus exilis	slender madtom		X	X		
Noturus flavus	stonecat		X	X		
Noturus gyrinus	tadpole madtom		X	X		
Pylodictis olivaris	flathead catfish			X	X	X
ESOCIDAE						
Esox americanus #	grass pickerel	X	X	X		X
Esox lucius	northern pike			X	X	X
UMBRIDAE						
Umbra limi	central mudminnow		X			X
OSMERIDAE						
Osmerus mordax	rainbow smelt				X	X
SALMONIDAE						
*Salmo trutta**	brown trout		X	X		

Table 16. Continued.

FAMILY *Scientific Name*[2,3,4]	Common Name	Headwaters	Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
PERCOPSIDAE						
Percopsis omiscomaycus	trout-perch				X	
ATHERINIDAE						
Labidesthes sicculus	brook silverside			X	X	X
*Menidia beryllina**	inland silverside				X	X
FUNDULIDAE						
Fundulus notatus	blackstripe topminnow		X	X	X	
POECILIIDAE						
Gambusia affinis	mosquitofish	X	X			X
GASTEROSTEIDAE						
Culaea inconstans	brook stickleback	X	X			X
Pungitius pungitius	ninespine stickleback			X		X
COTTIDAE						
Cottus bairdi	mottled sculpin	X	X			
MORONIDAE						
Morone americana	white perch			X	X	
Morone chrysops	white bass			X	X	
Morone mississippiensis	yellow bass		X	X	X	X
Morone saxatilis	striped bass				X	X
CENTRARCHIDAE						
Ambloplites rupestris	rock bass		X	X	X	
Lepomis cyanellus #	green sunfish		X	X	X	X
Lepomis gibbosus	pumpkinseed		X	X	X	X
Lepomis gulosus	warmouth		X	X	X	X
Lepomis humilis	orangespotted sunfish		X	X	X	
Lepomis macrochirus	bluegill		X	X	X	X
Lepomis megalotis	longear sunfish		X	X	X	
Micropterus dolomieu	smallmouth bass		X	X	X	X
Micropterus salmoides	largemouth bass		X	X	X	X
Pomoxis annularis	white crappie		X	X	X	X
Pomoxis nigromaculatus	black crappie		X	X	X	X
PERCIDAE						
***Ammocrypta clara* - SE**	**western sand darter**			X	X	
Etheostoma caeruleum	rainbow darter	X	X	X	X	
Etheostoma chlorosomum	bluntnose darter		X	X	X	
Etheostoma flabellare	fantail darter	X	X	X		
Etheostoma microperca	least darter	X	X			X
Etheostoma nigrum #	johnny darter	X	X	X	X	
Etheostoma spectabile	orangethroat darter	X	X	X		
Etheostoma zonale	banded darter		X	X	X	
Perca flavescens	yellow perch		X	X		X
Percina caprodes	logperch		X	X	X	
Percina maculata	blackside darter	X	X	X	X	

Table 16. Continued.

FAMILY *Scientific Name*[2,3,4]	Common Name	Headwaters	Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
Percina phoxocephala #	slenderhead darter		X	X	X	
Stizostedion vitreum	walleye			X	X	
SCIAENIDAE						
Aplodinotus grunniens	freshwater drum			X	X	

[1] Data from the Illinois Natural History Survey Fish Collection.
[2] Bold type indicates a State Endangered Species (SE); State Threatened Species (ST).
[3] * = non-native species; # = common species.
[4] Total number of species = 112 (108 native, 4 introduced).

Table 17. Freshwater fishes recored from the Prairie Parklands Assessment Area, by habitat[1].

FAMILY *Scientific Name*[2,3,4]	Common Name	Streams			Standing Water	
		Riffles	Runs	Pools	Littoral	Open Water
LEPISOSTEIDAE						
Lepisosteus osseus	longnose gar				X	
Lepisosteus platostomus	shortnose gar		X		X	X
AMIIDAE						
Amia calva	bowfin			X	X	
HIODONTIDAE						
Hiodon alosoides	goldeye		X	X		
Hiodon tergisus	mooneye		X	X		
ANGUILLIDAE						
Anguilla rostrata	American eel		X	X		
CLUPEIDAE						
Alosa chrysochloris	skipjack herring		X	X		
*Alosa pseudoharengus**	alewife			X		X
Dorosoma cepedianum #	gizzard shad		X			X
Dorosoma petenense	threadfin shad		X	X		
CYPRINIDAE						
Campostoma anomalum #	central stoneroller	X	X			
Campostoma oligolepis	largescale stoneroller	X	X			
*Carassius auratus**	goldfish			X	X	
Cyprinella lutrensis #	red shiner		X	X		
Cyprinella spiloptera #	spotfin shiner		X	X		
Cyprinella whipplei	steelcolor shiner		X	X		
*Cyprinus carpio** #	common carp			X	X	
Ericymba buccata	silverjaw minnow		X	X		
***Hybopsis amnis* - SE**	**pallid shiner**			**X**		
Luxilus chrysocephalus #	striped shiner		X	X		
Luxilus cornutus	common shiner		X	X		
Lythrurus umbratilis	redfin shiner		X	X		

Table 17. Continued.

FAMILY *Scientific Name*[2,3,4]	Common Name	Streams			Standing Water	
		Riffles	Runs	Pools	Littoral	Open Water
Macrhybopsis aestivalis	speckled chub		X	X		
Macrhybopsis storeriana	silver chub			X		
Nocomis biguttatus	hornyhead chub		X	X		
Notemigonus crysoleucas	golden shiner			X	X	X
Notropis atherinoides #	emerald shiner			X		
Notropis blennius	river shiner		X	X		
***Notropis boops* - SE**	**bigeye shiner**			**X**		
Notropis buchanani	ghost shiner			X		
Notropis dorsalis #	bigmouth shiner		X	X		
Notropis hudsonius	spottail shiner			X	X	X
Notropis ludibundus #	sand shiner		X	X		
Notropis rubellus	rosyface shiner		X	X		X
Notropis shumardi	silverband shiner		X	X		
Notropis volucellus	mimic shiner		X	X		
Opsopoeodus emiliae	pugnose minnow			X		
Phenacobius mirabilis	suckermouth minnow	X	X			
Phoxinus erythrogaster	southern redbelly dace	X	X			
Pimephales notatus #	bluntnose minnow		X	X		
Pimephales promelas	fathead minnow			X		
Pimephales vigilax	bullhead minnow		X	X		
Rhinichthys atratulus	blacknose dace	X	X			
*Scardinius erythrophthalmus**	rudd			X	X	
Semotilus atromaculatus #	creek chub			X		
CATOSTOMIDAE						
Carpiodes carpio	river carpsucker		X	X		
Carpiodes cyprinus #	quillback		X	X		
Carpiodes velifer	highfin carpsucker		X	X		
Catostomus commersoni #	white sucker		X	X		
Erimyzon oblongus	creek chubsucker		X	X		
Erimyzon sucetta	lake chubsucker			X		
Hypentelium nigricans	northern hog sucker	X	X			
Ictiobus bubalus	smallmouth buffalo			X		
Ictiobus cyprinellus	bigmouth buffalo			X		
Ictiobus niger	black buffalo			X		
Minytrema melanops	spotted sucker			X		
Moxostoma anisurum	silver redhorse		X	X		
***Moxostoma carinatum* - ST**	**river redhorse**		**X**	**X**		
Moxostoma duquesnei	black redhorse		X	X		
Moxostoma erythrurum	golden redhorse		X	X		
Moxostoma macrolepidotum	shorthead redhorse		X	X		
***Moxostoma valenciennesi*-SE**	**greater redhorse**		**X**	**X**		
ICTALURIDAE						
Ameiurus melas #	black bullhead			X	X	
Ameiurus natalis	yellow bullhead			X	X	

Table 17. Continued.

FAMILY *Scientific Name*[2,3,4]	Common Name	Streams			Standing Water	
		Riffles	Runs	Pools	Littoral	Open Water
Ameiurus nebulosus	brown bullhead				X	
Ictalurus punctatus	channel catfish		X	X	X	
Noturus exilis	slender madtom	X				
Noturus flavus	stonecat	X				
Noturus gyrinus	tadpole madtom		X	X		
Pylodictis olivaris	flathead catfish			X	X	
ESOCIDAE						
Esox americanus #	grass pickerel			X	X	
Esox lucius	northern pike			X	X	
UMBRIDAE						
Umbra limi	central mudminnow			X	X	
OSMERIDAE						
Osmerus mordax	rainbow smelt			X		X
SALMONIDAE						
*Salmo trutta**	brown trout		X	X		
PERCOPSIDAE						
Percopsis omiscomaycus	trout-perch		X	X		
ATHERINIDAE						
Labidesthes sicculus	brook silverside			X	X	X
Menidia beryllina	inland silverside			X	X	X
FUNDULIDAE						
Fundulus notatus	blackstripe topminnow			X		
POECILIIDAE						
Gambusia affinis	mosquitofish			X	X	
GASTEROSTEIDAE						
Culaea inconstans	brook stickleback			X	X	
Pungitius pungitius	ninespine stickleback			X	X	
COTTIDAE						
Cottus bairdi	mottled sculpin	X				
MORONIDAE						
Morone americana	white perch			X		
Morone chrysops	white bass			X		
Morone mississippiensis	yellow bass			X	X	
Morone saxatilis	striped bass			X		X
CENTRARCHIDAE						
Ambloplites rupestris	rock bass			X		
Lepomis cyanellus #	green sunfish			X		X
Lepomis gibbosus	pumpkinseed			X		
Lepomis gulosus	warmouth			X	X	
Lepomis humilis	orangespotted sunfish			X		
Lepomis macrochirus	bluegill			X	X	
Lepomis megalotis	longear sunfish			X		
Micropterus dolomieu	smallmouth bass			X	X	X
Micropterus salmoides	largemouth bass			X	X	X

Table 17. Continued.

FAMILY *Scientific Name*[2,3,4]	Common Name	Streams			Standing Water	
		Riffles	Runs	Pools	Littoral	Open Water
Pomoxis annularis	white crappie			X	X	X
Pomoxis nigromaculatus	black crappie			X	X	X
PERCIDAE						
***Ammocrypta clara* - SE**	**western sand darter**		**X**			
Etheostoma caeruleum	rainbow darter	X				
Etheostoma chlorosomum	bluntnose darter			X	X	
Etheostoma flabellare	fantail darter	X				
Etheostoma microperca	least darter		X	X	X	
Etheostoma nigrum #	johnny darter		X	X		
Etheostoma spectabile	orangethroat darter	X		X		
Etheostoma zonale	banded darter	X				
Perca flavescens	yellow perch			X	X	
Percina caprodes	logperch		X	X		
Percina maculata	blackside darter			X		
Percina phoxocephala #	slenderhead darter	X	X			
Stizostedion vitreum	walleye			X		
SCIAENIDAE						
Aplodinotus grunniens	freshwater drum			X		

[1] Data from the Illinois Natural History Survey Fish Collection.
[2] Bold type indicates a State Endangered Species (SE); State Threatened Species (ST).
[3] * = non-native species; # = common species.
[4] Total number of species = 112 (108 native, 4 introduced).

Table 18. Freshwater mussels recorded from the Prairie Parklands Assessment Area[1].

ORDER Subfamily *Scientific Name*[2,3,4]	Common Name	Headwaters/ Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
MARGARITIFERIDAE					
Cumberlandinae					
***Cumberlandia monodonta* - SE**	**spectaclecase**			**X**	
UNIONIDAE					
Anodontinae					
Alasmidonta marginata	elktoe		X	X	
***Alasmidonta viridis* - SE**	**slippershell mussel**	**X**	**X**		
Anodontoides ferussacianus #	cylindrical papershell	X	X		X
Lasmigona complanata	white heelsplitter	X	X	X	X
Lasmigona compressa	creek heelsplitter	X	X		
Lasmigona costata	flutedshell		X	X	
Pyganodon grandis #	giant floater	X	X	X	X
***Simpsonaias ambigua* - SE**	**salamander mussel**		**X**	**X**	

Table 18. Continued.

ORDER Subfamily *Scientific Name*[2,3,4]	Common Name	Headwaters/ Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
Strophitus undulatus	squawfoot		X	X	X
Utterbackia imbecillis	paper pondshell		X	X	X
Ambleminae					
Amblema plicata	threeridge		X	X	
Cyclonaias tuberculata	purple wartyback			X	
***Elliptio crassidens* - ST**	**elephantear**			**X**	
***Elliptio dilatata* - ST**	**spike**		**X**	**X**	
Fusconaia flava	Wabash pigtoe		X	X	
Megalonaias nervosa	washboard			X	
***Plethobasus cyphyus* - SE**	**sheepnose**			**X**	
Pleurobema sintoxia	round pigtoe		X	X	
Quadrula metanevra	monkeyface			X	
Quadrula pustulosa	pimpleback		X	X	
Quadrula quadrula	mapleleaf		X	X	
Tritogonia verrucosa	pistolgrip		X	X	
Lampsilinae					
Actinonaias ligamentina #	mucket		X	X	
***Ellipsaria lineolata* - ST**	**butterfly**			**X**	
***Epioblasma triquetra* - SE**	**snuffbox**		**X**	**X**	
Lampsilis cardium	plain pocketbook		X	X	
***Lampsilis higginsii* - SE, FE**	**Higgins eye**		**X**	**X**	
Lampsilis siliquoidea #	fatmucket		X	X	X
Lampsilis teres	yellow sandshell		X	X	
Leptodea fragilis	fragile papershell		X	X	
Ligumia recta	black sandshell			X	
Obliquaria reflexa	threehorn wartyback			X	
Potamilus alatus	pink heelsplitter		X	X	
Potamilus ohiensis	pink papershell		X	X	
Toxolasma parvus	lilliput	X	X	X	X
Truncilla truncata	deertoe			X	
Venustaconcha ellipsiformis #	ellipse		X	X	
***Villosa iris* - SE**	**rainbow**		**X**	**X**	
DREISSENIDAE					
*Dreissena polymorpha**	zebra mussel			X	
CORBICULIDAE					
*Corbicula fluminea**	Asian clam	X	X	X	X

[1] Data from the Illinois Natural History Survey Mollusk Collection.

[2] Bold type indicates a State Endangered Species (SE); State Threatened Species (ST); Federally Endangered Species (FE).

[3] * = non-native species; # = common species.

[4] Total number of species = 41 (39 native, 2 introduced).

Table 19. Freshwater mussels recorded from the Prairie Parklands Assessment Area, by habitat.[1]

FAMILY Subfamily *Scientific Name* [2,3,4]	Common Name	Streams			Standing Water
		Riffles	Runs	Pools	Littoral Zone
MARGARITIFERIDAE					
Cumberlandinae					
***Cumberlandia monodonta* - SE**	**spectaclecase**		**X**	**X**	
UNIONIDAE					
Anodontinae					
Alasmidonta marginata	elktoe	X	X		
***Alasmidonta viridis* - SE**	**slippershell mussel**	**X**	**X**		
Anodontoides ferussacianus #	cylindrical papershell		X	X	X
Lasmigona complanata	white heelsplitter		X	X	X
Lasmigona compressa	creek heelsplitter	X	X		
Lasmigona costata	flutedshell	X	X		
Pyganodon grandis #	giant floater		X	X	X
***Simpsonaias ambigua* - SE**	**salamander mussel**	**X**	**X**		
Strophitus undulatus	squawfoot		X	X	X
Utterbackia imbecillis	paper pondshell		X	X	X
Ambleminae					
Amblema plicata	threeridge	X	X	X	
Cyclonaias tuberculata	purple wartyback	X	X		
***Elliptio crassidens* - ST**	**elephantear**		**X**	**X**	
***Elliptio dilatata* - ST**	**spike**	**X**	**X**		
Fusconaia flava	Wabash pigtoe	X	X		
Megalonaias nervosa	washboard	X	X	X	
***Plethobasus cyphyus* - SE**	**sheepnose**	**X**	**X**		
Pleurobema sintoxia	round pigtoe	X	X		
Quadrula metanevra	monkeyface	X	X		
Quadrula pustulosa	pimpleback	X	X		
Quadrula quadrula	mapleleaf	X	X	X	
Tritogonia verrucosa	pistolgrip	X	X		
Lampsilinae					
Actinonaias ligamentina #	mucket	X	X		
***Ellipsaria lineolata* - ST**	**butterfly**		**X**	**X**	
***Epioblasma triquetra* - SE**	**snuffbox**	**X**	**X**		
Lampsilis cardium	plain pocketbook	X	X	X	
***Lampsilis higginsii* - SE, FE**	**Higgins eye**		**X**	**X**	
Lampsilis siliquoidea #	fatmucket	X	X	X	X
Lampsilis teres	yellow sandshell	X	X		
Leptodea fragilis	fragile papershell	X	X	X	
Ligumia recta	black sandshell	X	X		
Obliquaria reflexa	threehorn wartyback	X	X	X	
Potamilus alatus	pink heelsplitter	X	X	X	
Potamilus ohiensis	pink papershell	X	X	X	
Toxolasma parvus	lilliput	X	X	X	X
Truncilla truncata	deertoe	X	X		

Table 19. Continued.

FAMILY Subfamily *Scientific Name* [2,3,4]	Common Name	Streams Riffles	Runs	Pools	Standing Water Littoral Zone
Venustaconcha ellipsiformis #	ellipse	X	X		
***Villosa iris* - SE**	**rainbow**	**X**	**X**		
DREISSENIDAE					
*Dreissena polymorpha**	zebra mussel		X	X	
CORBICULIDAE					
*Corbicula fluminea**	Asian clam	X	X	X	X

[1] Data from the Illinois Natural History Survey Mollusk Collection.
[2] Bold type indicates a State Endangered Species (SE); State Threatened Species (ST); Federally Endangered Species (FE).
[3] * = non-native species; # = common species.
[4] Total number of species = 41 (39 native, 2 introduced).

Table 20. Freshwater crustaceans recorded from the Prairie Parklands Assessment Area .[1]

ORDER Family *Scientific Name*[2,3,4]	Common Name	Caves & Springs	Headwaters	Creeks	Small Rivers	Medium Rivers	Standing Water
ISOPODA (Isopods)							
Asellidae							
Caecidotea forbesi							X
Caecidotea intermedia #		X	X	X	X	X	
Caecidotea kendeighi		X					
AMPHIPODA (Amphipods)							
Crangonyctidae							
Bactrurus mucronatus		X					
Gammaridae							
Gammarus pseudolimnaeus		X	X				
Hyalellidae							
Hyalella azteca #			X	X	X	X	X
DECAPODA (Crayfishes & shrimps)							
Cambaridae							
Procambarus acutus	White River crawfish			X	X	X	X
Procambarus gracilis	prairie crayfish			burrower			
Orconectes immunis	calico crayfish	X	X	X	X		X
Orconectes propinquus#	clearwater crayfish			X	X	X	
*Orconectes rusticus**	rusty crayfish		X	X	X	X	
Orconectes virilis#	virile crayfish		X	X	X		X
Cambarus diogenes	devil crawfish				burrower		

[1]Data from the Illinois Natural History Survey Crustacean Collection.
[2]* = non-native species; # = common species.
[3]Total number of species = 13 (12 native, 1 introduced).

Table 21. Freshwater crustaceans recorded from the Prairie Parklands Assessment Area, by habitat.[1]

ORDER Family *Scientific Name*[2,3]	Common Name	Caves & Springs	Streams			Standing Water	
			Riffles	Runs	Pools	Littoral	Open Water
ISOPODA (Isopods)							
Asellidae							
Caecidotea forbesi						X	
Caecidotea intermedia #		X	X		X		
Caecidotea kendeighi		X					
AMPHIPODA (Amphipods)							
Crangonyctidae							
Bactrurus mucronatus		X					
Gammaridae							
Gammarus pseudolimnaeus		X	X				
Hyalellidae							
Hyalella azteca #			X	X	X	X	
DECAPODA (Crayfishes & shrimps)							
Cambaridae							
Procambarus acutus	White River crawfish				X	X	
Procambarus gracilis	prairie crayfish				burrower		
Orconectes immunis	calico crayfish				X	X	
Orconectes propinquus#	clearwater crayfish		X				
*Orconectes rusticus**	rusty crayfish		X			X	
Orconectes virilis #	virile crayfish		X	X		X	
Cambarus diogenes	devil crawfish				burrower		

[1]Data from the Illinois Natural History Survey Crustacean Collection.
[2]* = non-native species; # = common species.
[3]Total number of species = 13 (12 native, 1 introduced).

Table 22. Aquatic macroinvertebrates, exclusive of the Crustacea and unionid Mollusca, recorded for the Prairie Parkland Assessment Area.[1]

Phylum CNIDARIA (Coelenterata)
Class HYDROZOA - Hydrozoans
Anthomedusae
Hydridae
Hydra sp.

Phylum NEMATODA - Nematode Worms
(species indeterminate)

Phylum NEMATOMORPHA - Horsehair Worms
Parachordodidae
(species indeterminate)

Phylum BRYOZOA - Moss Animacules
Phylactolaemata
Plumatellidae
(species indeterminate)

Table 22. Continued.

Phylum TURBELLARIA - Flatworms
Tricladida
Planariidae
(species indeterminate)

Phylum ANNELIDA - Segmented Worms
Class BRANCHIOBDELLAE - Crayfish Worms
Branchiobdellida
Cambarincolidae
(species indeterminate)

Phylum ANNELIDA - Segmented Worms
Class APHANONEURA - Suction-Feeding Worms
Aeolosomatida
Aeolosomatidae
Aeolosoma hemprichi
Aeolosoma variegatum
Class BRANCHIOBDELLAE - Crayfish Worms
Branchiobdellida
Cambarincolidae
Cambarincola sp.
(species indeterminate)
Class OLIGOCHAETA - Oligochaete Worms
Haplotaxida
Haplotaxidae
Haplotaxis gordioides
Lumbriculida
Lumbriculidae
(species indeterminate)
Tubificida
Enchytraeidae
(species indeterminate)
Naididae
Amphichaeta leydigi
Chaetogaster diaphanus
Bratislavia unidentata
Dero digitata
Dero furcata
Dero nivea
Haemonais waldvogeli
Nais bretscheri
Nais communis
Nais pardalis
Nais simplex
Nais variabilis
Ophidonais serpentina
Paranais frici
Pristina leidyi
Pristinella osborni
Slavina appendiculata
Stephensoniana trivandrana
Stylaria lacustris
Tubificidae
Aulodrilus pigueti
Branchiura sowerbyi
Ilyodrilus templetoni
Limnodrilus cervix
Limnodrilus claparedianus
Limnodrilus hoffmeisteri
Limnodrilus maumeensis
Limnodrilus udekemianus
Quistadrilus multisetosus
Tubifex tubifex
Lumbricidae
species indeterminate
Class HIRUDINEA - Leeches
Rhynchobdellida
Glossiphoniidae
Helobdella stagnalis
Helobdella triserialis
Placobdella montifera
Placobdella multilineata
Placobdella ornata
Placobdella parasitica
Gnathobdellida
Hirudinidae
Haemopis marmorata
Haemopis terrestris
Pharyngobdellida
Erpobdellidae
Erpobdella punctata

Phylum ARTHROPODA - Arthropods
Class ARACHNIDA
Hydrachnida - Aquatic Mites
(species indeterminate)

Phylum ARTHROPODA - Arthropods
Class ARACHNIDA
Hydrachnida - Aquatic Mites
(species indeterminate)
Class INSECTA - Insects
Ephemeroptera - Mayflies

Table 22. Continued.

Baetidae
Baetis intercalaris
Baetis propinquus
Callibaetis fluctuans
Baetiscidae
Baetisca bajkovi
Caenidae
Caenis sp.
Ephemerellidae
Serratella frisoni
Ephemeridae
Hexagenia atrocaudata
Hexagenia bilineata
Hexagenia rigida
Heptageniidae
Heptagenia marginalis
Leucrocuta hebe
Leucrocuta maculipennis
Stenacron interpunctatum
Stenonema femoratum
Stenonema luteum
Stenonema modestum
Stenonema pulchellum
Stenonema terminatum
Isonychiidae
Isonychia bicolor
Isonychia sicca
Leptophyidae
Tricorythodes atratus
Tricorythodes peridius
Tricorythodes stygiatus
Polymitarcidae
Ephoron album
Ephoron leukon
Potamanthidae
Anthopotamanthus verticis
Pseudironidae
Pseudiron centralis
Siphlonuridae
Tricorythodes sp.

Odonata - Damselflies and Dragonflies

Zygoptera - Damselflies

Calopterygidae
Calopteryx maculata
Hetaerina americana
Coenagrionidae
Argia apicalis
Argia fumipennis violacea
Argia moesta
Argia sedula
Argia tibialis
Enallagma antennatum
Enallagma civile
Enallagma exsulans
Enallagma geminatum
Ischnura verticalis
Lestidae
Lestes disjunctus
Lestes dryas
Lestes rectangularis
Lestes unguiculatus
Lestes vigilax

Anisoptera - Dragonflies

Aeshnidae
Anax junius
Cordulegasteridae
Cordulegaster obliquus
Corduliidae
Neurocordulia obsoleta
Gomphidae
Dromogomphus spinosus
Erpetogomphus designatus
Gomphus externus
Gomphus fraternus
Gomphus graslinellus
Gomphus spiniceps
Gomphus vastus
Ophiogomphus repinsulensis
Libellulidae
Erythemis simplicicollis
Leucorrhinia intacta
Libellula pulchella
Libellula semifasciata
Pachydiplax longipennis
Perithemis tenera
Plathemis lydia
Sympetrum rubicundulum
Sympetrum vicintum
Macromyiidae
Macromia illinoiensis
Macromia pacifica

Order Plecoptera - Stoneflies

Capniidae
Allocapnia granulata
Allocapnia vivipara

Table 22. Continued.

Perlidae
Acroneuria evoluta
Acroneuria abnormis
Acroneuria internata
Agnetina capitata
A gnetina flavescens
Perlesta dicipiens
P erlesta placida complex
Perlodidae
Isoperla bilineata
Taeniopterygidae
Strophopteryx fasciata
Taeniopteryx burksi
Taeniopteryx nivalis

Order Heteroptera - True Bugs

Belostomidae
Belostoma flumineum
Benacus griseus
Lethocerus americanus
Corixidae
Corisella edulis
Hesperocorixa nitida
Hesperocorixa obliqua
Hesperocorixa vulgaris
Palmacorixa buenoa
Sigara alternata
Sigara grossolineata
Sigara hubbelli
Sigara modesta
Trichocorixa calva
Trichocorixa kansa
Trichocorixa naias
Gerridae
Aquarius remigis
Gerris comatus
Gerris marginatus
Metrobates hesperius
Rheumatobates sp.
Trepobates knighti
Trepobates subnitidus
Mesoveliidae
Mesovelia mulsanti
Nepidae
Nepa apiculata
Ranatra fusca
Ranatra kirkaldyi
Ranatra nigra
Notonectidae
Buenoa margaratacea
Buenoa scimitra
Notonecta irrorata
Notonecta raleighi
Notonecta undulata
Pleidae
Neoplia striola
Veliidae
Rhagovelia oriander

Order Megaloptera - Dobsonflies & Alderflies

Corydalidae
Corydalus cornutus
Sialidae
Sialis sp.

Order Lepidoptera - Butterflies & Moths

Pyralidae
Acentria sp.

Order Coleoptera - Beetles

Dryopidae
Helichus fastigiatus
Helichus lithophilus
Dytiscidae
Acilius semisulcatus
Copelatus chevrolati
Copelatus glyphicus
Coptotomus lenticus
Coptotomus loticus
Coptotomus venustus
Cybister fimbriolatus
Desmopachria convexa
Graphoderus liberus
Hydroporus hybridus
Hydroporus pulcher
Hydroporus sericus
Hydroporus triangularis
Hydroporus undulatus
Hydroporus vitiosus
Hydroporus wickhami
Hygrotus laccophilinus
Hygrotus nubilus
Hygrotus sayi
Ilybius fraterculus
Ilybius laramaeus
Laccophilus fusciatus rufus
Laccophilus maculosus maculosus
Laccophilus proximus

Table 22. Continued.

Liodessus affinis
Liodessus fuscatus
Matus ovatus ovatus
Uvarus lacustris

Elmidae

Ancyronyx variegatus
Dubiraphia bivittata
Dubiraphia minima
Dubiraphia quadrinotata
Dubiraphia vittata
Microeylloepus pusillus
Macronychus glabratus
Optioservus fastiditus
Optioservus ovalis
Optioservus trivittatus
Stenelmis crenata
Stenelmis decorata
Stenelmis musgravei
Stenelmis quadrimaculata
Stenelmis sandersoni
Stenelmis sexlineata
Stenelmis vittipennis

Gyrinidae

Dineutes assimilis
Dineutes horni
Gyrinus aeneolus
Gyrinus analis
Gyrinus borealis
Gyrinus maculiventris

Haliplidae

Haliplus blanchardi
Haliplus borealis
Haliplus fasciatus
Haliplus immaculicollis
Haliplus ohiensis
Haliplus patherinus
Haliplus tortilipenis
Haliplus triopsis
Peltodytes duodecimpunctatus
Peltodytes edentulus
Peltodytes lengi
Peltodytes litoralis
Peltodytes muticus
Peltodytes pedunculatus
Peltodytes sexmaculatus

Hydrochidae

Hydrochus granulatus
Hydrochus pseudosquamifer
Hydrochus rufipes
Hydrochus scabratus
Hydrochus squamifer
Hydrochus subcupreus

Hydrophilidae

Anacaena limbata
Berosus aculeatus
Berosus exiguus
Berosus fraternus
Berosus infuscatus
Berosus pantherinus
Berosus peregrinus
Berosus striatus
Chaetarthria altra
Chaetarthria pallida
Cymbiodyta blanchardi
Cymbiodyta fimbriata
Cymbiodyta toddi
Cymbiodyta vindicata
Dibolocelus ovatus
Enochrus cinctus
Enochrus consortus
Enochrus diffusus
Enochrus ochraceus
Enochrus perplexus
Enochrus pygmaeus nebulosus
Enochrus sayi
Helochares maculicollis
Helocombus bifidus
Helophorus lacustris
Helophorus nitidulus
Hydrobius fuscipes
Hydrochara obtusata
Hydrochus granulatus
Hydrochus subcupreus
Hydrophilus triangularis
Laccobius agilis
Paracymus communis
Paracymus confusus
Paracymus subcupreus
Sperchopsis tessulatus
Tropisternus blatchleyi blatchleyi
Tropisternus blatchleyi modestus
Tropisternus collaris striolatus
Tripisternus ellipticus
Tripisternus glaber
Tripisternus lateralis nimbatus
Tripisternus mixtus

Table 22. Continued.

Tropisternus natator
Limnebiidae
Hydraena pennsylvanica
Limnichidae
Lutrochus laticeps
Noteridae
Hydrocanthus iricolor
Psephenidae
Psephenus herricki
Order Trichoptera - Caddisflies
Brachycentridae
Brachycentrus numerosus
Micrasema rusticum
Glossosomatidae
Protoptila erotica
Protoptila palina
Protoptila sp.
Helicopsychidae
Helicopsyche borealis
Hydropsychidae
Ceratopsyche bronta
Cheumatopsyche campyla
Cheumatophsyche lasia
Cheumatopsyche pasella
Cheumatopsyche pettiti
Cheumatopsyche sordida
Cheumatopsyche speciosa
Hydropsyche aerata
Hydropsyche bidens
Hydropsyche cuanis
Hydropsyche frisoni
Hydropsyche hageni
Hydropsyche incommoda
Hydropsyche orris
Hydropsyche phalerata
Hydropsyche rossi
Hydropsyche simulans
Macrostemum zebratum
Potamyia flava
Hydroptilidae
Hydroptila albicornis
Hydroptila angusta
Hydroptila armata
Hydroptila grandiosa
Hydroptila hamata
Hydroptila perdita
Hydroptila spatulata
Hydroptila waubesiana
Ithytrichia mazon
Mayatrichia ayama
Neotrichia falca
Neotrichia minutisimella
Neotrichia okopa
Ochrotrichia shawnee
Ochrotrichia tarsalis
Oxyethira coercens
Oxyethira pallida
Stactobiella palmata
Leptoceridae
Ceraclea alagma
Ceraclea ancylus
Ceraclea angusta
Ceraclea cancellata
Ceraclea maculata
Ceraclea resurgens
Ceraclea tarsipunctata
Ceraclea transversa
Nectopsyche albida
Nectopsyche candida
Nectopsyche exquiseta
Oecetis avara
Oecetis cinerascens
Oecetis inconspicua
Setodes oligius
Triaenodes flavescens
Triaenodes injustus
Triaenodes marginatus
Triaenodes tardus
Limnephilidae
Anabolia consocius
Hydatophylax argus
Platycentropus radiatus
Pycnopsyche semifasciata
Pycnopsyche subfasciata
Philopotamidae
Chimarra obscura
Phryganeidae
Ptilostomis semifasciata
Polycentropodidae
Cyrnellus fraternus
Neureclipsis crepuscularis
Nyctiophylax celta
Nyctiophylax vestitus
Paranyctiophylax vestitus
Polycentropus cinereus

Table 22. Continued.

Psychomyiidae
Cernotina calcea
Chimarra obscura
Chimarra socia
Rhyacophilidae
Rhyacophila lobifera
Order Lepidoptera - Butterflies & Moths
Pyralidae
Petrophila sp.
Order Diptera - Flies
Ceratopogonidae
Forcipomyia aurea
Palpomyia complex
Chironomidae
Ablabesmyia janta
Ablabesmyia mallochi
Ablabesmyia peelensis
Chironomus attenuatus
Chironomus decorus
Chironomus riparius
Cricotopus bicinctus
Cryptochironomus fulvus
Cryptotendipes sp.
Dicrotendipes neomodestus
Einfeldia sp.
Glyptotendipes lobiferus
Larsia decorata
Orthocladius sp.
Parachironomus monochromus
Paracladopelma nr. *nereis*
Paratanytarsus sp.
Phaenopsectra obediens
Polypedilum halterale
Polypedilum illinoense
Polypedilum scalaenum
Polypedilum illinoense
Polypedilum tritum
Procladius sp.
Psectrotanypus dyari
Thienemannimyia complex
Culicidae
Aedes fitchii
Aedes trivittatus
Aedes vexan
Anopheles punctipennis
Anopheles quadrimaculatus
Culex erraticus
Culex pipiens
Culex restuans
Culex salinarius
Culex tarsalis
Psorophora discolor
Urotaenia sapphirina
Simuliidae
(species indeterminate)
Tabanidae
Chrysops brunneus
Chrysops callidus
Chrysops cincticornis
Chrysops macquarti
Chrysops pikei
Chrysops univittatus
Chrysops vittatus
Tabanus atratus
MOLLUSCA - Mollusks (not including Unionidae)
Gastropoda - Snails
Neotaenioglossa
Hydrobiidae
Amnicola sp.
Pleuroceridae
Goniobasis sp.
Pleurocera sp.
Bassomatophora
Ancylidae
Ferrissia sp.
Physidae
Physa anatina
Pelecypoda - Bivalve Mollusks
Veneroida
Sphaeriidae
Pisidium sp.
Sphaerium sp.
Tabanus similis
Tabanus quinquevittatus
Tabanus lineola
Tipulidae
(species indeterminate)

[1] Data are from the Illinois Natural History Survey Insect and Annelida collections, and literature cited in this document. List compiled by M.J. Wetzel, D.W. Webb, and S.J. Taylor, Illinois Natural History Survey Center for Biodiversity.

Threatened and Endangered Species

Fishes

State endangered or threatened fishes known from the Prairie Parklands Assessment Area include the bigeye shiner, last observed in 1968, pallid shiner, observed in 1992, river redhorse, observed in 1989, greater redhorse, observed in 1989, and western sand darter, observed in 1992.

Bigeye shiner: The bigeye shiner is found in Illinois only in extremely isolated populations inhabiting flowing pools of clear rocky streams. Individuals usually are found near emergent vegetation along stream margins. The population in Mazon River is the northernmost in Illinois.

Pallid shiner: In the late 1800s, the pallid shiner was statewide in distribution, although populations were highly localized in small to large rivers. The pallid shiner now survives in Illinois only in the Kankakee River and in the upper Mississippi River. The species requires clean water over rocky substrates and often is associated with aquatic vegetation.

River redhorse: The river redhorse is found in only a few large rocky streams in Illinois. The only stream in which it is common is the Kankakee River.

Greater redhorse: The greater redhorse is one of the rarest fishes in Illinois. It maintains populations only in the Fox River in Kendall and Kane counties, the Vermilion River in Livingston County, and the Illinois River in Grundy and LaSalle counties.

Western sand darter: Once found in several tributaries of the Illinois River, the western sand darter now appears to have been extirpated from the entire Illinois River basin except in the lower Kankakee River. Elsewhere in Illinois the species survives only in the upper Mississippi River from Carroll County to Rock Island County, and in isolated stretches of the Kaskaskia River.

Mussels

Three state threatened mussels (elephantear, spike, butterfly) and seven state endangered mussels (spectaclecase, slippershell mussel, salamander mussel, sheepnose, snuffbox, Higgins eye, rainbow) have historically been reported from this Assessment Area. The Higgins eye is also a federally endangered species.

A summary of the past occurrence of each threatened or endangered mussel in the area is given below. Data used in these summaries have been taken from Cummings and Mayer (1997) and the INHS Mollusk Collection database.

Elephantear: The elephantear is a large river species that has not been collected alive in the Illinois River drainage in over 50 years. It is currently found alive in Illinois only in the Wabash and Ohio rivers.

Spike: The spike was once a common species in small- to medium-sized streams like the Kankakee in Illinois. Today it has undergone a rapid decline and is limited to a few isolated populations in the state. The only recent record for this mussel in this region was in the Kankakee River at Custer Park (1988).

Butterfly: As with the elephantear, the butterfly is now restricted to a few isolated populations in the larger rivers of the state. It has been virtually extirpated from the Illinois River and its tributaries and does not currently occur in this region.

Spectaclecase: The spectaclecase is now restricted to a few isolated population in the Mississippi and Ohio rivers. It has been virtually extirpated from the Illinois River and its tributaries and does not currently occur in this region.

Slippershell mussel: The slippershell was a common species in small streams in Illinois. Today it has undergone a rapid decline and is limited to a few isolated populations in the state. No live slippershells have been collected in about 20 years, but fresh-dead shells have been found in Spring and Waupecan creeks.

Salamander mussel: The salamander mussel has been nearly extirpated from Illinois. No live individuals have been seen in many years. However, fresh-dead shells have been found at a few localities, indicating that a population might still exist in the state. It is possible that this species still exists in the Kankakee River below the dam at Wilmington or in one of the tributaries that still contain a viable population of the host species, the mudpuppy.

Sheepnose: The sheepnose was widely distributed but uncommon throughout medium to large streams in Illinois. In this region it was most recently found in the Kankakee River at Wilmington (1984) and Custer Park (1986).

Snuffbox: The snuffbox is currently thought to exist only in the Embarras River in east-central Illinois. It historically was found in the Assessment Area and, although unlikely, may still exist in the Kankakee River.

Higgins eye: The federally endangered Higgins eye was last reported alive in this region in the Kankakee River near Lorenzo in 1966. It is most likely extirpated from this area.

Rainbow: Historically found in the Des Plaines and Kankakee rivers, the rainbow has not been seen alive for over 50 years and is presumed extirpated from this area.

Thirteen species of crustaceans are known from this region (Tables 20 and 21). None is considered threatened or endangered. No threatened or endangered aquatic macroinvertebrates are known or thought to occur in the PPA.

Non-native Species

The common carp is found throughout Illinois. It can be found in almost any type of habitat but prefers warm sluggish waters of streams and lakes and is very tolerant of high turbidity and low oxygen levels. Native to Eurasia, the common carp has been present in Illinois since the earliest surveys, making its effect on native species difficult to determine. The species tends to destroy vegetation and increase water turbidity by dislodging plants and rooting around in the substrate, causing a deterioration of habitat for species requiring vegetation and clear water. The common carp attains a large size and has become an important commercial food species in Illinois; however, it may have done so at the expense of ecologically similar native species such as carpsuckers and buffalos. It was distributed throughout Illinois by the time of Forbes and Richardson's (1908) survey of Illinois fishes and was described as abundant in all parts of the state by Smith (1979). It remains common in most areas of Illinois, including the Prairie Parklands Assessment Area.

The goldfish also is a Eurasian carp that has been present in Illinois since at least the 1800s. It is sporadic in its distribution, but the largest population is that in the Illinois River. The goldfish does best in polluted streams where few other fishes are present; as the water quality of the Illinois River improves, the goldfish can be expected to become less common. The impacts of the goldfish on native fishes, like the impacts of the carp, are difficult to assess because of the long history of the species in Illinois. However, the goldfish must be less damaging because of its more restricted distribution and its inability to persist where native species do well.

The alewife is native to the Atlantic Ocean and coastal steams of eastern North America. With the completion of the Welland Canal in the 1820s, the alewife gained access to the Great Lakes. It first appeared in Lake Michigan in 1949, and has been reproducing there since then. It appears in the Assessment Area only rarely as individuals move into the Illinois River from Lake Michigan.

The rudd is a European minnow that is used by fishermen as bait and sometimes released alive into Illinois water bodies. Although recorded from the Assessment Area, it is not thought to be reproducing.

The brown trout is European in origin and is stocked in Illinois streams by the Department of Natural Resources. It is not reproducing in Illinois.

The zebra mussel and Asian clam are two other non-native species that are having major impacts on aquatic communities in Illinois. The zebra mussel is having negative impacts on native Illinois species, particularly native mussels that are restricted to large rivers. Effects of the Asian clam on native species and communities are difficult to measure, but some studies have suggested that it probably competes with native mussels for food. Both the Asian clam and zebra mussel are common throughout the Assessment Area.

Chinese mystery snails (an introduced snail from Asia newly discovered in Illinois) have been found in nearby drainages and could turn up in this area.

The rusty crayfish was first reported in this region in 1993. The rusty crayfish is rapidly expanding its range and is contributing to declines in native crayfishes in Illinois, particularly the virile and clearwater crayfishes (Taylor and Redmer 1996).

Of the aquatic macroinvertebrate taxa known or thought likely to occur in the PPAA (Table 22), none other than one aquatic worm species is known to have been introduced. *Branchiura sowerbyi* (Annelida: Oligochaeta: Tubificidae) was first reported in the USA from a lake in Ohio in 1932, most likely introduced to the continent with imported aquatic and semiaquatic plants or other aquatic organisms. Originally thought to be restricted to thermally influenced habitats, *B. sowerbyi* is now commonly collected from a variety of stream and lake systems. This species is widespread throughout North America and Europe, and has been recorded from all continents except Antarctica. *Branchiura sowerbyi* does not appear to pose any threat to native populations of aquatic macroinvertebrates.

Unique Habitats

Only one extant spring is known to occur within the Assessment Area (Webb and Wetzel, unpublished). No biological survey, specifically, has been conducted at this spring, although the caddisfly *Anabolia consocius* (Trichoptera: Limnephilidae) was reported from its springbrook (Ross 1944).

Information Gaps

The Prairie Parklands Assessment Area has been well studied with respect to fishes, mussels, and crayfishes. However, additional survey work in the smaller tributaries would better define the limits of some of the species, especially mussels and fishes, and possibly uncover additional populations of state endangered and other rare species.

The status of several species is uncertain; additional survey work is needed to determine whether these species still occur in the Assessment Area and, if not, whether they could be successfully reintroduced.

Several historical and recent collections of aquatic macroinvertebrates from the Prairie Parklands Assessment Area, particularly from the Des Plaines and Kankakee rivers proper, are deposited in the permanent INHS Collections; information for these collections, however, is not easily retrievable because much of the identified material has not yet been incorporated into a searchable database, and many specimens have yet to be identified.

Once specimens in the INHS collections have been identified and incorporated into a database, comparisons of historical material with that obtained during more recent collections could be made to determine changes in distribution and abundance. Moreover,

long-term monitoring of selected communities, species, and groups of aquatic macroinvertebrates in habitats throughout the state - particularly in headwater streams and, to a lesser extent, in small ponds, lakes and wetland areas - would provide needed information on population trends and habitat associations.

Water Quality

The Illinois Water Quality Report (Illinois Environmental Protection Agency 1996) rated the segment of the Des Plaines River within the Assessment Area as "Partial Support/ Moderate Impairment" (water quality conditions are impaired to a greater degree inhibiting the waterbody from meeting all the needs for that designated use). Jackson Creek and the upstream portion of Hickory Creek were rated as "Full Support" (water quality meets the needs of all designated uses protected by applicable water quality standards); the remainder of Hickory Creek drainage (including Spring Creek) was rated as "Partial Support/Minor Impairment" (water quality has been impaired, but only to a minor degree). The Kankakee River drainage within the Assessment Area was rated as "Full Support," except for Prairie Creek which was given a rating of "Full Threatened" (water quality is adequate to maintain designated uses, but if a declining trend continues, only partial support may be attained in the future).

The entire Mazon River drainage was rated as "Full Support." Aux Sable Creek mainstem was rated as "Partial Support/Minor Impairment;" the remainder of that drainage was rated as "Full Support." East Fork Nettle Creek, Rat Run, and the Illinois River were rated as "Partial Support/Minor Impairment." Most of the remaining streams in the Assessment Area were rated as "Full Support" or not rated. Some of the reasons for lower ratings included degraded water conditions due to urban surface water runoff, municipal and industrial discharges, land development, and channelization.

The Biological Stream Characterization (BSC) (Bertrand et al. 1996) rated the Mazon River from the West Fork up to the East Fork, Johnny Run (Mazon River drainage), and Manhattan Creek (Des Plaines River drainage) as "Class A" streams (Unique Aquatic Resource). Streams rated as "Class B" streams (Highly Valued Aquatic Resource) in the Assessment Area include Jackson Creek (Des Plaines River drainage), Aux Sable Creek from its mouth to West Aux Sable Creek, Valley Run (Aux Sable Creek drainage), Bills Run (direct tributary to the Illinois River), Hog Run (direct tributary to the Illinois River), Mazon River from its mouth to West Fork Mazon River, West Fork Mazon River, East Fork Mazon River, East Fork Mazon tributary from its mouth to Illinois Route 17, Claypool Ditch (Mazon River drainage), Granary Creek (Mazon River drainage), Kankakee River from I-55 to beyond the assessment boundary, and Forked Creek (Kankakee River drainage). Spring Creek (Hickory Creek drainage) from Gouger Road to Bell Road in Will County was rated as a "Class E Stream" (Restricted Aquatic Resource), the lowest BSC rating. The remainder of the streams in the Assessment Area were rated as "Class C" (Moderate Aquatic Resource) or "Class D" (Limited Aquatic Resource) streams or not rated. The Illinois River was not rated.

Smith (1971) rated the Mazon River system as "Good," the Kankakee River system as "Excellent," and the Des Plaines River system as "Poor." Domestic and industrial pollution and extension modification of habitats are the major problems with the Des Plaines basin. He noted that Prairie and Jackson creeks have good species diversity, but Hickory Creek is the outstanding stream in the system. Smith did not rate the Illinois River.

Biologically Significant Streams

Six areas in the Prairie Parklands Assessment Area were recognized as Biologically Significant Streams (Page et al. 1992) because of the presence of threatened and/or endangered species and high mussel and/or fish diversity (Table 8). These streams provide the best opportunities in the basin for the protection of large numbers of native species.

1. *Johnny Run, Grundy County.* This stream was rated as a "Class A Stream" by Bertrand et al. (1996) in the Biological Stream Characterization Report. No data on stream characteristics are available for this site.

2. *Mazon River, West Fork up to East Fork, Grundy County.* This stream segment was rated as a "Class A Stream" by Bertrand et al. (1996) in the Biological Stream Characterization Report. No data on stream characteristics are available for this site.

3. *Manhattan Creek, Will County.* This stream was rated as a "Class A Stream" by Bertrand et al. (1996) in the Biological Stream Characterization Report. No data on stream characteristics are available for this site.

4. *Illinois River, 2.5 miles above and below Marseilles, LaSalle County.* The greater redhorse is present in this stream segment. No data on stream characteristics are available for this site.

5. *Illinois River, 2.5 miles above and below Dresden Lock & Dam, Grundy & Will counties.* The pallid shiner, river redhorse, and greater redhorse are present in this stream segment. No data on stream characteristics are available for this site.

6. *Kankakee River, Des Plaines Conservation Area east to Assessment Area boundary, Will County.* This is a small downstream segment of this significant stream; the entire segment runs from the Des Plaines Conservation Area to Momence. The Kankakee River, from Momence to the Des Plaines Wildlife Conservation Area, flows as a naturally meandering stream. The river varies from 200 to 800 feet wide and is up to 15 feet deep. A variety of stream habitats are found including alternating riffles, pools, and islands. Between Momence and Kankakee the substrate is mainly bedrock overlain with sand and cobble with sandy pools along the margin. From Kankakee the substrate changes from gravel and cobble with numerous riffles, shallow pools, and small islands, to silted pools separated by extensive runs of solid bedrock. The pallid shiner, weed shiner, western sand darter, and river redhorse are present. This area supports a high diversity of mussels including the

threatened sheepnose. The Kankakee River supports one of the state's most diverse and abundant aquatic faunal populations and should be regarded as a resource of national importance.

Environmental Problems

Stream ecosystems are fragmented by landscape changes that render stream habitats unsuitable for aquatic organisms and by instream modifications that eliminate stream habitats. Smith (1971) ranked the causes of extirpation or declines in fish species in Illinois as follows: siltation (as the primary factor responsible for the loss of 2, and decimation of 14, species), drainage of bottomland lakes, swamps, and prairie marshes (0, 13), desiccation during drought (0, 12), species introductions (2, 7), pollution (2, 5), impoundments (0, 4), and increased water temperatures (0, 1). All of these factors render habitats unsuitable for many aquatic species throughout Illinois and lead to extirpations.

Streams in Illinois naturally have wooded floodplains that are extremely important in maintaining a healthy aquatic environment. The vegetation on a floodplain shades the stream and keeps it from becoming excessively hot during the summer, stabilizes the streambank and reduces erosion, and acts as a filter that removes topsoil and pesticides which would otherwise reach the stream as water drains from croplands. During periods of high water, vegetated floodplains provide feeding and spawning areas for many species of aquatic organisms and nurseries for developing larvae. When floodplains are converted to crop production as they have been throughout much of Illinois, they no longer provide these benefits to aquatic organisms.

Another major landscape change that has negatively impacted streams has been the tiling of land for agriculture. Land that once drained slowly drains quickly once it is tiled. Rapid drainage of land increases the pulse of a flood and increases the intensity and duration of low-flow once the water has moved downstream. These artificially extreme fluctuations in water levels subject stream organisms to environmental conditions to which they are not adapted and can lead to the extirpation of populations.

Siltation, increased water temperatures, and desiccation follow the removal of riparian vegetation and the tiling of fields as land is prepared for agriculture. The excessive siltation associated with the removal of floodplain vegetation is among the most damaging forms of stream pollution. The clean rock and gravel substrates that are normally characteristic of riffles and other stream habitats with fast-flowing water provide living space for many species of aquatic insects and other invertebrates and important spawning habitat for many species of fishes. The deposition of silt covers the rocks, leaving no place for small organisms to hide or for fishes to hide their eggs. Silt can also cover the leaves of aquatic plants and, if sufficient to prevent gas exchange or photosynthesis, will cause the plants to die. The reduction of plant life in a stream has a cascading negative impact on the stream ecosystem. Many animals, in particular insect larvae and fishes, use the plants as places to hide and forage. Some fishes use plants to hide from predators, others use plants

as sites from which to ambush prey. As plants are eliminated, populations of insects and fishes are reduced or eliminated because they have fewer places to live.

The impact of increased water temperatures resulting from the loss of riparian vegetation and reduced water flow during warm seasons is difficult to separate from the effects of siltation and other factors that occur concomitantly. However, throughout Illinois, increased water temperatures per se are probably especially harmful to cool-water species such as northern pike and species dependent on springs and spring-fed streams, such as the southern redbelly dace and many species of amphipods, isopods, and crayfishes.

Stream desiccation is thought to be primarily an effect of the artificially extreme fluctuations in water levels that follow tiling of fields for agriculture. The rapid drainage of surrounding land increases the intensity and prolongs the duration of low-flow once the water has moved downstream. A drought that historically would have had the impact of decreasing the flow in a stream can now lead to a dry stream bed.

Floodplains of large rivers normally have low areas that fill with water during floods and survive year-round as shallow lakes. These lakes provide primary habitat for a wide variety of plants and animals, and because they naturally have luxuriant plant growth, they are important feeding areas for waterfowl, and they provide spawning areas, nurseries for larvae, and overwintering refugia for fishes. Unfortunately, most of the bottomland lakes in Illinois have been drained to create cropland, and those that remain have become shallow and barren because of the tremendous silt loads deposited in them each year during periods of high water. The shallow muddy lakes no longer support the plant life that was fundamental to successful completion of the life cycles of many aquatic species.

The impacts of introduced fishes include competition, predation, inhibition of reproduction, environmental modification, transfer of parasites and diseases, and hybridization. Freshwater mussels and crayfishes have been seriously impacted in Illinois in recent decades by non-native invaders, most notably the zebra mussel and the rusty crayfish. Nalepa (1994) documented the severe decline in native mussels due to the invasion of zebra mussels in Lake St. Clair over a six-year period. He found that mussel densities declined from 2.4/m^2 in 1986 to 0/m^2 in 1992 in areas heavily infested with zebra mussels. The rusty crayfish, introduced through its use as fishing bait, is rapidly spreading through Illinois and displacing native crayfishes (Taylor and Redmer 1996).

Point sources of pollution include industrial wastes and domestic sewage. In Illinois, considerable progress has been made in identifying and eliminating point sources of pollution, and water quality has improved as a result. Nonpoint sources are now a larger problem than are point sources and include siltation and agricultural pesticides that reach streams following the removal of floodplain vegetation.

Impounding a stream converts it into a standing body of water that lacks the riffles, runs, pools, and other habitats that stream-inhabiting organisms require. When a stream is dammed, most native species are eliminated from the inundated area, and upstream and

downstream populations become isolated from one another. Dams block migrations of fishes that in many species are necessary for reproduction. The loss of migratory fishes from a stream ecosystem can lead to the loss of mussels using the migratory fishes as glochidial hosts.

Channelization is the straightening of a stream to enhance drainage of the surrounding land. The straightening converts the diversity of habitats in a stream to one continuous straight channel that supports few species. Because of their sedentary nature mussels are particularly susceptible to the effects of channelization.

Potential Management Strategies for Aquatic Species

Management strategies for aquatic ecosystems must consider each watershed on an individual basis. Attempting to correct problems locally without consideration of upstream activities and downstream implications will result in partial, and probably temporary, improvement.

Correction of some factors that have led to stream habitat fragmentation in past decades is relatively easy. Important initiatives include building sewage treatment plants and avoiding the construction of mainstream impoundments when possible. Other initiatives, such as stopping the removal of riparian vegetation, cessation of stream channelization, and the drainage of bottomland lakes, require more public education and governmental action including, perhaps providing better incentives to landowners. Assuming that pollution will be held at current levels or reduced, nothing will be more beneficial to the biota of Illinois streams than to have natural riparian vegetation restored. Siltation, desiccation, and higher than normal temperatures would all be reduced to acceptable levels if streams were lined with native plants that shaded the stream, stabilized the banks, and filtered sediment and chemicals from runoff before they reached the stream.

Most introductions of non-native fishes have been done in an effort to improve sport or commercial fishing, and usually governmental agencies have been responsible for the introductions. We now know that non-native species alter ecosystems, and the long-term effect of any introduction is likely to be negative rather than an improvement.

Given the opportunity, streams will restore themselves and, often, the best approach to restoration may be to encourage restoration of the native vegetation of the drainage basin, in particular the riparian zone, correct any additional existing pollution problems, and let the stream return to natural conditions. In some instances additional measures, such as reintroducing extirpated species, may be advisable.

References

Introduction

Anderson, R.C. 1970. Prairies in the prairie state. Transactions of the Illinois State Academy of Science 63(2): 214-221.

Anderson, R.C. 1983. The eastern prairie-forest transition—an overview. Pp. 86-92 *in*: R. Brewer, ed. Proceedings of the Eighth North American Prairie Conference. Western Michigan University, Kalamazoo, MI.

Anderson, R.C. 1990. The historic role of fire in the North American grassland. Pp. 8-18, *in*: S. Collins and L. Wallace, eds., Fire in tallgrass prairie ecosystems. University of Oklahoma Press, Norman, OK.

Axelrod, D.I. 1985. Rise of the grassland biome, central North America. Botanical Review 51: 163-202.

Bertrand, W.A., R.L. Hite, and D.M. Day. 1995. Biological Stream Characterization (BSC): Biological Assessment of Illinois Stream Quality through 1993. Illinois Environmental Protection Agency Report No. IEPA/BOW.96-058. December 1996. 40 pages + map.

Fehrenbacher, J.B., J.D. Alexander, I.J. Jansen, R.A. Pope, M.A. Flock, W.F. Andrews, L.J. Bushue, J.W. Scott, and E.E. Voss. 1982. General soil map of Illinois. Agricultural Experiment Station, College of Agriculture, University of Illinois at Urbana-Champaign in cooperation with the Soil Conservation Service, U.S. Department of Agriculture.

Fehrenbacher, J.B., J.D. Alexander, I.J. Jansen, R.G. Darmody, R.A. Pope, M.A. Flock, E.E. Voss, J.W. Scott, W.F. Andrews, and L.J. Bushue. 1984. Soils of Illinois. Agricultural Experiment Station Bulletin 778. College of Agriculture, University of Illinois at Urbana-Champaign in co-operation with the Soil Conservation Service, U.S. Department of Agriculture. 85 pp.

Havera, S.P., L.B. Suloway, J.B. Taft, P.M. Malmborg, J. Hofmann, A. Nugteran, M. Morris. 1994. Wetlands. Pages 87-152 *in*: Illinois Department of Energy andNatural Resources. The Changing Illinois Environment: Critical Trends. Volume 3 Technical Report. Illinois Department of Energy and Natural Resources. Springfield, IL, ILENR/RE-94/05.

Illinois Department of Natural Resources. 1998. Biological and Conservation Database System (BCD), Division of Natural Heritage, Office of Resource Conservation, Illinois Department of Natural Resources.

Illinois Department of Natural Resources. 1999. Prairie Parklands Area Assessment, Volume 2: Water resources. Illinois Department of Natural Resources. Springfield, IL.

Illinois Endangered Species Protection Board. 1999. Checklist of endangered and threatened animals and plants of Illinois. Illinois Department of Natural Resources, Springfield, IL ii + 20 pp.

Illinois Geographic Information System. Digital Data at the Illinois Natural History Survey.

Iverson, L.R., R.L. Oliver, D.P. Tucker, P.G. Risser, C.D. Burnett, and R.G. Rayburn. 1989. The forest resources of Illinois: an atlas and analysis of spatial and temporal trends. Illinois Natural History Survey Special Publication 11.

Kilburn, P.D. 1959. The forest-prairie ecotone in northeastern Illinois. American Midland Naturalist 62:206-217.

Leighton, M.M., G.E. Ekblaw, and C.L. Horberg. 1948. Physiographic divisions of Illinois: Journal of Geology 56: 16-33. Illinois Geological Survey Report of Investigations 129.

Lineback, J.A. 1979. Quaternary deposits of Illinois (map. Illinois State Geological Survey, Urbana.

McFall, D. and J. Karnes (editors). 1995. A Directory of Illinois Nature Preserves. Volume 2 - Northwestern, Central, and Southern Illinois. Illinois Department of Natural Resources, Springfield. iv + 321 pages.

Nuzzo, V.A. 1986. Extent and status of Midwest oak savanna: presettlement and 1985. Natural Areas Journal. 6: 6-36.

Page, L.M., K.S. Cummings, C.A. Mayer, S.L. Post, and M.E. Retzer. 1992. Biologically significant Illinois streams. An evaluation of the streams of Illinois based on aquatic biodiversity. Final report prepared for the Illinois Department of Energy and Natural Resources and the Illinois Department of Conservation. Illinois Natural History Survey, Center for Biodiversity Technical Report. 1992(1a): v + 485 p.

Schwegman, J.E., G.B. Fell, M.D. Hutchinson, G. Paulson, W.M. Shephard, and J. White. 1973. Comprehensive plan for the Illinois Nature Preserve system. Part 2. The natural divisions of Illinois. IL Nature Preserves Commission, Rockford, IL. 32 pp.

Suloway, L. and M. Hubbell. 1994. Wetland resources of Illinois: an analysis and atlas. Illinois Natural History Survey Special Publication 15. 88 pp.

Taft, J.B. 1997. Savanna and Open-Woodland Communities. pp. 24-54, chapter 2 *in*: Mark W. Schwartz (editor). Conservation in Highly Fragmented Landscapes, Chapman and Hall Press.

Taft, J.B., M.W. Schwartz, and L.R. Phillippe. 1995. Vegetation ecology of flatwoods on the Illinoian till plain. Journal of Vegetation Science 6: 647-666.

Vestal, A.G. 1931. Strategic habitats and communities in Illinois. Illinois State Academy of Science Transactions 24: 80-85.

White, J. 1978. Illinois natural areas inventory technical report. Vol. 1. Survey methods and results. Illinois Natural Areas Inventory, Urbana. 426 pp.

White, J. and M.H. Madany. 1978. Classification of natural communities in Illinois. Pages 310-405 (Appendix 30) *in*: White, J. Illinois Natural Areas Technical Report, Volume 1. Survey Methods and Results. Urbana. Illinois Natural Areas Inventory.

Willman, H.B., E. Atherton, T.C. Buschbach, C. Collinson, J.C. Frye, M.E. Hopkins, J.A. Lineback, and J.A. Simon. 1975. Handbook of Illinois stratigraphy: Illinois State Geological Survey, Bulletin 95, 261 pp.

Adams, D.E., and R.C. Anderson. 1980. Species response to a moisture gradient in central Illinois forests. American Journal of Botany 67: 381-392.

Anderson, R.C. 1970. Prairies in the prairie state. Transactions of the Illinois State Academy of Science 63(2): 214-221.

Anderson, R.C. 1983. The eastern prairie-forest transition—an overview. Pp. 86-92 *in*: R. Brewer, ed. Proceedings of the Eighth North American Prairie Conference. Western Michigan University, Kalamazoo, MI.

Bell, D.T. 1974. Tree stratum composition and distribution in the streamside forest. American Midland Naturalist 92:35-46.

Bell, D.T. and W.M. Zales. 1978. Vascular plants of Will County; annotated checklist, ecological summary, and natural area inventory. Will County Forest Preserve District.

Braun, E.L. 1950. Deciduous forests of eastern North America. Hafner Publishing Company, New York.

Brown, S. and A.E. Lugo. 1994. Rehabilitation of tropical lands: a key to sustaining development. Restoration Ecology 2: 97-111.

Curtis, J.T. 1959. The vegetation of Wisconsin. Univ. Wisconsin Press, Madison, WI.

Fralish, J.S. 1994. The effect of site environment on forest productivity in the Illinois Shawnee Hills. Ecological Applications 4:134-143.

Gelhausen, S.M., M.W. Schwartz, C.K. Augspurger. An analysis of vegetation and microclimatic edge effects in two mixed-mesophytic forest fragments. Conservation Biology *(in review)*.

Gleason, H.A. 1913. The relation of forest distribution and prairie fires in the Middle West. Torreya 13: 173-181.

Havera, S.P., L.B. Suloway, J.B. Taft, P.M. Malmborg, J. Hofmann, A. Nugteran, M. Morris. 1994. Wetlands. Pages 87-152 *in*: Illinois Department of Energy andNatural Resources. The Changing Illinois Environment: Critical Trends. Volume 3 Technical Report. Illinois Department of Energy and Natural Resources. Springfield, IL, ILENR/RE-94/05.

Herkert, J.R. (ed.) 1991. Endangered and Threatened Species of Illinois: Status and Distribution, Volume 1 - Plants. Illinois Endangered Species Protection Board, Springfield, Illinois. 158 pp.

Herkert, J.R. (ed.) 1994. Endangered and Threatened Species of Illinois: Status and Distribution, Volume 3 - 1994 Changes to the Illinois List of Endangered and Threatened Species. Illinois Endangered Species Protection Board, Springfield, Illinois. 33 pp.

Hill, S.R. 1998. Introduction, Natural Vegetation Communities, Appendices A & B:Plant Species lists, pp. 1-21, 25-67, 155-201 *in:* W.G. Ruesink, D.K. Niven *et al.* 1998. Kankakee River Area Assessment. Volume 3: Living Resources. Illinois Department of Natural Resources, Springfield. 201 pp.

Illinois Department of Natural Resources. 1998. Biological and Conservation Database System (BCD), Division of Natural Heritage, Office of Resource Conservation, Illinois Department of Natural Resources.

Illinois Endangered Species Protection Board. 1999. Checklist of endangered and threatened animals and plants of Illinois. Illinois Department of Natural Resources, Springfield, IL ii + 20 pp.

Iverson, L.R., R.L. Oliver, D.P. Tucker, P.G. Risser, C.D. Burnett, and R.G. Rayburn. 1989. The forest resources of Illinois: an atlas and analysis of spatial and temporal trends. Illinois Natural History Survey Special Publication 11.

Lovejoy, T.E. 1975. Rehabilitation of degraded tropical forest lands. The Environmentalist 5: 13-20.

Malecki, R.A., B. Blossey, S.D. Hight, D. Schroeder, L.T. Kok, and J.R. Coulson. 1993. Biological control of purple loosestrife. BioScience 43: 680-686.

McFall, D. and J. Karnes, eds. 1995. A Directory of Illinois Nature Preserves, Volume1 and Volume 2. Illinois Department of Natural Resources, Springfield. vol. 1:195 pp, vol. 2: 327 pp.

McClain, W.E. 1983. Photodocumentation on the loss of hill prairie within PereMarquette State Park, Jersey County, Illinois. Transactions of the Illinois State Academy of Science 76: 343-346.

Mohlenbrock, R.H. 1986. Guide to the vascular flora of Illinois. Revised and enlarged edition. Southern Illinois University Press, Carbondale. 508 pp.

Nelson, J.C., A. Redmond, and R.E. Sparks. 1994. Impacts of settlement on floodplain vegetation at the confluence of the Illinois and Mississippi Rivers. Transactions of the Illinois State Academy of Science 87: 117-133.

Nelson, P.W. 1985. The terrestrial natural communities of Missouri. Missouri Department of Natural Resources and Missouri Department of Conservation, Jefferson City.

Nuzzo, V.A. 1991. Experimental control of garlic mustard [*Alliaria petiolata* (Bieb.) Cavara & Grande] in northern Illinois using fire, herbicide, and cutting. Natural Areas Journal 11: 158-167.

Robertson, K.R., M.W. Schwartz, J.W. Olson, B.R. Dunphy, and H.A. Clarke. 1995. A synopsis of hill prairies in Illinois: 50 years of change. pp. 9-20 *in*: T.E. Rice (ed.) Proceedings of the Fourth Central Illinois Prairie Conference. Milliken University, Decatur, Illinois.

Robertson, P.A. 1992. Factors affecting tree growth on three lowland sites in southern Illinois. American Midland Naturalist 128: 218-236.

Schwartz, M.W. and J. Heim. 1996. Effects of a prescribed fire on degraded forest vegetation. Natural Areas Journal 16: 184-191.

Solecki, M.K. 1997. Invasive plants and their control. Pages 251-278 *in*: Packard, S. and C.F. Mutel (eds.). The Tallgrass Restoration Handbook- For Prairie, Savannas, and Woodlands. Society for Ecological Restoration. Island Press.

Suloway, L. and M. Hubbell. 1994. Wetland resources of Illinois: an analysis and atlas. Illinois Natural History Survey Special Publication 15. Illinois Natural History Survey: Champaign. 88 pp.

Swink, F. & G.S. Wilhelm. 1994. Plants of the Chicago Region. 4th ed. Morton Arboretum, Lisle, Illinois and the Indiana Academy of Science, Indianapolis. xiv + 922 pp.

Taft, J.B. 1995. Ecology, distribution, and rareness patterns of threatened and endangered prairie plants in Illinois. Pages 21-31 *in*: T.E. Rice (editor). Proceedings of the fourth Central Illinois Prairie Conference. Milliken University, Decatur, IL.

Taft, J.B. 1996. Reading the signs: plants as indicators of site history. Illinois Steward, Spring 1996: 20-24.

Taft, J.B. 1997. Savanna and Open-Woodland Communities. pp. 24-54, chapter 2 *in*: Mark W. Schwartz (editor). Conservation in Highly Fragmented Landscapes, Chapman and Hall Press.

Taft, J.B., M.W. Schwartz, and L.R. Phillippe. 1995. Vegetation ecology of flatwoods on the Illinoian till plain. Journal of Vegetation Science 6: 647-666.

Taft, J.B., G.S. Wilhelm, D.M. Ladd, and L.A. Masters. 1997. Floristic Quality Assessment for vegetation in Illinois, A method for assessing vegetation integrity. Erigenia 15: 1-95.

Thompson, D.Q., R.L. Stuckey, and E.B. Thompson. 1987. Spread, impact, and control of purple loosestrife (*Lythrum salicaria*) in North American wetlands. U.S. Fish Wildl. Serv. Res. Rep. 2.

White, J. 1978. Illinois natural areas inventory technical report. Vol. 1. Survey methods and results. Illinois Natural Areas Inventory, Urbana. 426 pp.

White, J. and M.H. Madany. 1978. Classification of natural communities in Illinois. Pages 310-405 (Appendix 30) *in*: White, J. Illinois Natural Areas Technical Report, Volume 1. Survey Methods and Results. Urbana. Illinois Natural Areas Inventory.

Wilcove, D.S., C.H. McLellan, and A.P. Dobson. 1986. Habitat fragmentation in the temperate zone. Pages 237-256 *in*: M. E. Soule (editor). Conservation Biology. The Science of Scarcity and Diversity. Sinauer Associates, Inc., Sunderland, MS.

Birds

Birkenholz, D.E. 1975. The Summer Birds of Goose Lake Prairie Nature Preserve, 1970-1973. The Chicago Academy of Sciences Natural History Miscellanea No. 193:1-11.

Birkenholz, D.E. 1982. Avian Ecological Investigations: Goose Lake Prairie State Park. Final Report to the Illinois Dept. of Conservation.

Birkenholz, D.E. 1995. Report of a Nesting Bird Survey of the Marseilles Training Area. Final Report to the Illinois Dept. of Natural Resources.

Bohlen, H.D., and W. Zimmerman. 1989. The Birds of Illinois. Indiana University Press, Bloomington. 222 pp.

Brawn, J.D., and S.K. Robinson. 1996. Source-sink population dynamics may complicate the interpretation of long-term census data. Ecology 77:3-12.

Ciaranca, M.A., C.C. Allin, and G.S. Jones. 1997. Mute Swan (*Cygnus olor*). *in*: The Birds of North America, No. 273. A. Poole and F. Gill (eds.). The Academy of Natural Sciences, Philadelphia, Pa., and The American Ornithologists' Union, Washington, D.C.

Farris, A.L. 1970. Distribution and abundance of the Gray Partridge in Illinois. Transactions of the Illinois State Academy of Science 63 : 240-245.

Graber, J.W., and R.R. Graber. 1983. Feeding rates of warblers in spring. Condor 85:139 150.

Herkert, J.R. 1991. Prairie birds of Illinois: Population responses to two centuries of habitat change. Illinois Natural History Survey Bulletin 34:393-399.

Herkert, J.R. 1994. Breeding bird communities of mid-western prairie fragments: The effects of prescribed burning and habitat area. Natural Areas Journal 14:128-135.

Herkert, J.R., R.E. Szafoni, V.M. Kleen, and J.E. Schwegman. 1993. Habitat establishment, enhancement, and management for forest and grassland birds in Illinois. IL Dept. Conserv., Natural Heritage Technical Publication No.1. 20 pp.

Illinois Department of Natural Resources. 1998. Biological and Conservation Database System (BCD), Division of Natural Heritage, Office of Resource Conservation, Illinois Department of Natural Resources.

Illinois Department of Natural Resources. (*in preparation*). Illinois Birds - Illinois Breeding Bird Atlas. http://www.inhs.uiuc.edu/chf/pub/ifwis/birds/index.html. July 8, 1998.

Milosevich, J. and J. Olson. 1981. Nesting Canada Warblers in Joliet. Illinois Audubon Bulletin. 197: 23-26.

Milosevich, J. and J. Olson. 1982. Avian Ecological Investigations: Des Plaines Conservation Area. Final Report to the Illinois Department of Conservation.

Milosevich, J. 1993. Nesting Acadian Flycatchers in Joliet. Meadowlark. Vol. 2 (1): 21-22.

Milosevich, J. 1994. A Tale of Two Colonies. Meadowlark. Vol. 3 (1): 7-9.

Peterjohn, B.G., J.R. Saur, and W.A. Link. 1994. The 1992 and 1993 summary of the North American Breeding Bird Survey. Bird Populations 2: 46-61.

Robinson, S.K., J.P. Hoover, and J.R. Herkert. in press. Cowbird parasitism in a fragmented landscape: Effects of tract size, habitat, and abundance of cowbird hosts. *in:* Ecology and management of cowbirds, J.N.M. Smith, S.K. Robinson, S.I. Rothstein, S.G. Sealy, and T. Cook (editors). University of Texas Press, Austin, Texas.

Robinson, S.K., F.R. Thompson III, T.M. Donovan, D.R. Whitehead, and J. Faaborg. 1995. Regional forest fragmentation and the nesting success of migratory birds. Science 267:1987-1990.

Rothstein, S.I., and S.K. Robinson. 1994. Conservation and coevolutionary implications of brood parasitism by cowbirds. Trends in Ecology and Evolution. 9: 162-164.

Suloway, L. and M. Hubbell. 1994. Wetland resources of Illinois: an analysis and atlas. Illinois Natural History Survey Special Publication 15. Illinois Natural History Survey: Champaign. 88 pp.

Warner, R.E. 1994. Agricultural land use and grassland habitat in Illinois: Future shock for Midwestern birds? Conservation Biology 8:147-156.

Mammals

Anderson, E. 1995. Status in the Midwest and Illinois. Pages 23-32 *in:* Illinois river otter recovery plan. R. Bluett (ed.). Illinois Department of Natural Resources, Division of Wildlife Resources Technical Bulletin 7. 96 pp.

Bluett, B. 1997. River otter recovery update. Illinois Department of Natural Resources, Division of Natural Resources, Furbearer Program Management Note 97-1. [3 pp.].

Churcher, P.B. and J.H. Lawton. 1987. Predation by domestic cats in an English village. Journal of Zoology 212:439-455.

Coleman, J.S. and S.A. Temple. 1996. On the prowl. Wisconsin Natural Res. 20(6):4-8.

Gardner, J.E., J.E. Hofmann, and J.D. Garner. 1996. Summer distribution of the federally endangered Indiana bat (*Myotis sodalis*) in Illinois. Transactions of the Illinois State Academy of Science 89:187-196.

Herkert, J.R. (ed.) 1992. Endangered and threatened species of Illinois: status and distribution. Volume 2 - animals. Illinois Endangered Species Protection Board, Springfield. 142 p.

Hoffmeister, D.F. 1989. Mammals of Illinois. University of Illinois Press, Urbana and Chicago. 348 pp.

Hofmann, J.E. 1998. A survey of Franklin's ground squirrel (*Spermophilus franklinii*) in east-central Illinois. Center for Biodiversity Technical Report 1998(11). Illinois Natural History Survey, Champaign. 31 pp.

Illinois Department of Natural Resources. 1998. Biological and Conservation Database System (BCD), Division of Natural Heritage, Office of Resource Conservation, Illinois Department of Natural Resources.

Illinois Endangered Species Protection Board. 1999. Checklist of endangered and threatened animals and plants of Illinois. Illinois Department of Natural Resources, Springfield, IL ii + 20 pp.

Lewis, T.L. and O.J. Rongstad. 1992. The distribution of Franklin's ground squirrel in Wisconsin and Illinois. Transactions of the Wisconsin Academy of Sciences, Arts & Letters 80:57-62.

Mierzwa, K. 1991. The masked shrew and pygmy shrew in McHenry County, Illinois. Unpubished report. 10 pp.

Nixon, C.M., S.P. Havera, and R.E. Greenberg. 1978. Distribution and abundance of the gray squirrel in Illinois. Illinois Natural History Survey Biological Notes 105. 55 pp.

Rosenblatt, D.L., E.J. Heske, S.L. Nelson, M.A. Miller, D.M. Barber, and B. McCallister. 1999. Forest fragments in east-central Illinois: islands or habitat patches for mammals? American Midland Naturalist. 141:115-123.

Suloway, L. and M. Hubbell. 1994. Wetland resources of Illinois: at analysis and atlas. Illinois Natural History Survey Special Publication 15. Champaign. 88 pp.

U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered and threatened species. 50 CFR Part 17. Federal Register 56(225):58804-58836.

Warner, R.E. 1985. Demography and movements of free-ranging domestic cats in rural Illinois. Journal of Wildlife Management 49:340-346.

Warner, R.E. and B. Ver Steeg. 1995. Illinois badger studies. Final report, Federal Aid to Wildlife Project No. W-103-R, 1-6, Illinois Natural History Survey. 161 pp.

Wilson, D.E. and D.M. Reeder (eds). 1993. Mammal species of the world, a taxonomic and geographic reference, second edition. Smithsonian Institution Press, Washington. 1206 pp.

Woolf, A. 1996. Status of the bobcat in Illinois. Annual performance report, Federal Aid Project W-126-R-1, submitted to Illinois Department of Natural Resources. Cooperative Wildlife Research Laboratory, Carbondale, IL.

Amphibians and Reptiles

Collins, J.T. (ed.) 1990. Standard common and current scientific names for North American amphibians and reptiles. Society for the Study of Amphibians and Reptiles. Herpetological Circular No. 19. 41 pp.

Illinois Department of Natural Resources. 1998. Biological and Conservation Database System (BCD), Division of Natural Heritage, Office of Resource Conservation, Illinois Department of Natural Resources.

Smith, P.W. 1961. The Amphibians and Reptiles of Illinois. Illinois Natural History Survey Bulletin 28(1):1-298.

Redmer, M. and T.G. Anton. 1993. Surveys of the Joliet Training Area and Joliet Army Ammunition Plant for endangered, threatened, and watchlist reptiles. Unpublished report to the Illinois Department of Conservation, Springfield. 21 pp. + maps.

Redmer, M. 1994. The amphibians and reptiles of the Joliet Training Area, Will County, Illinois. Unpublished report to the United States Army, Directorate of Engineering, Fort McCoy, Wisconsin. 16 August 1994. 53 pp.

Aquatic Biota

Bertrand, W.A., R.L. Hite, and D.M. Day. 1996. Biological Stream Characterization (BSC): Biological Assessment of Illinois Stream Quality through 1993. Illinois Environmental Protection Agency Report No. IEPA/BOW.96-058. December 1996. 40 pages + map.

Brigham, A. R., L.B. Suloway, and L.M. Page. 1981. The effects of sedimentation on aquatic life of the Kankakee River. Phase II: Quantitative studies and threatened, endangered, and rare species. Illinois Department of Energy and Natural Resources. Document No. 81/37. 16 pp.

Burks, B.D. 1953. The mayflies, or Ephemeroptera, of Illinois. Bulletin of the Illinois Natural History Survey. 26(1): 1-216.

Coker, R.E. 1919. Fresh-water mussels and mussel industries of the U.S. Bulletin of the Bureau of Fisheries [Issued separately as U.S. Bureau of Fisheries Document 865]. 36(1917-18):13-89 + 46 plates.

Cummings, K.S., and C.A. Mayer. 1997. Distributional checklist and status of Illinois freshwater mussels (Mollusca: Unionacea). pp. 129-145 *in* K.S. Cummings, A.C. Buchanan, C.A. Mayer, and T.J. Naimo, eds. Conservation and management of freshwater mussels II: Initiatives for the future. Proceedings of a UMRCC Symposium, 16-18 October 1995, St. Louis Missouri. Upper Mississippi River Conservation Committee, Rock Island, Illinois. 293 pp.

Ecological Analysts Inc. 1984. Des Plaines River benthic macroinvertebrate survey - January 1984. Project report prepared for Commonwealth Edison Company, Chicago. iv + 15pp. + Appendix (pp. 1-12).

Forbes, S.A., and R.E. Richardson. 1908. The fishes of Illinois. Illinois State Laboratory of Natural History, Danville. cxxxvi + 357 pp.

Frison, T.H. 1935. The stoneflies, or Plecoptera, of Illinois. Bulletin of the Illinois Natural History Survey. 20(4): 281-471.

Graham, R.J., R.W. Larimore, and W.F. Dimond. 1984. Recreational fishing in the Kankakee River, Illinois. IL Natural History Survey Biological Notes No. 120. 13 pp.

Havera, S.P., and F.C. Bellrose. 1985. The Illinois River: a lesson to be learned. Wetlands. 4:29-41.

Illinois Environmental Protection Agency. 1996. Illinois Water Quality Report (1994-95). State of Illinois, Environmental Protection Agency, Division of Water Pollution Control, Planning Section, Springfield. 241 pp.

Kwak, T.J. 1993. The Kankakee River: A case study and management recommendations for a stream diverse in habitat, fauna, and human values. pp. 123-141 *in*: L.W. Hesse, C.B. Stalnaker, N.G. Benson, and J.R. Zuboy (eds.). Restoration Planning for the Rivers of the Mississippi River Ecosystem. U.S. Department of Interior, National Biological Survey Biological Report 19. 502 pp.

Lauck, D. R. 1959. The taxonomy and bionomics of the aquatic Hemiptera of Illinois. Unpublished M.S. thesis, University of Illinois, Urbana. xxii + 353 pp.

Lewis, R.B., and J.R. Brice. 1980. A comparison of the past and present freshwater mussel fauna of the Kankakee River in Illinois. Natural History Miscellanea 211:1-7.

Malloch, J.R. 1915a. The Chironomidae, or midges, of Illinois, with particular reference to the species occurring in the Illinois River. Bulletin of the Illinois State Laboratory of Natural History 10(6): 275-543.

Malloch, J.R. 1915b. Some additional records of Chironomidae for Illinois and notes on other Illinois Diptera. Bulletin of the Illinois State Laboratory of Natural History 11(4): 305-363.

Mitch, W.J., J.K. Cronk, X. Wu, R.W. Nairn, and D.L. Hey. 1995. Phosphorus retention in constructed freshwater riparian marshes. Ecological Applications 5: 830-845.

Nalepa, T.F. 1994. Decline of native unionid bivalves in Lake St. Clair after infestation by the zebra mussel, *Dreissena polymorpha*. Canadian Journal of Fisheries and Aquatic Sciences 51(10):2227-2233.

Page, L.M., K.S. Cummings, C.A. Mayer, S.L. Post, and M.E. Retzer. 1992. Biologically significant Illinois streams. An evaluation of the streams of Illinois based on aquatic biodiversity. Final report prepared for the Illinois Department of Energy and Natural Resources and the Illinois Department of Conservation. Illinois Natural History Survey, Center for Biodiversity Technical Report 1992(1a): v + 485 p.

Page, L.M., P.W. Smith, L.B. Suloway, A.R. Brigham, D.W. Webb, J.D. Unzicker, and W.U. Brigham [undated {1979}]. The effects of sedimentation on aquatic life of the Kankakee River. Phase I. Illinois Natural History Survey, Urbana. 86 pp.

Pechumen, L.L., D.W. Webb, and H.J. Teskey. 1983. The Diptera, or true flies, of Illinois. I. Tabanidae. Illinois Natural History Survey Bulletin 33(1):1-122.

Ross, H.H. 1944. The caddis flies, or Trichoptera, of Illinois. Bulletin of the Illinois Natural History Survey. 23(1):1-326.

Ross, H.H. 1947. The mosquitoes of Illinois (Diptera: Culicidae). Bulletin of the Illinois Natural History Survey 24(1): 1-96.

Ross, H.H., and W.R. Horsfall. 1965. A synopsis of the mosquitoes of Illinois (Diptera, Culicidae). Illinois Natural History Survey, Biological Notes 52:1-50.

Schacht, R.A., and W. Matsunaga. 1977a. A biological investigation of the Des Plaines River from the Wisconsin State Line to Joliet, Illinois. May - November 1975. Illinois Environmental Protection Agency, Division of Water Pollution Control, State of Illinois. iii + 59 pp.

Schwegman, J.E. 1973. Comprehensive plan for the Illinois nature preserves system. Part 2. The natural divisions of Illinois. Illinois Nature Preserves Commission, Springfield, Illinois. 32 pp.

Smith, P.W. 1971. Illinois streams: a classification based on their fishes and analysis of factors responsible for disappearance of native species. Illinois Natural History Survey Biological Notes No. 76. 14 pp.

Smith, P.W. 1979. The fishes of Illinois. University of Illinois Press, Urbana. xxix + 314 pp.

Sparks, R.E., K.D. Blodgett, G.L. Warren, and M.J. Wetzel. 1986. Macroinvertebrate communities. Pp. 15-35 (+ tables) *in*: R.E. Sparks, P.P. Tazik, K.D. Blodgett, G.L. Warren, and M.J. Wetzel. Des Plaines River Long-Term Monitoring Program: Phase 1 Report. Final report submitted to Commonwealth Edison Co., Chicago, Illinois. Illinois Natural History Survey Aquatic Biology Section Technical Report 1986(6). iii + 110 pp.

Suloway, L. 1981. The unionid (Mollusca: Bivalvia) fauna of the Kankakee River in Illinois. American Midland Naturalist 105(2):233-239.

Talkington, L.M. 1991. The Illinois River: working for our state. Illinois State Water Survey Miscellaneous Publication No. 128. 51 pp.

Taylor, C.A., and M. Redmer. 1996. Dispersal of the crayfish *Orconectes rusticus* in Illinois, with notes on species displacement and habitat preference. Journal of Crustacean Biology 16:547-551.

Taylor, S.J. 1996. Habitat preferences, species assemblages, and resource partitioning by Gerromorpha (Insecta: Heteroptera) in southern Illinois, with a faunal list and keys to species of the state. Unpublished Ph.D. thesis, Department of Zoology, Southern Illinois University, Carbondale. xviii + 345 pp.

Vidal, P.J. 1969. DuPage County surface water resources. Illinois Department of Conservation, Division of Fisheries, Springfield. 168 pp.

Webb, D.W., S.J. Taylor, and J.K. Krejca. 1993. The biological resources of Illinois caves and other subterranean environments. Determination of the diversity, distribution, and status of the subterranean faunas of Illinois caves and how these faunas are related to groundwater quality. Illinois Natural History Survey, Center for Biodiversity, Technical Report 1993 (8):1-157.

Webb, D.W., M.J. Wetzel, and L.R. Phillippe. 1998. The aquatic biota and groundwater quality of Illinois springs in the Lincoln Hills, Wisconsin Driftless, and Northern Till Plains Sections of Illinois. Illinois Natural History Survey Center for Biodiversity Technical Report 1998 (6). 164 pp. Prepared for the Environmental Protection Trust Fund Commission and the Illinois Department of Natural Resources, Division of Energy and Environmental Assessment, Office of Realty and Environmental Planning, Springfield.

Wetzel, M.J. 1992. Aquatic Annelida of Illinois: Introduction and checklist of species. Transactions of the Illinois State Academy of Science 85(1 and 2): 87-101.

Wilson, C.B., and H.W. Clark. 1912. The mussel fauna of the Kankakee basin. Report and Special Papers of the U.S. Fish Commission. [Issued separately as U.S. Bureau of Fisheries Document 758]. 1911:1-52 + 1 map.

Wooldridge, D. P. 1967. The aquatic Hydrophilidae of Illinois. Transactions of the Illinois State Academy of Science 60(4): 422-431).

Appendix 1

Incomplete list of vascular plants known from the Prairie Parklands Assessment Area, with notes on their habitat associations.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
Adam's needle**	*Yucca flaccida* **																															x
adder's-tongue fern	*Ophioglossum vulgatum*				x	x	x			x																x	x					
alfalfa**	*Medicago sativa* **																															x
alkali bulrush SE**	***Scirpus paludosus** SE***																							x								x
alkali grass**	*Puccinellia distans* **																															x
Alsike clover**	*Trifolium hybridum* **																															x
alternate-leaved dogwood	*Cornus alternifolia*		x																								x			x		
American bindweed	*Calystegia sepium*								x						x			x					x									x
American black currant	*Ribes americanum*			x	x	x	x																		x	x		x				
American bulrush	*Scirpus americanus*						x									x								x					x	x		
American burnet-SE	***Sanguisorba canadensis-SE***									x	x					x										x						
American elm	*Ulmus americana*		x	X	x	x	x																									
American feverfew	*Parthenium integrifolium*									x	x				x																	
American gromwell	*Lithospermum latifolium*	x	x																													
American hop	*Humulus lupulus*				x	x	x																									x
American lotus	*Nelumbo lutea*						x																	x					x	x		
American pennyroyal	*Hedeoma pulegioides*	x						x													x											
American plum	*Prunus americana*	x																														x
American spikenard	*Aralia racemosa*		x																							x		x			x	
American vetch	*Vicia americana*	x							x	x																						x

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
American wild strawberry+	*Fragaria americana+*	x	x		x																											
American wormseed**	*Chenopodium ambrosioides* **																															x
amur honeysuckle**	*Lonicera maackii* **	x	x	x	x	x	x			x										x							x					x
angelica	*Angelica atropurpurea*																				x			x		x		X				
anise-root	*Osmorhiza longistylis*		x		x																							x				
annual bedstraw	*Galium aparine*	x	x	x	x	x	x																					x				x
annual bluegrass**	*Poa annua* **																															x
apple**	*Malus pumila***																															x
arbor vitae-ST+	***Thuja occidentalis-ST+***																								x	x		x				
aromatic aster	*Aster oblongifolius*								x									x		x												
arrow-leaved violet	*Viola sagittata*									x					x	x							x									
arrow feather	*Aristida purpurascens*													x																		
arrowhead+	*Sagittaria calycina+*																x							x			x		x			x
arrowleaf aster	*Aster sagittifolius*	x	x																													
arrowleaf tearthumb	*Polygonum sagittatum*																							x								
arum-leaved arrowhead	*Sagittaria cuneata*						x																	x					x			
asparagus**	*Asparagus officinalis* **								x	x													x									x
aster	*Aster prenanthoides*		x	x	x																							x				
aster+	*Aster parviceps+*								x					x	x																	
Aunt Lucy	*Ellisia nyctelea*				x	x	x																									x
autumn bent grass+	*Agrostis perennans+*	x			x																											
autumn olive**	*Elaeagnus umbellata* **	x						x						x						X	x											x
autumn sedge	*Fimbristylis autumnalis*						x				x													x					x			x
awl-fruited sedge	*Carex tribuloides*				x	x	x				x	x			x									x	x	x	x					
awned flat sedge	*Cyperus aristatus*						x										x						x				x		x			x
awned graceful sedge	*Carex davisii*		x	x	x	x																										
awned sedge	*Carex atheroides*						x																	x								
bachelor's button**	*Centaurea cyanus* **																															x
balsam groundsel	*Senecio pauperculus*										x	x															x					
Baltic rush	*Juncus balticus*																							x								x

Appendix 1. Continued.

Class[1]	Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]	Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]	dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6] / Scientific Name[5,6]																															
bare-stemmed tick trefoil+ *Desmodium nudiflorum+*	x	x																													
barley** *Hordeum vulgare* **																															
barnyard grass *Echinochloa muricata*						x				x						x															x
barnyard grass *Echinochloa pungens*															x	x							x			x		x			
barnyard grass** *Echinochloa crus-galli* **																							x			x		x			
basil bee-balm *Monarda clinopodia*		x	x	x																											x
basswood *Tilia americana*	x	x	x	x																											
bastard toadflax *Comandra umbellata*								x	x	x			x	x				x	x		x	x			x						
beach wormwood *Artemisia caudata*													x						x	x	x	x									
bead grass *Paspalum ciliatifolium*									x	x	x	x	x	x																	
beak-seeded knotweed *Polygonum achoreum*																															
beak grass *Diarrhena americana*		x	x	x																											x
beakrush *Rhynchospora capitellata*																x										x					
beard-tongue** *Penstemon tubaeflorus* **													x																		
beef-steak plant** *Perilla frutescens* **																															x
beggars lice** *Lappula echinata* **																															x
berry bladder fern *Cystopteris bulbifera*		x																									x		x		
biennial gaura *Gaura biennis*	x							x	x					x			x	x	x												x
biennial wormwood** *Artemisia biennis* **																															x
big bluestem *Andropogon gerardii*								x	X	X			x	X	x		x	x	x	x		x			x						
big tooth aspen *Populus grandidentata*	x																														x
birdfoot violet *Viola pedata*								x					x						x	x	x	x									
birdsfoot trefoil *Lotus corniculatus* **																															x
birthwort *Aristolochia serpentaria*		x																													
Bishop's cap+ *Mitella diphylla+*		x																													
bitter dock** *Rumex obtusifolius* **				x	x	x																								x	
bitternut hickory *Carya cordiformis*	x	x		x	x																										x
bittersweet *Celastrus scandens*	x							x					x	x					x												
bittersweet nightshade** *Solanum dulcamara* **	x				x	x														x					x						x
black-eyed Susan *Rudbeckia hirta*								x	x				x	x				x			x	x									x

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
black-seeded rice grass	*Oryzopsis racemosa*	x	x																													
black alder**	*Alnus glutinosa* **						x																									
black ash	*Fraxinus nigra*		x	x	x																						x					
black bindweed**	*Polygonum convolvulus* **																															x
black cherry	*Prunus serotina*	x	x	x	X			x							x												x					x
black chokecherry	*Aronia melanocarpa*		x												x	x	x				X											
black haw	*Viburnum prunifolium*		x	x	x	x	x																									
black horehound**	*Ballota nigra* **																															x
black huckleberry	*Gaylussacia baccata*	x						x		x											x		x									
black locust**	*Robinia pseudoacacia* **	x																														x
black maple	*Acer nigrum*		x																													
black medic**	*Medicago lupulina* **																															x
black mustard**	*Brassica nigra* **																															x
black nightshade	*Solanum ptycanthum*	x			x	x	x																									x
black oak	*Quercus velutina*	x	x					x						x						x	x	X	X									
black raspberry	*Rubus occidentalis*	x												x	x																	x
black snakeroot	*Sanicula canadensis*	x	x		x	x	x																									
black walnut	*Juglans nigra*	x	x	x	x	x														x							x					
black willow	*Salix nigra*					x	X									x	x							x	x				x	x		x
bladder catchfly**	*Silene cucubalus* **																															x
bladdernut	*Staphylea trifolia*		x	x	x																											
bloodroot	*Sanguinaria canadensis*	x	x																													
blue-eyed grass	*Sisyrinchium albidum*								x	x				x	x					x			x									
blue-eyed Mary	*Collinsia verna*		x	x	x	x																										
blue ash	*Fraxinus quadrangulata*	x	x		x																											
blue beech	*Carpinus caroliniana*	x	x	x																												
blue cohosh	*Caulophyllum thalictroides*		x																													
blue flag	*Iris shrevei*				x	x	x					x			x	x	x							x	x	x	x	x	x			
blue lobelia	*Lobelia siphilitica*						x			x						x								x		x	x					
blue skullcap	*Scutellaria lateriflora*						x																	x	x		x					

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																																
blue toadflax	*Linaria canadensis*													x																			x
blue vervain	*Verbena hastata*				x	x						x					x						x	x			x					
blue vine**	*Cynanchum laeve* **					x																											x
bluejoint grass	*Calamagrostis canadensis*							X			x	X			x	x	X				x			X			X	x				
bluejoint grass+	*Calamagrostis inexpansa*+														x	x	x										x						
bluestem goldenrod	*Solidago caesia*	x	x																			x	x										
bluets+	*Houstonia longifolia*+																	x	x														
blunt-leaved spurge	*Euphorbia obtusata*					x	x																										x
bog clearweed+	*Pilea fontana*+																							x	x	x	x						
bog goldenrod	*Solidago uliginosa*																x									x						
bog willow herb	*Epilobium leptophyllum*									x						x	x									x	x					
border privet**	*Ligustrum obtusifolium* **																																x
Boston ivy**	*Parthenocissus tricuspidata* **																																x
bottlebrush grass	*Elymus hystrix*	x	x	x	x																												
bottlebrush sedge+	*Carex lurida*+		x	x	x	x	x																	x	x								
bouncing bet**	*Saponaria officinalis* **																																x
box elder	*Acer negundo*			x	x	x	x																					x					
boxwood knotweed	*Polygonum buxiforme*																																x
brachyelytrum	*Brachyelytrum erectum*		x	x	x																												
bracken fern	*Pteridium aquilinum*	x						x		x												x	x										
bracted green orchid+	*Platanthera viridis*+		x														x																
bracted plantain	*Plantago aristata*																																x
bristly bearded sedge	*Carex comosa*																							x						x			
bristly blackberry-SE	***Rubus setosus- SE***														x	x					x		x										
bristly buttercup	*Ranunculus pensylvanicus*																							x									
bristly greenbrier	*Smilax hispida*		x	x	x	x	x																										
bristly foxtail**	*Setaria verticillata* **																																x
bristly hedge nettle	*Stachys palustris*					x	x								x	x								x			x					
bristly locust**	*Robinia hispida***																																x
bristly sunflower	*Helianthus hirsutus*	x																															

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
broad-leaved galium	*Galium circaezans*	x	x																													
broad-leaved panic grass	*Panicum latifolium*		x																													
broad beech fern	*Phegopteris hexagonoptera*		x																													
broadleaf goldenrod	*Solidago flexicaulis*		x																							x		x			x	
brome grass	*Bromus purgans*		x	x	x	x																										x
bronze fern+	*Botrychium dissectum var. obliquum+*	x	x																													
brook flat sedge	*Cyperus rivularis*						x																	x		x						
broom-corn millet**	*Panicum miliaceum* **																															x
broom sedge**	*Andropogon virginicus* **																															x
brown-eyed Susan	*Rudbeckia triloba*				x	x				x								x	x													
brown-headed fox sedge	*Carex alopecoidea*						x																				x					x
brown fox sedge	*Carex vulpinoidea*														x	x								x			x					x
buckbrush**	*Symphoricarpos orbiculatus* **				x			x										x														x
buckhorn plantain**	*Plantago lanceolata* **																															x
buckwheat**	*Fagopyrum esculentum* **																															x
buffalo bur**	*Solanum cornutum* **																															x
buffalo clover-SE	***Trifolium reflexum-SE***	x						x	x					x					x				x	x								
buffalo current**	*Ribes odoratum* **																															x
buffalograss**	*Buchloe dactyloides* **																															x
bugle weed	*Lycopus virginicus*				x	x	x									x	x															
bulblet-bearing water hemlock	*Cicuta bulbifera*																								x	x		x				
bulbous bittercress	*Cardamine bulbosa*				x	x	x																	x		x		x				
bulbous bluegrass**	*Poa bulbosa* **																															x
bull thistle**	*Cirsium vulgare* **													x	x					x			x									x
bullhead lily	*Nuphar variegatum*						x																						x	x		
bulrush	*Scirpus validus*						x									x	x							x					x	x		
bur buttercup**	*Ceratocephalus testiculatus* **																															x
bur cucumber	*Sicyos angulatus*				x	X	X																									

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																																
bur oak	*Quercus macrocarpa*	x	X	X	x	x	x																X					X				
burdock sumpweed**+	*Iva xanthifolia***+															x																x
burning bush**	*Euonymus alatus* **	x																														x
burning bush**	*Kochia scoparia* **																															x
bush clover	*Lespedeza capitata*								x	x				x	x					x	x	x	x									
bushy aster	*Aster dumosus*	x							x					x	x																	
Butler's quillwort-SE	***Isoetes butleri-SE***																	x	x													
butter and eggs**	*Linaria vulgaris* **													x	x																	x
butterfly weed	*Asclepias tuberosa*								x	x					x			x				x	x									x
butternut-WL	***Juglans cinerea-WL***		x		x																								x				
butterweed**	*Senecio glabellus* **																																x
buttonbush	*Cephalanthus occidentalis*				x	x	x									x								x				X				
buxbaum sedge	*Carex buxbaumii*											x												x		x	x					
Caesar's campion**	*Silene cserei* **																																x
Canada bluegrass**	*Poa compressa* **								x	x				x	x			x	x	X													x
Canada goldenrod	*Solidago canadensis*	x						x	x	x					x	x				x	x	x	x										x
Canada hawkweed	*Hieracium canadense*												x	x						x	x	x	x										
Canada thistle**	*Cirsium arvense* **													x	x																		x
Canada wild rye	*Elymus canadensis*	x	x	x	x	x	x								x	x																	x
Canadian milk vetch	*Astragalus canadensis*								x		x				x																		
Canadian plum+	*Prunus nigra*+		x		x																												
Canadian rush	*Juncus canadensis*																x							x		x			x				
candle anemone	*Anemone cylindrica*									x					x			x		x			x										
caraway**	*Carum carvi* **																																x
cardinal flower	*Lobelia cardinalis*				x	x	x									x								x	x			x				
Carey's heartease-SE+	***Polygonum careyi-SE+***							x								x	x															
Carey's sedge	*Carex careyana*		x																														
Carolina anemone	*Anemone caroliniana*								x					x																			
carpet bugle**	*Ajuga reptans* **																																x
carpet weed**	*Mollugo verticillatus* **						x				x																						x

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
catalpa**	*Catalpa speciosa* **																															x
catnip**	*Nepeta cataria* **																															x
celery-leaved meadow parsnip+	*Thaspium barbinode*+	x	x		x	x																	x									
charlock**	*Brassica kaber* **																															x
cheat grass**	*Bromus tectorum* **												x	x	x																	x
chestnut sedge	*Fimbristylis puberula*															x	x															
chickasaw plum**	*Prunus augustifolia* **																															x
chickory**	*Cichorium intybus* **																															x
chickweed+	*Stellaria longifolia*+				x	x	x				x														x							
chinquapin oak	*Quercus prinoides* var. *acuminata*	x	x																	x											x	
chives**	*Allium schoenoprasum* **																															x
chokeberry	*Aronia prunifolia*														x	x	x				x				x							
Christmas fern+	*Polystichum acrostichoides*+		x																													
cinnamon fern	*Osmunda cinnamomea*		x				x	x			x					x	x								x			x				
cinnamon willow herb	*Epilobium coloratum*						x																	x		x	x	x	x			
clammy false foxglove	*Aureolaria pedicularia*	x							x					x								x	x									
clammy ground cherry	*Physalis heterophylla*								x	x					x																	x
clammy hedge hyssop	*Gratiola neglecta*						x										x							x					x			x
clammy weed	*Polanisia dodecandra*													x																		x
clasping cress**	*Lepidium perfoliatum* **																															x
clearweed	*Pilea pumila*				x	x	x																	x				x			x	
cleft phlox	*Phlox bifida*													x	x			x	x	x		x	x									
cleft violet	*Viola triloba*	x	x																													
climbing false buckwheat	*Polygonum scandens*				x	x	x								x																	x
closed gentian	*Gentiana andrewsii*										x	x				x	x							x								
clustered poppy mallow	*Callirhoe triangulata*																					x	x									
cock-spur hawthorn	*Crataegus crus-galli*	x																														x
colic root	*Aletris farinosa*									x					x	x																

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand	Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
columbine	*Aquilegia canadensis*	x	x												x								x			x					x	
common arrowhead	*Sagittaria latifolia*						x																	x					x			
common barberry**+	*Berberis vulgaris***+	x																											x	x		
common beggar ticks	*Bidens frondosa*		x		x	x	x									x	x							x								x
common beggar ticks	*Bidens vulgata*				x	x	x									x	x													x		x
common blackberry	*Rubus allegheniensis*	x			x															X	x	x	x									x
common blackberry	*Rubus pensylvanicus*	x												x						x		x	x									x
common bladderwort	*Utricularia vulgaris*																															
common blue-eyed grass	*Sisyrinchium angustifolium*	x								x																			x			
common blue violet	*Viola pratincola*	x	x		x	x	x			x					x								x									
common boneset	*Eupatorium perfoliatum*				x							x																					
common buckthorn**	*Rhamnus cathartica* **	x	x		X	x	x																	x		x	x	x	x			
common bur sedge	*Carex grayi*				x	x	x																									x
common burdock**	*Arctium minus* **				x	x																			x							
common burreed	*Sparganium eurycarpum*						x																x									x
common carrion flower	*Smilax lasioneuron*	x	x																					x	x				x	x		
common cat-tail	*Typha latifolia*											x				x	x							X	x	x	x		x			x
common chickweed**	*Stellaria media* **																															x
common chokecherry	*Prunus virginiana*	x	x		x																							x				
common cinquefoil	*Potentilla simplex*	x								x				x	x						X		x									x
common cocklebur	*Xanthium strumarium*				x	x	x									x																x
common crab grass**	*Digitaria sanguinalis* **																															x
common day flower**	*Commelina communis* **																															x
common forget-me-not**	*Myosotis scorpioides* **				x	x	x																	x								x
common fox sedge	*Carex stipata*				x												x							x			x	x				
common foxtail	*Alopecurus carolinianus*																															x
common foxtail**	*Setaria viridis* **																															x
common goat's beard**	*Tragopogon pratensis* **														x								x									x
common groundsel**	*Senecio vulgaris* **																								x							
common hop sedge+	*Carex lupulina*+				x	x																										

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
common horehound**+	*Marrubium vulgare***+																															
common horsetail	*Equisetum arvense*				x	x	x								x	x	x				x			x			x	X	x		x	x
common hound's tongue**	*Cynoglossum officinale* **																															x
common ironweed	*Vernonia fasciculata*				x	x			x	x	x				x																	
common knotweed**	*Polygonum arenastrum* **																															X
common lake sedge	*Carex lacustris*				x	x											x							x			x					
common milkweed	*Asclepias syriaca*								x	x	x				x						x		x									x
common mountain mint	*Pycnanthemum virginianum*								x	x	x			x	x	x		x	x				x			x	x					
common mouse-ear chickweed**	*Cerastium vulgatum* **													x	x								x									x
common nettle	*Urtica dioica*				x	x	x																									
common nut sedge	*Cyperus esculentus*						x										x												x			x
common peppergrass	*Lepidium virginicum*													x	x																	x
common periwinkle**	*Vinca minor* **																															x
common phlox	*Phlox divaricata*		x	x	x	x																										
common plantain**	*Plantago major* **																															x
common prairie goldenrod	*Solidago rigida*								x	x								x	x	x			x									x
common privet**	*Ligustrum vulgare* **	x			x	x																										x
common ragweed	*Ambrosia artemisiifolia*				x	x			x					x	x							x	x									x
common reed	*Phragmites australis*						x																	x		x			x			x
common rockrose	*Helianthemum canadense*							x		x					x							x	x									
common satin grass	*Muhlenbergia frondosa*	x			x	x																										x
common smartweed	*Polygonum hydropiper*					x	x									x	x							x					x			
common snakeroot	*Sanicula gregaria*	x	X	X	X	x	x																									
common speedwell**	*Veronica officinalis* **	x																														x
common St. John's-wort**	*Hypericum perforatum* **																	x	x													x
common stiff sedge	*Carex tetanica*								x	x	x	x			x	x										x						
common stitchwort**	*Stellaria graminea* **				x																											x
common sunflower**	*Helianthus annuus* **																															x
common teasel**	*Dipsacus sylvestris* **																															x

Appendix 1. Continued.

Common name[5,6]	Scientific Name[5,6]	Class[1]	Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
		Sub-class[2]	Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
		Natural Community[3,4]	dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
common tussock sedge	*Carex stricta*							x									x	x								x	x	X	x				
common valerian	*Valeriana edulis*											x	x																				
common water horehound	*Lycopus americanus*							x			x																x	x					
common water plantain	*Alisma subcordatum*							x					x				x	x	x						x		x	x					
common waterweed	*Elodea canadensis*							x											x						x					x			
common wood rush	*Luzula multiflora*	x																												x	x		
common wood sedge	*Carex blanda*	x	X	X	X	x	x				x	x										x							x				
common woodsia+	*Woodsia obtusa+*	x	x		x																			x								x
common wormwood**	*Artemisia vulgaris* **																														x		
common yarrow**	*Achillea millefolium* **										x				x	x					x			x									x
compass plant	*Silphium laciniatum*									x	x	x									x			x									x
coontail	*Ceratophyllum demersum*							x																						X	x		
copper-shouldered oval sedge	*Carex bicknellii*									x	x					x																	
coriander**	*Coriandrum sativum* **																																x
corn salad-SE	***Valerianella chenopodiifolia-SE***																																
corn salad+	*Valerianella intermedia+*																x		x						x						x		
corn speedwell**	*Veronica arvensis* **																																x
corn**	*Zea mays* **																																x
cosmos**	*Cosmos bipinnatus* **																																x
cottonsedge	*Eriophorum angustifolium*																								x		x	x					
cottonweed	*Froelichia gracilis* **														x								x										x
cottonwood	*Populus deltoides*				x	x	X	x																x	x				x				x
cow herb**	*Saponaria vaccaria* **																																x
cow parsnip	*Heracleum maximum*		x		x	x	x																	x		x	x	x					
cowslip	*Caltha palustris*																									x	x	x	x				
cranebill**	*Erodium cicutarium* **																																x
Crawe's sedge	*Carex crawei*										x					x	x			x													
cream violet	*Viola striata*			x	x	x	x																										
cream wild indigo+	*Baptisia leucophaea+*								x		x					x								x									

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
creeping buttercup**	*Ranunculus repens* **																															x
creeping Charlie**	*Glechoma hederacea* **				x	x	x																									x
creeping euonymus	*Euonymus obovatus*		x																													
creeping lovegrass	*Eragrostis hypnoides*				x	x	x									x								x					x			
creeping smartweed**	*Polygonum cespitosum* **																															x
creeping sorrel**	*Oxalis corniculata* **																															x
creeping vervain	*Verbena bracteata*																															x
creeping yellow cress**	*Rorippa sylvestris* **				x	x	x																									x
crested rye grass**	*Lolium perenne* **																															x
crested woodfern	*Dryopteris cristata*					x	x	x													x				x	x		x				
cross milkwort+	*Polygala cruciata var. aquilonia*+		x								x					x							x									
crown vetch**	*Coronilla varia* **																															x
crypsis**	*Crypsis schoenoides* **																															x
culver's root	*Veronicastrum virginicum*	x							x	x	x			x	x	x											x					
cup plant	*Silphium perfoliatum*				x	x				x	x												x			x		x				
curly-styled wood sedge	*Carex rosea*	x	x	x																								x				
curly dock**	*Rumex crispus* **										x				x	x					x		x	x								x
curly pondweed**	*Potamogeton crispus* **						x																						x	x		
cursed crowfoot	*Ranunculus sceleratus*																x							x	x		x		x			
cut-leaved grape fern+	*Botrychium dissectum var. dissectum*+	x	x																													
cut-leaved teasel**	*Dipsacus laciniatus* **																		x													x
cylindric blazing star	*Liatris cylindracea*								x					x						x												
cypress spurge**	*Euphorbia cyparissias* **									x																						x
daffodil**	*Narcissus pseudonarcissus* **																															x
daisy fleabane	*Erigeron annuus*	x								x					x					x			x				x					x
daisy fleabane	*Erigeron strigosus*								x					x	x			x		x												x
Dalmatian toadflax**	*Linaria dalmatica* **																															x
dame's rocket**	*Hesperis matronalis* **	x	x		x	x																										x

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
dandelion**	*Taraxacum officinale* **																															
dark green rush	*Scirpus atrovirens*						x									x	x															x
Deam's vervain	*Verbena x deamii*																							x	x				x			
deer-tongue grass	*Panicum clandestinum*				x	x	x	x								x							x									x
Deptford pink**	*Dianthus armeria* **																															
dewberry	*Rubus flagellaris*		x	x		x				x	x				x	x					x	x	x									x
disturbed sedge	*Carex molesta*									x	x																					
ditch stonecrop	*Penthorum sedoides*					x	x									x	x															x
dock**	*Rumex mexicanus* **																							x					x			
dodder	*Cuscuta campestris*																															x
dodder	*Cuscuta glomerata*				x	x	x				x	x																				x
dodder	*Cuscuta gronovii*				x	x	x																	x								
dog mustard**	*Erucastrum gallicum* **																						x									
dogfennel**	*Anthemis cotula* **																															x
doll's eyes	*Actaea pachypoda*	x	x																													x
dotted hawthorn	*Crataegus punctata*				x	x	x																									
dotted smartweed	*Polygonum punctatum*						x										x							x					x	x		x
doveweed**	*Croton capitatus* **																	x	x													x
downy-blue violet	*Viola sororia*	x	x		x	x	x			x					x								x									
downy arrowwood	*Viburnum rafinesquianum*	x																														
downy gentian	*Gentiana puberulenta*								x	x										x												
downy phlox	*Phlox pilosa*									x	x				x					x		x	x									
downy sunflower	*Helianthus mollis*								x	x				x	x																	
Drummond's aster	*Aster drummondii*	x								x													x					x				x
duckweed	*Lemna gibba*						x																	x	x				x			
duckweed+	*Lemna minor+*						x																	x	x				x			
Dudley's rush	*Juncus dudleyi*						x				x	x				x	x							x		x			x			
Dune ladies' tresses	*Spiranthes magnicamporum*									x	x							x	x													
dutchman's breeches	*Dicentra cucullaria*	x	x		x																											
dwarf dandelion	*Krigia virginica*												x	x																		x

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand	Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
dwarf honeysuckle	*Diervilla lonicera*	x																					x									
dwarf horseweed	*Conyza ramosissima*																															x
dwarf mallow**	*Malva neglecta* **																															x
dwarf mouse-ear chickweed**	*Cerastium pumilum* **																															x
dwarf plantain	*Plantago virginica*													x	x																	x
dwarf snapdragon**	*Chaenorrhinum minus* **																															x
dwarf St. John's-wort	*Hypericum mutilum*					x	x									x	x							x			x		x			x
dwarf sumac	*Rhus copallina*							x													x	x	x									x
ear-leafed foxglove-ST	***Tomanthera auriculata* -ST**								x	x				x	x								x	x									
early buttercup	*Ranunculus fascicularius*	x							x											x													
early figwort	*Scrophularia lanceolata*	x	x												x								x										
early goldenrod	*Solidago juncea*								x	x				x	x							x	x										x
early horse gentian	*Triosteum aurantiacum*	x	x																														
early meadow rue	*Thalictrum dioicum*		x																														
ebony spleenwort	*Asplenium platyneuron*	x																														x	
eelgrass	*Vallisneria americana*																													x	x		
elderberry	*Sambucus canadensis*				x	x	x																	x	x			x	x				x
elecampane**	*Inula helenium* **																																x
elm-leaved goldenrod	*Solidago ulmifolia*	x			x																		x										
Emory's sedge	*Carex emoryi*				x	x	x																				x	x					
enchanter's nightshade	*Circaea lutetiana* ssp. *cana*	x	x	x	x																												
European gromwell**	*Lithospermum officinale* **																																x
European highbush cranberry**	*Viburnum opulus* **				x																												x
European loosestrife**	*Lysimachia vulgaris* **																																x
evening campion**	*Lychnis alba* **																																x
evening primrose	*Oenothera biennis*								x						x			x					x										x
everlasting	*Antennaria plantaginifolia*	x						x														x	x										
everlasting pea**	*Lathyrus latifolius* **																																

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
fairground grass**	*Sclerochloa dura* **																															x
fall witch grass	*Leptoloma cognatum*												X	X	x			x		x												x
false asphodel-ST+	***Tofieldia glutinosa-ST+***																x									x		x				
false aster	*Boltonia asteroides*				x		x								x	x								x			x					
false boneset	*Brickellia eupatorioides*								x	x								x	x	x											x	
false dandelion	*Krigia biflora*	x						x		x				x	x							x	x									
false dragonhead	*Physostegia speciosa*				x		x								x	x																
false dragonhead	*Physostegia virginiana*								x	x								x		x			x				x					
false foxglove	*Agalinis purpurea*										x			x	x	x		x	x							x						
false hellebore**	*Epipactis helleborine* **	x	x																													x
false indigo bush	*Amorpha fruticosa*				x		x																		x			x				
false loosestrife	*Ludwigia polycarpa*																x							x				x				
false mallow-SE	***Malvastrum hispidum* -SE**																	x	x													
false mermaid	*Floerkea proserpinacoides*		x		x	x																						x				
false nettle	*Boehmeria cylindrica*				x	x	x									x	x							x					x			
false pennyroyal	*Trichostema brachiatum*																	X	x											x		
false pimpernel	*Lindernia dubia*						x										x							x						x		
false rue anenome	*Isopyrum biternatum*		x		x																											
false Solomon's seal	*Smilacina racemosa*	x	x					x																								
false sunflower	*Heliopsis helianthoides*	x			x					x	x					x																
false wild stonecrop**	*Sedum spurium* **																															x
fat-hen saltbush**	*Atriplex patula* **																															x
fen thistle	*Cirsium muticum*										x													x		x		x				
fennel-leaved pondweed	*Potamogeton pectinatus*						x																		x				x	x		
fern flat sedge	*Cyperus filiculmis*							x	x					x	x																	x
fetid marigold**	*Dyssodia papposa* **																															x
few-flowered goldenrod	*Solidago ptarmicoides*																	x	x	x												
few-fruited gray sedge	*Carex oligocarpa*		x																													
field bindweed**	*Convolvulus arvensis* **																															x
field garlic**	*Allium vineale* **																															x

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
field goldenrod	*Solidago nemoralis*								x	x								x	x	x		x	x									x
field hawkweed**	*Hieracium caespitosum* **																															x
field hedge parsley**	*Torilis arvensis* **																															x
field milkwort	*Polygala sanguinea*							x		x					x	x							x	x								
field mint	*Mentha arvensis* var. *villosa*										x													x		x	x					
field mouse-eared chickweed	*Cerastium arvense*	x			x																										x	x
field mustard**	*Brassica rapa* **																															x
field penny cress**	*Thlaspi arvense* **								x						x											x						x
field peppergrass**	*Lepidium campestre* **																															x
field thistle	*Cirsium discolor*	x								x	x			x	x						x		x									x
firepink+	*Silene virginica*+	x	x																													
fireweed	*Erechtites hieracifolia*																															x
flat top aster	*Aster umbellatus*														x									x	x	x						
flax-leaved aster	*Aster linariifolius*													x								x	x									
flax**	*Linum usitatissimum* **																															x
fleshy hawthorn	*Crataegus succulenta*	x																														
floating manna grass	*Glyceria septentrionalis*						x																	x					x			
flower-of-an-hour**	*Hibiscus trionum* **																															x
flowering spurge	*Euphorbia corollata*	x							x	x				x	x					x		x	x									
fog-fruit	*Phyla lanceolata*					x	x									x								x			x		x			
forked aster-ST	***Aster furcatus* -ST**		x		x																								x				
forked duckweed	*Lemna trisulca*						x																	x	x				x			
four-o'clock**	*Mirabilis jalapa* **																															x
fowl manna grass	*Glyceria striata*						x								x									x		x	x	X	x			
fox-tail barley**	*Hordeum jubatum* **																															x
foxglove beard-tongue	*Penstemon digitalis*	x			x				x	x	x			x	x			x														x
fragile fern	*Cystopteris protrusa*	x	x		x																											
fragrant coneflower	*Rudbeckia subtomentosa*								x	x																						
fragrant water lily	*Nymphaea odorata*																							x	x				x			

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
Frank's sedge	*Carex frankii*				x	x	x																									
Fraser's St.-John's-wort	*Triadenum fraseri*																x							x	x	x						
French grass	*Psoralea onobrychis*								x																							x
fringed gentian	*Gentianopsis crinita*																x							x		x						
fringed loosestrife	*Lysimachia ciliata*				x	x	x																	x				x				
frost grape+	*Vitis vulpina+*			x	x																											
frostweed	*Helianthemum bicknellii*							x	x					x	x					x		x	x									
garden bluebell**	*Campanula rapunculoides* **																															x
garden burnet**	*Sanguisorba minor* **																															
garden iris**	*Iris germanica* **																															x
garden lettuce**	*Lactuca sativa* **																															x
garden petunia**	*Petunia x hybrida* **																															x
garden phlox**	*Phlox paniculata* **	x																														x
garlic mustard**	*Alliaria petiolata* **	x	x	x	x	x																										x
garlic**	*Allium sativum* **																															x
giant chickweed**	*Myosoton aquaticum* **				x	x	x																									x
giant duckweed	*Spirodela polyrhiza*						x																	x	x				x			
giant foxtail**	*Setaria faberi* **								x					x	x																	X
giant ragweed	*Ambrosia trifida*				X	x	X				x				x																	x
giant St.-John's-wort+	*Hypericum pyramidatum+*				x																x					x						
ginseng	*Panax quinquefolius*		x																													
glade mallow	*Napaea dioica*				x																											
glade onion**	*Allium canadense* var. *mobilense* **																	x														
glaucous white lettuce	*Prenanthes racemosa*								x	x	x				x																	
Gleason's trillium+	*Trillium flexipes+*		x		x																											
globethistle**	*Echinops sphaerocephalus* **																															x
glossy buckthorn**	*Rhamnus frangula* **	x	x		x															x					x							x
goat's beard**	*Tragopogon dubius* **														x																	x
goat's rue	*Tephrosia virginiana*													x	x						x	x	x	x								
goatsbeard	*Aruncus dioicus*		x																													

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
golden Alexanders	*Zizia aurea*	x	x		x					x	x															x						
golden aster	*Chrysopsis camporum*												x	x																		x
golden daisy**	*Prionopsis ciliatus* **																															x
golden ragwort+	*Senecio aureus+*				x	x	x																	x	x	x		x				
golden seal	*Hydrastis canadensis*		x		x																											
goldenglow	*Rudbeckia laciniata*				x	X	x																			x		x				
Goldie's fern+	*Dryopteris goldiana+*		x	x																												
goose grass**	*Eleusine indica* **																															x
graceful sedge	*Carex gracillima*	x	x																						x							
grape honeysuckle	*Lonicera prolifera*	x	x	x	x																							x				
grass-leaved arrowhead	*Sagittaria graminea*						x																						x			
grass-leaved goldenrod	*Euthamia graminifolia*									x	x	x			x	x	x					x	x	x			x					x
grass-leaved goldenrod	*Euthamia gymnospermoides*													x	x	x						x	x									
grass-leaved rush+	*Juncus marginatus+*															x	x							x								x
grass-of-parnassus	*Parnassia glauca*																											x				
grass pink orchid-SE	***Calopogon tuberosus* -SE**										x	x			x	x	x									x		x				
gray dogwood	*Cornus racemosa*	x	x	x	x			x	x	x	x				x	x		x			x		x		x			x				
gray poplar**	*Populus canescens* **																															x
gray sedge	*Carex annectens*					x	x			x	x	x			x									x			x					x
great bulrush	*Scirpus acutus*															x	x							x		x						
great burdock**	*Arctium lappa* **				x																											x
great chickweed-SE+	***Stellaria pubera-SE+***		x																													
Great Lakes spikemoss	*Selaginella eclipes*																x							x		x		x	x			
great water dock	*Rumex orbiculatus*																							x		x						
great waterleaf	*Hydrophyllum appendiculatum*		x		x																											
great white lettuce	*Prenanthes crepidinea*			x	x	x																										
green-headed fox sedge	*Carex conjuncta*										x	x							x													
green-stem Joe-Pye-weed	*Eupatorium purpureum*	x	x																													
green amaranth**	*Amaranthus hybridus* **																															x
green ash	*Fraxinus pennsylvanica*				X	X	X										x							x	x			x				

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																																
green dragon	*Arisaema dracontium*		x	x	x	x																						x					
green milkweed	*Asclepias viridiflora*								x						x	x				x													
green violet	*Hybanthus concolor*		x	x	x																												
grooved yellow flax	*Linum sulcatum*								x					x	x			x		x													
ground cherry	*Physalis virginiana*								x					x	x					x		x	x										x
ground pine	*Lycopodium digitatum*	x								x													x										
groundnut	*Apios americana*				x										x	x					x			x		x		x					
hackberry	*Celtis occidentalis*	x	x	X	X	x	x								x																		
hair grass	*Agrostis hyemalis*									x																		x					
hair love grass**	*Eragrostis capillaris* **																																x
hair sedge	*Bulbostylis capillaris*												x	x																			x
hairy-fruited lake sedge	*Carex trichocarpa*										x	x												x			x	x					
hairy aster	*Aster pilosus*									x				x	x								x				x						x
hairy beard-tongue	*Penstemon hirsutus*												x					x	x	x													
hairy bitter cress**+	*Cardamine hirsuta***+*																																x
hairy brome**+	*Bromus commutatus***+*																																x
hairy cupseed**	*Eriochloa villosa* **																																x
hairy green sedge	*Carex hirsutella*	x								x																							
hairy hawkweed	*Hieracium gronovii*	x													x							x	x										
hairy hawkweed	*Hieracium longipilum*								x													x											x
hairy hawkweed	*Hieracium scabrum*														x							x	x										
hairy marsh yellow cress	*Rorippa islandica* ssp. *hispida*					x	x																	x					x				
hairy mountain mint	*Pycnanthemum pilosum*								x											x													
hairy panic-grass	*Panicum lanuginosum*	x	x							x																							x
hairy panic grass	*Panicum villosissimum*													X	x							x	x										
hairy panic grass+	*Panicum villosissimum var. praecocius+*								x					x	x							x											
hairy pinweed	*Lechea villosa*													x																			
hairy puccoon	*Lithospermum caroliniense*													x	x							x	x										
hairy rock cress	*Arabis hirsuta*																			x											x		
hairy ruellia	*Ruellia humilis*								x	x								x	x	x													

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
hairy wood sedge	*Carex hirtifolia*	x	x																			x	x									
halberd-leaved rose mallow	*Hibiscus laevis*						x										x							x	x				x	x		
harbinger-of-spring	*Erigenia bulbosa*		x	x	x																											
hardhack	*Spiraea tomentosa*									x	x				x	x	x				X											
hawksbeard**	*Crepis tectorum* **																															x
Hayden's sedge	*Carex haydenii*				x	x	x								x											x	x					
hazel dodder	*Cuscuta coryli*	x						x		x					x					x	x											x
hazelnut	*Corylus americana*	x						x		x					x					x	x											x
headed sedge	*Carex cephaloidea*		x																													
heart-leaved aster	*Aster cordifolius*	x	x		x																											
heart-leaved skullcap	*Scutellaria ovata*	x	x																													
heart-leaved willow	*Salix eriocephala*						x									x	x								x				x			x
heart-leaved willow	*Salix rigida*						x									x	x								x				x			x
heartsease	*Polygonum lapathifolium*				x	x	x				x													x								x
heath aster	*Aster ericoides*								x	x				x	x			x	x	x			x									x
Heckrott's hybrid honeysuckle**	*Lonicera x heckrottii* **																															x
hedge mustard**	*Sisymbrium officinale* **																															x
hedge parsley**	*Torilis japonica* **																															x
henbit**	*Lamium amplexicaule* **																															x
highbush cranberry+	*Viburnum trilobum+*		x																													
Hill's oak	*Quercus ellipsoidalis*	x	x					x																							x	
Hill's thistle-ST	***Cirsium hillii -ST***								x											x												
Hitchcock's sedge	*Carex hitchcockiana*		x		x																											
hoary alyssum**	*Berteroa incana* **																															x
hoary cress**	*Cardaria draba* **																															x
hoary puccoon	*Lithospermum canescens*								x					x	x					x												
hoary vervain	*Verbena stricta*								x									x	x	x		x	x									x
hog peanut	*Amphicarpa bracteata*	x	x		x	x	x																									
hollyhock**	*Alcea rosea* **																															x

Appendix 1. Continued.

Class[1]	Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]	Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]	dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6] / Scientific Name[5,6]																															
honewort *Cryptotaenia canadensis*		x	x	x	X	x																					x				
honey locust *Gleditsia triacanthos*				x	x	x													x												
honeysuckle** *Lonicera xylosteum* **																															x
hooded violet+ *Viola cucullata+*						x																		x			x				
hooked buttercup *Ranunculus recurvatus*			x	x	x	x																									
hop hornbeam *Ostrya virginiana*	x	x	x	x																							x				
hornbeam-leaved blackberry *Rubus ostryifolius*	x																														x
horse-nettle** *Solanum carolinense* **																															x
horse gentian *Triosteum perfoliatum*	x	x																													
horsemint *Monarda punctata*								x					x	x							x	x									
horsetail milkweed *Asclepias verticillata*								x	x				x	x	x		x		x			x									x
horseweed *Conyza canadensis*													x	x																	x
hybrid black willow *Salix x glatfelteri*																															x
hybrid cat-tail *Typha x glauca*																							x								x
hybrid crack willow** *Salix x rubens* **						x																									x
hybrid elm** *Ulmus x notha* **																															x
Illinois bundleflower *Desmanthus illinoensis*								x	x					x				x	x												x
Illinois carrion flower *Smilax illinoensis*																															
Illinois horse gentian *Triosteum illinoensis*	x	x																													
Illinois tick trefoil *Desmodium illinoense*								x						x																	x
Indiangrass *Sorghastrum nutans*								X	X	x			x	X	x		x	x	X	x	x	x			x						
Indian hemp *Apocynum cannabinum*								x		x			x	x				x				x									x
Indian hemp *Apocynum sibiricum*								x	x	x			x	x				x				x									x
Indian mustard** *Brassica juncea* **																															x
Indian paintbrush+ *Castilleja coccinea+*								x	x					x	x																
Indian pipe *Monotropa uniflora*	x																														
Indian plantain *Cacalia atriplicifolia*	x			x				x																							
Indian tobacco *Lobelia inflata*	x																														x
inland rush *Juncus interior*									x					x					x				x			x					x
inland sedge+ *Carex interior+*															x	x							x		x	x	x				

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																																
intermediate scouring rush	*Equisetum x ferrissii*														x									x								x
intermediate woodfern	*Dryopteris intermedia*		x	x																													
interrupted fern	*Osmunda claytoniana*		x																									x					
Iowa crabapple	*Malus ioensis*	x																x			x												x
ivy-leaved morning glory**	*Ipomoea hederacea* **																																x
Jack-in-the-pulpit	*Arisaema triphyllum*		x	x	x																							x					
Jacob's ladder	*Polemonium reptans*		x		x					x					x								x			x							
jagged chickweed**	*Holosteum umbellatum* **																																x
James' sedge	*Carex jamesii*	x	x	x	x																												
Japanese barberry**	*Berberis thunbergii* **	x	x		x																												x
Japanese brome**	*Bromus japonicus* **																																x
Japanese fleece flower**	*Polygonum cuspidatum* **																																x
Japanese honeysuckle**	*Lonicera japonica* **	x	x		x	x														x													x
Jerusalem artichoke	*Helianthus tuberosus*				x	x	x			x	x				x						x												x
Jerusalem oak**	*Chenopodium botrys* **																																x
jimpson weed**	*Datura stramonium* **																																x
Johnny-jump-up**	*Viola tricolor* **																																x
Johnsongrass**	*Sorghum halepense* **																																x
jointed goat grass**	*Triticum cylindricum* **																																x
jointed rush	*Juncus nodosus*																							x		x	x	x					x
June grass	*Koeleria macrantha*								x				x	x	x					x		x	x										
Kalm's lobelia	*Lobelia kalmii*																		x					x		x							
Kansas sunflower**	*Helianthus petiolaris* **																																x
Kentucky bluegrass**	*Poa pratensis* **	x							x	x					x	x		x	x	X	x	x	x				x						X
Kentucky coffeetree	*Gymnocladus dioica*		x		x	x																											
kidney-leaf violet+	*Viola nephrophylla+*																							x		x							
knapweed**	*Centaurea diffusa* **																																x
knapweed**	*Centaurea maculosa* **																																x
knotty-leaved rush	*Juncus acuminatus*						x																	x					x				x
knotweed	*Polygonum ramosissimum*				x																						x						x

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
Korean lespedeza**	*Kummerowia stipulacea* **																															
lady fern	*Athyrium angustum*		x	x	x																											x
lady's thumb**	*Polygonum persicaria* **					x	x																									
lake cress	*Armoracia aquatica*																							x					x			x
lamb's quarters**	*Chenopodium album* **													x	x			x														
lance-leaved buckthorn	*Rhamnus lanceolata*																									x						x
lance-leaved loosestrife	*Lysimachia lanceolata*									x	x				x	x								x								
lance-leaved violet	*Viola lanceolata*										x					x					x											
lance coreopsis	*Coreopsis lanceolata*								x					x								x	x									
large-fruited black snakeroot+	*Sanicula trifoliata+*		x	x																												
large-leaved shinleaf	*Pyrola elliptica*	x	x																				x									
large-seeded hawthorn	*Crataegus macrosperma*	x	x																													
large-spike spike rush	*Eleocharis macrostachya*																							x					x			
large fescue**	*Festuca arundinacea* **																															x
late boneset	*Eupatorium serotinum*				x	x	x			x	x	x			x	X	x							x					x			x
late figwort	*Scrophularia marilandica*	x	x		x											x							x									
late golden rod	*Solidago gigantea*				x	x					x				x	x																
lawn speedwell**	*Veronica polita* **																															x
leadplant	*Amorpha canescens*								x	x				x	x			x		x			x									
leafcup	*Polymnia canadensis*	x	x																									x				
leafy pondweed	*Potamogeton foliosus*						x												x						x				x			
leafy prairie clover-SE, FE	***Dalea foliosa-SE, FE***																															
leafy spurge**	*Euphorbia esula* **																															x
least bluegrass**	*Poa trivialis* **				x	x	x																									x
least duckweed+	*Lemna perpusilla+*						x																	x	x				x			
leatherflower	*Clematis pitcheri*				x	x																										
leatherwood	*Dirca palustris*		x	x	x																											
leavenworth sedge	*Carex leavenworthii*																							x							c	x
lesser chelandine**	*Chelidonium majus* **																															x

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
lesser salt spurrey**	*Spergularia marina* **																															x
lesser twayblade orchid	*Liparis loeselii*																									x						
leucospora	*Leucospora multifida*					x	x									x								x					x			x
lilac**	*Syringa vulgaris* **																															x
lily-of-the-valley**	*Convallaria majalis* **																															x
lion's-tail**	*Leonurus marrubiastrum* **																															x
lion's foot	*Prenanthes alba*	x	x		x																											
little barley**	*Hordeum pusillum* **																															x
little bluestem	*Schizachyrium scoparium*							x	X	X	x		X	X	X			x	x	X	x	x	X			x						
little pussy toes	*Antennaria neglecta*	x						x	x						x					x												x
live-forever**	*Sedum purpureum* **																															x
liverleaf	*Hepatica nobilis* var. *acuta*		x																													
lizard's tail	*Saururus cernuus*						x																		x			x	x			
long-awned bracted sedge	*Carex gravida*								x	x								x														x
long-beaked sedge	*Carex sprengelii*	x	x	x	x																											
long-flowered gaura	*Gaura longiflora*	x																														x
long-fruited oval sedge	*Carex albolutescens*		x				x																		x							
long-leaved ammania	*Ammania coccinea*				x	x	x																	x					x			x
loose-headed bracted sedge	*Carex sparganioides*		x		x																											
loosestrife	*Lysimachia hybrida*					x	x				x	x				x	x							x								
lopseed	*Phryma leptostachya*	x	x																													
lousewort	*Pedicularis canadensis*		x		x					x												x	x									
low-bush blueberry	*Vaccinium augustifolium*							x													x		x									
low bindweed	*Calystegia spithamea*	x																		x												
low calamint	*Satureja arkansana*																	x	x							x						
low forked chickweed	*Paronychia fastigiata*								x	x			x																				
low hop clover**	*Trifolium campestre* **																															x
mahaleb cherry**	*Prunus mahaleb* **				x																											x
maidenhair fern+	*Adiantum pedatum*+		x																													
maple-leaved arrowwood	*Viburnum acerifolium*	x	x		x																											

Appendix 1. Continued.

Class[1]	Forest							Prairie													Sav		Wetland					L/P	Stn	Pri	Cu
Sub-class[2]	Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]	dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6] / Scientific Name[5,6]																															
maple-leaved goosefoot *Chenopodium gigantosperm*	x																														
marbleseed *Onosmodium hispidissimum*																		x	x												
marijuana** *Cannabis sativa* **																															x
marsh bellflower *Campanula aparinoides*																							x		x						
marsh bellflower *Campanula uliginosa*																									x						
marsh blazing star *Liatris spicata*										x			x	x	x										x						
marsh cress *Rorippa islandica* var. *fernaldiana*					x	x									x	x							x								x
marsh fern *Thelypteris palustris*															x	x							x	x	x	x		x			
marsh fleabane *Erigeron philadelphicus*				x	x								x	x													x				x
marsh purslane *Ludwigia palustris* var. *americana*						x										x							x					x			
marsh skullcap *Scutellaria epilobiifolia*																x							x								
marsh skullcap *Scutellaria galericulata*																x							x			x					
marsh St. John's-wort+ *Triadenum virginicum+*															x	x		·					x	x	x			x			
marsh vetchling *Lathyrus palustris*									x	x	x			x											x	x					
marsh wild timothy *Muhlenbergia glomerata*																									x		x				
Maryland senna *Cassia marilandica*				x				x																							
mat sandbur *Cenchrus longispinus*												x	x								x	x									x
matrimony vine** *Lycium barbarum* **																															x
Maximilian's sunflower**+ *Helianthus maximiliani***+																															x
mayapple *Podophyllum peltatum*	x	x		x																											
meadow anemone *Anemone canadensis*									x					x									x								x
meadow beauty+ *Rhexia virginica+*										x	x				x	x				x						x					
meadow fescue** *Festuca pratensis* **														x	x				x	x						x					x
meadow foxtail** *Alopecurus pratensis* **																															x
meadow parsnip *Oxypolis rigidior*						x				x				x	x										x	x	x				
meadow parsnip *Thaspium trifoliatum*	x			x					x	x																					
meadow rose *Rosa blanda*				x					x	x										x					x						x
meadow sedge *Carex granularis*									x														x		x						
meadow willow *Salix petiolaris*																x							x		x						
meadowsweet *Spiraea alba*										x					x					x			x								

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																																
Mead's sedge	*Carex meadii*								x	x					x					x							x	x					
mermaid weed	*Proserpinaca palustris*						x										x							x	x				x			
midland sand sedge	*Cyperus x mesochorus*												x	x																			x
mild water pepper	*Polygonum hydropiperoides*						x				x	x					x							x	x				x			x
milk spurge	*Chamaesyce supina*																																x
Missouri goldenrod	*Solidago missouriensis*								x	x	x									x													
Missouri gooseberry	*Ribes missouriense*	x	x	x	X	x	x																					x					x
Missouri ironweed	*Vernonia missurica*						x		x	x				x	x							x	x	x									
Missouri violet	*Viola missouriensis*				x	x	x																										
moneywort**	*Lysimachia nummularia* **				x	X	x																										x
monkey flower	*Mimulus ringens*				x	x	x									x								x					x			
moonseed	*Menispermum canadense*		x		x																							x				
morning glory**	*Ipomoea purpurea* **																																x
mosquito fern	*Azolla caroliniana*						x																					x				
mossy stonecrop**	*Sedum acre* **																																x
moth mullein**	*Verbascum blattaria* **																																x
motherwort**	*Leonurus cardiaca* **																																x
mountain ash**	*Sorbus aucuparia* **																																x
mouse-ear chickweed**	*Cerastium semidecandrum* **																																x
mouse-ear cress**	*Arabidopsis thaliana* **																																x
mouse-eared whitlow grass**	*Draba verna* **																																x
mousetail**	*Myosurus minimus* **																x																x
Muenden's hybrid honeysuckle**	*Lonicera x muendeniensis* **	x	x		x																												x
mullein foxglove	*Dasistoma macrophylla*	x																x															
multiflora rose**	*Rosa multiflora* **	x	x		x				x						x								x					x				x
munro grass	*Panicum rigidulum*					x	x									x	x						x	x					x			
musk thistle**	*Carduus acanthoides* **																																x
Muskingum River sedge	*Carex muskingumensis*				x	x	x																		x								

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
muskmelon**	*Cucumis melo* **																															x
naiad	*Najas flexilis*																												x	x		
nannyberry	*Viburnum lentago*		x		x	x	x																					x				
narrow-leaved cat-tail**	*Typha augustifolia* **																							X	x				x			x
narrow-leaved dayflower	*Commelina erecta*												x	x							x	x	x									
narrow-leaved goosefoot	*Chenopodium desiccatum*													x	x							x	x									
narrow-leaved pinweed	*Lechea tenuifolia*	x							x				x	x						x		x										
narrow-leaved sundew-ST	***Drosera intermedia-ST***											x				x	x				x											
narrow-leaved umbrellawort**	*Mirabilis linearis* **																															x
narrow-leaved vervain	*Verbena simplex*								x									X	X													
narrow cupseed**	*Eriochloa contracta* **																															x
narrow sedge	*Carex praegracilis*						x																									
needle spike rush	*Eleocharis acicularis*						x	x			x					x	x							x			x					
New England aster	*Aster novae-angliae*								x	x					x			x									x					x
New Jersey tea	*Ceanothus americanus*		x						x	x					x			x		x			x									
night flowering catchfly**	*Silene noctiflora* **																															x
nimble will	*Muhlenbergia schreberi*	x																														x
nipplewort**	*Lapsana communis* **																															x
nodding beggar ticks	*Bidens cernua*				x	x	x										x							x					x	x		
nodding brome**	*Bromus squarrosus* **																															x
nodding fescue	*Festuca obtusa*	x	x	x	x																							x				
nodding ladies' tresses	*Spiranthes cernua*									x					x	x	x		x										x			
nodding mouse-ear chickweed	*Cerastium nutans*																															x
nodding musk thistle**	*Carduus nutans* **																															x
nodding spurge	*Chamaesyce maculata*													x	x																	x
nodding wild onion	*Allium cernuum*									x								x	X				x									
northern bedstraw	*Galium boreale*		x							x					x									x			x				x	
northern bitter cress	*Cardamine douglassii*		x	x	x																											

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
northern bog orchid	*Platanthera hyperborea* var. *huronense*																x									x						
northern bugleweed	*Lycopus uniflorus*						x				x					x								x		x						
northern prairie dropseed	*Sporobolus heterolepis*							x	x	x					x			x		x						x						
northern willow herb	*Epilobium ciliatum*																								x							x
Norway maple**	*Acer platanoides* **	x	x																													x
oak-leaved goosefoot**	*Chenopodium glaucum* **																															x
oats**	*Avena sativa* **																															x
obscure duckweed	*Lemna obscura*						x																	x	x				x			
Ohio buckeye	*Aesculus glabra*		x	x	x																											
Ohio goldenrod	*Solidago ohioensis*																									x						
Ohio spiderwort	*Tradescantia ohiensis*								x	x	x			x	x			x				x	x									x
old-field balsam	*Gnaphalium obtusifolium*								x						x																	x
old field panic grass	*Panicum implicatum*	x										x					x															x
one-flowered broomrape+	*Orobanche uniflora*+	x	x							x																						
onion**	*Allium cepa* **																															x
Ontario aster	*Aster ontarionis*				x	x	x																									
opium poppy**	*Papaver somniferum* **																															x
orange day lily**	*Hemerocallis fulva* **	x			x					x																						x
orchard grass**	*Dactylis glomerata* **																															x
oriental bittersweet**	*Celastrus orbiculatus* **	x			x									x	x																	x
Osage orange**	*Maclura pomifera* **	x	x		x															x												x
ox-eye daisy**	*Leucanthemum vulgare* **																															x
pagoda plant	*Blephilia ciliata*		x						x	x					x			x	x													
pagoda plant	*Blephilia hirsuta*				x																											
pale-leaved sunflower	*Helianthus strumosus*	x																														
pale chickweed**	*Stellaria pallida* **																															
pale corydalis	*Corydalis flavula*		x	x																												
pale dock	*Rumex altissimus*					x	x				x					x								x			x					x
pale dogwood	*Cornus obliqua*					x				x						x	x				x			x	X	x		X				
pale gentian	*Gentiana alba*	x								x																						

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
pale purple coneflower	*Echinacea pallida*								x	x								x	x	x			x									
pale sunflower+	*Helianthus decapetalus+*	x																														
pale touch-me-not	*Impatiens pallida*			x	x	x	x																		x			x				
pale umbrellawort**	*Mirabilis albida* **																															x
panic grass	*Panicum auburne*													x																		x
panic grass	*Panicum leibergii*								x	x																						
panic grass	*Panicum linearifolium*								x		x																					
panic grass	*Panicum oligosanthes*								x	X					x				x	x		x	x									
panic grass	*Panicum perlongum*												x							x		x	x									
panic grass+	*Panicum meridionale+*							x																			x					
panicled aster	*Aster simplex*				x	X	X																	x	x		x		x			
parsnip**	*Pastinaca sativa* **								x	x	x				x	x					x											x
partridge berry	*Mitchella repens*		x																													
partridge pea	*Cassia fasciculata*							x						x	x			x				x	x	x								x
pasture rose	*Rosa carolina*								x	x					x						x	x	x									
path rush	*Juncus tenuis*	x																														x
paw paw	*Asimina triloba*		x	x	x	x																						x				
peach-leaved willow	*Salix amygdaloides*				x	x	x																	x					x			
peach**	*Prunus persica* **																															x
pear**	*Pyrus communis* **																															x
pearlwort**	*Sagina procumbens* **																															x
pellitory	*Parietaria pensylvanica*		x		x																	x	x									x
Pennsylvania bitter cress	*Cardamine pensylvanica*					x	x								x									x								x
Pennsylvania sedge	*Carex pensylvanica*	x							x													X	X					x				
peppergrass**	*Lepidium ruderale* **																															x
peppermint**	*Mentha piperita* **																															x
perennial flax**	*Linum perenne* **																															x
perennial foxtail**	*Setaria geniculata* **																															x
Peruvian daisy**	*Galinsoga ciliata* **																															x
Peruvian daisy**	*Galinsoga parviflora* **																															x

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
pickerelweed	*Pontederia cordata*																							x					x	x		
pignut hickory	*Carya glabra*	x																														
pin oak+	*Quercus palustris+*				x	x	x	x													x		x		x							
pineapple weed**	*Matricaria matricarioides* **																															x
pinesap	*Monotropa hypopithys*	x																														
pineweed	*Hypericum gentianoides*												x	x	x																	x
pink bush honeysuckle**	*Lonicera x bella* **	x	x		x																											x
pink prairie primrose**	*Oenothera speciosa* **																															
pinweed	*Lechea minor*													x								x	x									
pinweed	*Lechea pulchella*													x								x	x									
plains bluegrass**	*Poa arida* **																															x
plains oval sedge	*Carex brevior*	x							x	x					x									x								x
plains prickly-pear	*Opuntia macrorhiza*												x	x																		
plains three-awn grass**	*Aristida oligantha* **																															x
plum-leaved crabapple**	*Malus prunifolia* **	x																														x
plum hawthorn	*Crataegus pruinosa*	x			x																											
plume poppy**+	*Macleaya cordata***+																															
pointed tick trefoil	*Desmodium glutinosum*	x	x																				x									
poison hemlock**	*Conium maculatum* **				x	x	x								x																	x
poison ivy	*Toxicodendron radicans*	x	x	x	x	x	x								x			x	x		x	x	x	x	x						x	x
poke milkweed+	*Asclepias exaltata+*		x																													
pokeweed	*Phytolacca americana*	x			x																											x
polypody	*Polypodium virginianum*	x																													x	
pond sedge	*Dulichium arundinaceum*																							x					x			
pondweed	*Potamogeton diversifolius*						x																		x				x			
pondweed	*Potamogeton nodosus*						x																		x				x	x		
poorjoe**	*Diodia teres* **													x																		x
porcupine grass	*Stipa spartea*								x	x			x	x	x				x	X	x	X	x									
porcupine sedge	*Carex hystericina*																							x		x		x				x
poverty oat grass	*Danthonia spicata*	x											x									x	x									

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
povertygrass	*Aristida dichotoma*																															x
povertyweed**	*Monolepis nuttalliana* **																															x
prairie alumroot	*Heuchera richardsonii*		x						x						x					x												
prairie beard-tongue	*Penstemon pallidus*	x							x	x								x	x	x						x					x	
prairie blazing star	*Liatris pycnostachya*									x	x				x											x						
prairie blue-eyed grass+	*Sisyrinchium campestre+*								x		x									x												
prairie brome+	*Bromus kalmii+*											x														x						
prairie buttercup-ST+	***Ranunculus rhomboideus-ST+***								x											x												
prairie cinquefoil	*Potentilla arguta*								x					x	x			x		x												
prairie cord grass	*Spartina pectinata*									x	X	X			x	X	X							x			x		x			
prairie coreopsis	*Coreopsis palmata*								x	x				x	x	x				x		x	x									
prairie coreopsis**	*Coreopsis tinctoria* **																															x
prairie dock	*Silphium terebinthinaceum*								x	x	x				x				x				x									
prairie dodder	*Cuscuta pentagona*								x				x	x				x	x	x		x	x									
prairie gray sedge	*Carex conoidea*										x													x								
prairie groundsel	*Senecio plattensis*								x					x	x							x	x									
prairie Indian plantain	*Cacalia plantaginea*									x			x			x											x					
prairie lettuce-EXT+	***Lactuca ludoviciana-EXT+***								x	x									x													
prairie milkweed	*Asclepias sullivantii*									x	x				x								x									
prairie parsley	*Polytaenia nuttallii*								x	x	x																					
prairie parsnip	*Zizia aptera*																	x	x	x												
prairie rose	*Rosa setigera*	x			x														x				x									
prairie satin grass	*Muhlenbergia cuspidata*																	x	x													
prairie sundrops	*Oenothera pilosella*							x		x	x			x	x	x	x	x				x	x									
prairie sunflower	*Helianthus rigidus*								x	x				x	x				x				x									
prairie switchgrass	*Panicum virgatum*				x			x		x	X				x	x		x	x		x		x	x								
prairie tea**	*Croton monanthogynus* **																															x
prairie trillium	*Trillium recurvatum*	x	x		x										x												x					
prairie violet	*Viola pedatifida*								x	x					x					x												
prairie wedge grass	*Sphenopholis obtusata*										x					x	x		x					x								x

Appendix 1. Continued.

Class[1]	Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]	Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]	dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"		d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6] / Scientific Name[5,6]																																
prairie white fringed orchid-SE, FT / ***Platanthera leucophaea-SE, FT***									x	x	x																					
prairie willow / *Salix humilis*									x	x	x			x	x	x				x			x									
pretty sedge-ST / ***Carex woodii* -ST**		x																														
prickly-pear / *Opuntia humifusa*												x	x				x					x	x									
prickly ash / *Zanthoxylum americanum*	x	x																														
prickly gooseberry / *Ribes cynosbati*		x																								x					x	
prickly lettuce** / *Lactuca serriola* **													x	x																		x
prince's feather** / *Polygonum orientale* **																																x
prostrate amaranth** / *Amaranthus graecizans* **																																x
puccoon** / *Lithospermum arvense* **																																x
puffsheath dropseed / *Sporobolus neglectus*																																x
puncture vine** / *Tribulus terrestris* **																																x
purple coneflower / *Echinacea purpurea*	x			x																		x	x									
purple dead nettle** / *Lamium purpureum* **																																x
purple giant hyssop / *Agastache scrophulariaefolia*	x	x																														
purple loosestrife** / *Lythrum salicaria* **						x																		x	x	x						x
purple lovegrass / *Eragrostis spectabilis*													x	x																		
Purple malcomia** / *Malcolmia africana* **																																
purple meadow rue / *Thalictrum dasycarpum*									x	x														x								
purple milkweed / *Asclepias purpurascens*	x							x	x																							
purple milkwort / *Polygala polygama* var. *obtusata*														x					x			x	x									
purple oxalis / *Oxalis violacea*		x		x					x					x																		
purple prairie clover / *Dalea purpurea*								x	x					x			x	x	x													
purple rocket / *Iodanthus pinnatifidus*				x	x																											
purple rocket** / *Chorispora tenella* **																																x
purple sandgrass / *Triplasis purpurea*													x																			x
purple star thistle**+ / *Centaurea calcitrata***+																																x
purple willow** / *Salix purpurea* **																																x

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
purplestem beggar ticks	*Bidens connata*				x	x	x																	x						x		
purpletop**	*Tridens flavus* **								x					x	x					x												x
purslane speedwell	*Veronica peregrina*					x	x					x					x		x					x								x
purslane**	*Portulaca oleracea* **																															x
pussy willow	*Salix discolor*									x	x				x	x								x	x		x	x				
quack grass**	*Agropyron repens* **																															x
quaking aspen	*Populus tremuloides*				x	x		x		x					x										x							
Queen Anne's lace**	*Daucus carota* **									x				x	x								x									x
queen-of-the-prairie-SE	***Filipendula rubra-* SE**										x															x						
radish**	*Raphanus sativus* **																															x
Rafinesque's violet**	*Viola rafinesquii* **												x	x																		x
ragged evening primrose	*Oenothera laciniata*													x	x																	x
ragged fringed orchid+	*Platanthera lacera+*										x	x				x	x															
rattlebox	*Crotalaria sagittalis*												x	x																		x
rattlesnake fern	*Botrychium virginianum*		x																													
rattlesnake master	*Eryngium yuccifolium*								x	x	x			x	x	x																
rayless aster**	*Aster brachyactis* **																															x
red-osier dogwood	*Cornus stolonifera*		x		x	x				x						x							x	x	x						
red-rooted nut sedge	*Cyperus erythrorhizos*				x	x	x									x	x										x		x			x
red-seeded dandelion**	*Taraxacum laevigatum* **													x																		x
red bulrush	*Scirpus pendulus*					x	x									x	x							x			x		x			
red cedar	*Juniperus virginiana*	x													x				x	x										x		
red clover**	*Trifolium pratense* **								x						x																	x
red fescue**	*Festuca rubra* **																															x
red hawthorn	*Crataegus mollis*				x	x																										x
red honeysuckle+	*Lonicera dioica+*	x																														
red mint**	*Mentha* x *gentilis* **																															x
red mulberry	*Morus rubra*				x	x	x																									
red oak	*Quercus rubra*	X	X	x	X	x		x																							x	
red raspberry+	*Rubus strigosus+*				x																				x	x						

Appendix 1. Continued.

Class[1]	Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]	Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]	dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6] / Scientific Name[5,6]																															
red top** *Agrostis alba* **									x					x								x	x		x	x					x
redbud *Cercis canadensis*	x	x		x																										x	
redscale** *Atriplex rosea* **																															x
reed canary grass** *Phalaris arundinacea* **				x	x	x				x	X				x	x							X		x	x		x	x		x
rescuegrass** *Bromus secalinus* **																															x
rice cutgrass *Leersia oryzoides*						x																	x	x		x	x	X			
Riddell's goldenrod *Solidago riddellii*									x					x				x							x	x					
river birch *Betula nigra*					x	X																									
river bulrush *Scirpus fluviatilis*						x																	x		x		x	x			
riverbank grape *Vitis riparia*	x		x	X	x	x															x	x									x
riverbank wild rye *Elymus riparius*		x		x																											
Robin's plantain *Erigeron pulchellus*	x																		x												
rock elm-SE ***Ulmus thomasii-SE***		x	x																							x					
rock jasmine *Androsace occidentalis*													x				x														x
rocket larkspur** *Consolida ambigua* **																															x
Rocky Mountain sage** *Salvia reflexa* **																															x
rosinweed *Silphium integrifolium*								x	x	x				x					x						x						
rosinweed** *Grindelia squarrosa* **																															x
rough-clustered sedge *Carex cephalophora*	x			x									x				x														
rough-leaf goldenrod *Solidago patula*						x																		x	x		x	x			
rough-leaved dogwood *Cornus drummondii*	x												x					x	X	x											
rough avens *Geum laciniatum*				x					x	x													x			x					x
rough blazing star *Liatris aspera*								x					x						x		x	x									
rough buttercup *Ranunculus hispidus* var. *nitidus*		x		x																											
rough cinquefoil** *Potentilla norvegica* **																															x
rough dropseed *Sporobolus asper*								x					x					x	x												
rough false foxglove+ *Agalinis aspera+*								x																							
rough hedge nettle *Stachys hispida*				x	x	x			x	x													x								
rough hedge nettle+ *Stachys aspera+*																x															

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
rough muhly**	*Muhlenbergia asperifolia* **																															x
rough pennyroyal	*Hedeoma hispida*								x					x				x		x											x	x
rough pigweed**	*Amaranthus retroflexus* **																															x
rough rose	*Rosa x rudiuscula*								x																							x
rough rushgrass	*Sporobolus clandestinus*								x	x								x	x	x												
rough water horehound	*Lycopus asper*																							x								x
rough water milfoil	*Myriophyllum pinnatum*																												x	x		
rough white lettuce	*Prenanthes aspera*								x	x					x																	
round-fruited hedge hyssop	*Gratiola virginiana*					x	x										x							x					x	x		
round-fruited St. John's-wort	*Hypericum sphaerocarpum*								x	x	x				x	x		x														
round-leaved dogwood+	*Cornus rugosa+*		x	x																												
royal fern	*Osmunda regalis* var. *spectabilis*		x		x	x		x		x						x								x	x			x				
rue anenome	*Thalictrum thalictroides*	x	x	x																												
Rugel's plantain	*Plantago rugelii*				x																											x
running pine-SE	***Lycopodium clavatum* -SE**														x	x					x		x					x			x	
rush	*Juncus biflorus*															x	x							x								
rush	*Juncus brachycarpus*									x						x	x							x					x			
rush	*Juncus greenei*										x	x				x	x															x
rush aster+	*Aster borealis+*																							x		x		x				
Russian olive**	*Elaeagnus angustifolia* **																															x
rusty nut sedge	*Cyperus ferruginescens*						x										x												x			x
rye**	*Secale cereale* **																															x
salsify**	*Tragopogon porrifolius* **																															x
salt and pepper plant**	*Plantago patagonica* **																															x
salt meadow grass**	*Leptochloa acuminata* **						x																	x								x
saltmarsh aster**	*Aster subulatus* **																															x
sand blackberry	*Rubus argutus*													x	x						x	x	x									
sand bracted-sedge	*Carex muhlenbergii*								x					x	x					x		x	x									x

Appendix 1. Continued.

Class[1]	Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]	Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]	dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"		d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6] / Scientific Name[5,6]																																
sand cherry *Prunus susquehanae*												x	x	x																		
sand croton *Croton glandulosus*							x					x	x									x	x									x
sand dropseed *Sporobolus cryptandrus*													x									x										x
sand evening primrose *Oenothera rhombipetala*								x					x																			
sand lily** *Mentzelia decapetala* **												x																				x
sand milkweed *Asclepias amplexicaulis*													x	x								x										
sand violet *Viola fimbriatula*								x	x								x					x	x									
sandbar lovegrass *Eragrostis frankii*						x																										x
sandbar willow *Salix exigua*				x	x	X				x	x			x	x	x								x	x			x	x	x		x
Sartwell sedge *Carex sartwellii*																								x			x					
sassafras *Sassafras albidum*	x						x															x	x					x				x
savanna blazing star-ST ***Liatris scariosa* var. *nieuwlandii*- ST**																			x			x	x									
savanna sedge *Carex swanii*	x			x						x	x				x	x						x	x		x							
sawtooth sunflower *Helianthus grosseserratus*									x	x				x									x	x			x					x
scaleseed** *Spermolepis inermis* **																						x	x									x
scarlet hawthorn *Crataegus coccinea*	x																															x
scentless chamomile** *Matricaria maritima* **																																x
Schreber's aster *Aster schreberi*		x																														
Schweinitz's sand flat sedge *Cyperus schweinitzii*												x	x	x																		x
scorpion grass+ *Myosotis verna*+	x														x																	x
scouring rush *Equisetum hyemale*				x	x	x								x	x									x			x	x				x
Scribner's panic grass *Panicum oligosanthes* var. *scribnerianum*								x	x				x	x			x		x		x											
scurf-pea *Psoralea tenuiflora*																	x	x	x													
sea blite** *Suaeda depressa* **																																
seaside crowfoot-SE+ ***Ranunculus cymbalaria*-SE+**																								x								
seaside goldenrod** *Solidago sempervirens* **																						x	x									x
sedge *Carex albursina*		x																														
sedge *Carex cristatella*														x										x								x
sedge *Carex gracilescens*	x					x																	x									
sedge+ *Carex festucacea*+									x	x				x	x							x					x					

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Drn Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
sedge+	*Carex laeviconica+*						x			x																						
sedge	*Carex lanuginosa*		x												x	x	x							x		x	x					
sedge	*Carex leptalea*																x									x						
sedge	*Carex scoparia*														x	x										x	x					
sedge	*Carex shortiana*	x			x	x	x																									
sedge	*Carex substricta*										x													x								
sedge+	*Carex tenera+*													x		x																
seedbox	*Ludwigia alternifolia*									x					x	x	x							x								
self heal **	*Prunella vulgaris* **	x																														x
Seneca snakeroot	*Polygala senega*	x							x											x												
sensitive fern	*Onoclea sensibilis*				x	x	x				x	x				x	x							x	x	x						
sericea**+	*Lespedeza cuneata***+*																															x
sessile-flowered yellow cress	*Rorippa sessiliflora*						x										x							x					x	x		x
sessile-leaved boneset+	*Eupatorium sessilifolium+*	x	x																													
sessile-leaved tick trefoil	*Desmodium sessilifolium*								x					x	x								x									
sessile trillium	*Trillium sessile*		x																													
shadbush	*Amelanchier arborea*	x	x																													
shagbark hickory	*Carya ovata*	X	X		x																							x				
sheathing dropseed	*Sporobolus vaginiflorus*													x				x	x													x
sheep fescue**	*Festuca ovina* **																															x
shepherd's purse**	*Capsella bursa-pastoris* **																															x
shingle oak	*Quercus imbricaria*	x	x	x	x	x														x												
shining bedstraw	*Galium concinnum*	x	x																													
shining clubmoss	*Lycopodium lucidulum*		x																				x									
shining willow	*Salix lucida*											x												x	x							
shooting star	*Dodecatheon meadia*		x							x	x	x								x			x			x		x				
shore St. John's-wort-SE	***Hypericum adpressum-* SE**															x	x				x			x								
shoreline dock	*Rumex maritimus*																							x					x			x
short-awned foxtail	*Alopecurus aequalis*																												x			x

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																																
short-beaked arrowhead	*Sagittaria brevirostra*						x																	x								
short-headed rush	*Juncus brachycephalus*															x	x							x		x		x				
Short's aster	*Aster shortii*	x	x		x																										x	
short-stalked chickweed**	*Cerastium brachypodum* **																															x
showy campion+	*Silene nivea+*				x	x																				x		x				
showy goldenrod	*Solidago speciosa*								x	x				x	x																	
showy orchis+	*Orchis spectabilis+*		x	x																												
showy tick trefoil	*Desmodium canadense*								x	x					x																	
Siberian elm**	*Ulmus pumila* **														x					x	x											x
sicklepod	*Arabis canadensis*	x	x																													
sida**	*Sida spinosa* **				x																											x
side-flowered aster	*Aster lateriflorus*				x	x	x																									x
sidē-oats grama	*Bouteloua curtipendula*								x									X	x	X												
silky aster	*Aster sericeus*																			x												
silver bluestem**	*Bothriochloa saccharoides* **																															x
silver maple	*Acer saccharinum*				X	X	X																	x	x				x	x		x
silverweed	*Potentilla anserina*																x		x							x						
silvery cinquefoil**	*Potentilla argentea* **																															x
silvery spleenwort	*Athyrium thelypteroides*		x	x	x																											
six-weeks fescue	*Vulpia octoflora*							x						x								x										x
skunk cabbage	*Symplocarpus foetidus*																								x	x		X				
aromatic sumac	*Rhus aromatica*	x											x	x	x					x	x										x	
sky-blue aster	*Aster azureus*								x	x								x		x		x	x									
sleepy catchfly	*Silene antirrhina*													x	x																	x
slender cliff brake+	*Cryptogramma stelleri+*																														x	
slender corydalis**	*Corydalis micrantha* **																															x
slender false foxglove	*Agalinis tenuifolia*														x			x								x						
slender false pimpernel	*Lindernia dubia* var. *anagallidea*					x	x					x					x							x					x			
slender gilia **	*Collomia linearis* **																															x
slender green sedge	*Carex virescens*	x												x	x								x									

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
slender knotweed	*Polygonum tenue*												x	x								x										x
slender ladies' tresses+	*Spiranthes lacera+*														x	x						x	x									
slender mountain mint	*Pycnanthemum tenuifolium*									x	x				x																	
slender panic grass	*Panicum flexile*																	x	x					x		x		x				x
slender sandwort-ST	***Arenaria patula* -ST**																	x	x	x												
slender satin grass	*Muhlenbergia tenuiflora*	x																													x	
slender three-seeded mercury	*Acalypha gracilens*														x																	x
slender waterweed	*Elodea nuttallii*						x																						x	x		
slender wild rye	*Elymus villosus*	x	x		x	x																										
slippery elm	*Ulmus rubra*	x	x	X	x	x	x																									
small-flowered bitter cress	*Cardamine parviflora* var. *arenicola*													x	x																	x
small-flowered crowfoot	*Ranunculus abortivus*	x	x		x	x																						x				x
small-flowered gaura**	*Gaura parviflora* **																															x
small-fruited agrimony	*Agrimonia parviflora*	x			x	x					x				x									x								
small-fruited false flax**	*Camelina microcarpa* **																															x
small bedstraw	*Galium trifidum*																x									x						
small bulrush	*Scirpus micranthus*				x	x	x										x												x	x		
small duckweed+	*Lemna minuta+*						x																	x	x				x			
small false Solomon's seal	*Smilacina stellata*	x	x		x			x			x						x						x			x		x				
small fringed gentian	*Gentianopsis procera*																							x		x	x					
small lovegrass	*Eragrostis pectinacea*						x																									x
small lovegrass**	*Eragrostis minor* **																															x
small peppergrass**	*Lepidium densiflorum* **													x	x																	x
small skullcap	*Scutellaria leonardii*								x					x	x			x	x													
small skullcap	*Scutellaria parvula*								x					x				x	x	x			x									
small white aster	*Aster vimineus*										x																x					
small yellow flax	*Linum medium* var. *texanum*													x		x																
smartweed	*Polygonum pensylvanicum*				x	x					x																					x
smartweed dodder	*Cuscuta polygonorum*				x	x	x																	x	x							
smooth-sheathed sedge+	*Carex laevivaginata+*						x																					x				

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stn	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
smooth arrowwood	*Viburnum recognitum*	x			x	x																										x
smooth aster	*Aster laevis*								x	x					x					x			x									
smooth bead grass**	*Paspalum laeve* **																															x
smooth beard-tongue	*Penstemon calycosus*	x																														
smooth brome grass**	*Bromus inermis* **								x	x	x			x	x	x				x	x		x									x
smooth cliff brake+	*Pellaea glabella*+																														x	
smooth clustered sedge	*Carex aggregata*	x			x	x												x														
smooth crab grass**	*Digitaria ischaemum* **																															x
smooth ground cherry	*Physalis subglabrata*									x					x																	x
smooth hedge nettle	*Stachys tenuifolia*				x	x	x																								x	
smooth phlox	*Phlox glaberrima*									x	x				x											x	x					x
smooth pigweed**	*Amaranthus powellii* **																															x
smooth rock cress	*Arabis laevigata*	x	x																												x	
smooth ruellia	*Ruellia strepens*			x	x	x																										
smooth scouring rush	*Equisetum laevigatum*				x	x	x								x	x								x			x					x
smooth shadbush	*Amelanchier laevis*	x																														
smooth sow thistle**	*Sonchus arvensis* var. *glabrescens* **																															x
smooth sumac	*Rhus glabra*	x						x	x									x		x	x	x	x									x
smooth woolly panic grass+	*Panicum lindheimeri*+								x					x	x																	x
snake-mouth orchid-SE+	***Pogonia ophioglossoides-SE+***															x	x									x						
sneezeweed	*Helenium autumnale*				x	x					x												x	x		x	x					
snow-on-the-prairie**	*Euphorbia marginata* **																															x
snow trillium	*Trillium nivale*		x																													
soapwort gentian	*Gentiana saponaria*									x					x	x							x									
soft agrimony	*Agrimonia pubescens*	x	x		x																											
soft rush	*Juncus effusus*						x										x							x	x		x	x	x			
Solomon's seal	*Polygonatum commutatum*	x	x		x																											x
sorghum**	*Sorghum bicolor* **																															x
sorrel	*Oxalis dillenii*				x													x														x

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
sour dock**	*Rumex acetosella* **								x					x	x	x						x	x									x
sour gum	*Nyssa sylvatica*		x			x	x	x																								
southern lady fern	*Athyrium asplenioides*		x		x																											
southern naiad+	*Najas guadalupensis+*						x																						x	x		
sow thistle**	*Sonchus oleraceus* **																															x
soybean**	*Glycine max* **																															x
sparrow weed**	*Thymelaea passerina* **																															x
spearmint**	*Mentha spicata* **																															x
spike rush	*Eleocharis elliptica*				x	x						x												x		x						
spike rush	*Eleocharis elliptica* var. *compressa*														x	x			x					x			x					
spike rush	*Eleocharis erythropoda*					x	x					x											x	x			x					x
spike rush	*Eleocharis obtusa* var. *detonsa*					x	x					x					x							x					x			
spike rush	*Eleocharis palustris*					x	x					x				x	x							x	x		x		x			
spiked lobelia	*Lobelia spicata*								x	x	x				x					x	x		x									
spiked lobelia+	*Lobelia spicata var. leptostachys+*								x	x	x				x					x	x		x									
spinulose shield fern	*Dryopteris carthusiana*		x	x																												
spiny amaranth**	*Amaranthus spinosus* **																															x
spiny sow thistle**	*Sonchus asper* **																															x
spotted coral-root orchid-ST+	***Corallorhiza maculata-ST+***	x	x																													
spotted Joe-Pye-weed	*Eupatorium maculatum*																							x		x	x	x				
spotted phlox+	*Phlox maculata+*																									x						
spotted St. John's-wort	*Hypericum punctatum*	x																														x
spotted touch-me-not	*Impatiens capensis*				x	X	x																	x	x			X				
spreading dogbane	*Apocynum androsaemifolium*	x																			x		x									x
spreading oval sedge+	*Carex normalis+*				x	x	x			x									x				x	x								
spreading witch grass	*Panicum dichotomiflorum*				x	x	x												x	x												x
spring avens	*Geum vernum*		x	x	x	x	x																									x
spring beauty	*Claytonia virginica*	x	X	x	x	x				x																						

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Str	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
spurge**	*Chamaesyce glyptosperma* **								x				x	x																			x
spurge**	*Euphorbia heterophylla* **																																x
squarrose sedge	*Carex squarrosa*				x	x																				x							
squirrel corn	*Dicentra canadensis*		x		x																												
St. John's-wort	*Hypericum majus*															x								x								
staghorn sumac	*Rhus typhina*	x																															x
star-of-Bethlehem**	*Ornithogalum umbellatum* **																																x
starry catchfly	*Silene stellata*	x	x		x					x																							
starved panic grass	*Panicum depauperatum*																					x	x										
sterile sedge	*Carex sterilis*																							x		x		x					
stickseed	*Hackelia virginiana*	x																															x
stiff bedstraw	*Galium obtusum*						x					x					x							x	x		x					
stiff bedstraw	*Galium tinctorium*											x					x							x	x	x							
stiff gentian	*Gentianella quinquefolia*				x					x								x															
stiff sandwort	*Minuartia stricta*																	x		x													
stink grass**	*Eragrostis cilianensis* **																																x
stock**	*Matthiola incana* **																																x
stout wood reed	*Cinna arundinacea*				x	x	x																										
straw colored flat sedge	*Cyperus strigosus*									x					x	x								x									x
sugar hawthorn	*Crataegus calpodendron*	x	x																														
sugar maple	*Acer saccharum*	x	X	x	x																								x				
sulfur cinquefoil**	*Potentilla recta* **									x													x										x
Sullivant's orange coneflower	*Rudbeckia fulgida* var. *sullivantii*						x									x		x								x							
sumpweed*	*Iva annua* **																																x
sunshine rose+	*Rosa suffulta*+									x					x																		x
swamp aster	*Aster puniceus*										x	x													x	x	x	x					
swamp bluegrass	*Poa palustris*						x					x					x						x	x	x								
swamp buttercup	*Ranunculus septentrionalis*			x	x	x	x																		x	x		x					
swamp candles	*Lysimachia terrestris*																							x	x	x							

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
swamp dewberry	*Rubus hispidus*			x		x		x							x	x					x	x	x					x				
swamp dock	*Rumex verticillatus*						x								x	x								x	x				x	x		
swamp loosestrife	*Decodon verticillatus*																							x	x				x			
swamp marigold	*Bidens aristosa*										x	x				x	x							x			x	x	x			x
swamp milkweed	*Asclepias incarnata*				x											x	x							x		x	x		x			
swamp rose	*Rosa palustris*																							x	x							
swamp rose mallow	*Hibiscus palustris*																							x	x				x			
swamp saxifrage	*Saxifraga pensylvanica*																							x	x	x		x			x	
swamp tickseed	*Bidens tripartita*				x	x	x								x									x					x			
swamp white oak	*Quercus bicolor*			x	x	x	x																		x							
swamp wood betony	*Pedicularis lanceolata*																									x						
sweet-scented bedstraw	*Galium triflorum*		x																									x				
sweet annie**	*Artemisia annua* **				x																											x
sweet cicely	*Osmorhiza claytonii*		x		x	x	x																									
sweet flag**	*Acorus calamus* **																							x				x				
sweet grass	*Hierochloe odorata*										x	x				x	x							x		x						
sweet Indian plantain-WL+	***Cacalia suaveolens-WL+***						x																			x		x				
sweet vernal grass**	*Anthoxanthum odoratum* **																															x
sweet William**	*Silene armeria* **																															x
sweetbrier**+	*Rosa eglanteria***+																															x
sycamore	*Platanus occidentalis*				x	x	x																									
tall agrimony	*Agrimonia gryposepala*	x	x																													
tall anemone	*Anemone virginiana*	x	x												x																	
tall bellflower	*Campanula americana*	x	x		x																											
tall blue lettuce	*Lactuca biennis*	x			x																		x									
tall boneset	*Eupatorium altissimum*								x	x				x	x			x		x			x									x
tall buttercup**	*Ranunculus acris* **																															x
tall coreopsis	*Coreopsis tripteris*								x	x				x	x								x									
tall forked chickweed	*Paronychia canadensis*	x	x											x								x	x									

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																																
tall green milkweed	*Asclepias hirtella*									x				x	x																		
tall ironweed	*Vernonia gigantea*														x	x																	x
tall nut rush	*Scleria triglomerata*														x	x																	
tall swamp marigold	*Bidens coronata*					x	x									x	x							x	x				x				
tall thistle	*Cirsium altissimum*	x																															x
tall water hemp	*Amaranthus tuberculatus*				x	x	x																							x			x
tamarisk waterhemp**	*Amaranthus rudis* **				x	x	x																	x						x			x
tansy mustard**	*Descurainia pinnata* **																	x															x
tansy**	*Tanacetum vulgare* **																																x
taperleaf flat sedge	*Cyperus acuminatus*						x									x	x		x										x	x		x
tartarian honeysuckle**	*Lonicera tatarica* **	x	x		x															x													x
Tennessee milk vetch-SE+	***Astragalus tennesseensis-SE+***																	x	x														
terrestrial starwort	*Callitriche heterophylla*						x																						x	x			
thicket parsley	*Perideridia americana*	x			x																												
thicket Virginia creeper	*Parthenocissus inserta*	x			x						x																						x
thread-leaved beakrush	*Rhynchospora capillacea*																x							x		x							
thread-leaved pondweed	*Potamogeton pusillus*						x																		x				x				
three-awned grass**	*Aristida basiramea* **																																x
three-awned grass	*Aristida longespica*															x																	
three-flowered melic grass	*Melica nitens*	x	x						x	x																							
three-flowered nightshade**	*Solanum triflorum***+																																x
three-leaved stonecrop	*Sedum ternatum*		x		x																							x			x		
three-seeded mercury	*Acalypha rhomboidea*				x	x																											x
thyme-leaved sandwort**	*Arenaria serpyllifolia* **																																x
thyme-leaved speedwell**	*Veronica serpyllifolia* **																																x
tick trefoil	*Desmodium cuspidatum*	x																															
tick trefoil	*Desmodium glabellum*	x																															x
tie vine**	*Jacquemontia tamnifolia* **																																x
Timothy**	*Phleum pratense* **																																x

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand				Dolomite		Hill	Shrub		Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
toad rush	*Juncus bufonius*						x										x															x
tomato**	*Lycopersicon esculentum* **																															x
tooth-cup	*Rotala ramosior*						x										x							x					x			
toothed cress	*Arabis shortii*	x			x																										x	
toothwort	*Dentaria laciniata*	x	x																													
Torrey's rush	*Juncus torreyi*									x	x	x				x	x							x			x		x			x
treacle mustard**	*Erysimum repandum* **																															x
tree-of-heaven**	*Ailanthus altissima* **																			x												x
triploid woodfern	*Dryopteris* x *triploidea*		x																									x				
trumpet creeper**	*Campsis radicans* **				x																											x
tubercled orchid-SE	***Platanthera flava* var. *herbiola* -SE**															x	x				x				x		x					
tufted hair grass	*Deschampsia caespitosa*																	x	x									x				
tufted lake sedge	*Carex vesicaria*						x					x													x								
tufted loosestrife	*Lysimachia thyrsiflora*										x													x								
tulip tree	*Liriodendron tulipifera*		x																													x
tumble mustard**	*Sisymbrium altissimum* **																															x
tumble ringwing	*Cycloloma atriplicifolium*												x	x																		x
tumbleweed**	*Amaranthus albus* **													x																		x
tumbleweed**	*Salsola kali* **																															x
twayblade orchid	*Liparis liliifolia*	x	x																													
twin leaf+	*Jeffersonia diphylla*+		x																													
twisted-leaf yellow-eyed grass	*Xyris torta*															x	x									x						
umbrella sedge	*Carex umbellata*								x					x	x					x												
upright burhead	*Echinodorus rostratus*																x							x								
upright carrion flower	*Smilax ecirrhata*	x	x		x																											
Vasey's pondweed-EXT+	***Potamogeton vaseyi-EXT*+**						x																						x			
veiny pea	*Lathyrus venosus*	x							x												x											
velvet leaf**	*Abutilon theophrasti* **																															x
Venus' looking-glass	*Triodanis perfoliata*														x																	x

Appendix 1. Continued.

Class[1]	Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]	Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]	dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6] / Scientific Name[5,6]																															
vipers bugloss** *Echium vulgare* **																															x
Virginia bluebells *Mertensia virginica*		x	x	x	x																										
Virginia creeper *Parthenocissus quinquefolius*	x	x	x	x	x																						x			x	x
Virginia knotweed *Polygonum virginianum*	x	x	x	x																											
Virginia mercury** *Acalypha virginica* **																															x
Virginia waterleaf *Hydrophyllum virginianum*		x		x																											
Virginia wild rye *Elymus virginicus*	x	x		x	x	x								x	x																x
virgin's-bower *Clematis virginiana*				x																											x
wafer ash *Ptelea trifoliata*	x			x													x	x	x											x	
wahoo *Euonymus atropurpureus*		x	x	x																											
walking fern *Asplenium rhizophyllum*																														x	
wall rocket** *Diplotaxis muralis* **																															x
water cress** *Nasturtium officinale* **																							x	x	x		x				
water hemlock *Cicuta maculata*					x	x				x					x	x							x	x				x			
water horsetail** *Equisetum fluviatile* **						x									x								x								
water hyssop** *Bacopa rotundifolia* **																												x			x
water meal + *Wolffia columbiana*+						x																	x	x				x			
water milfoil + *Myriophyllum spicatum*+																												x	x		
water milfoil *Myriophyllum verticillatum*																												x	x		
water parsnip *Sium suave*										x	x												x	x		x	x	x			
water plantain + *Alisma plantago-aquatica*+						x										x							x					x			
water smartweed *Polygonum amphibium*				x	x	x					x				x	x							X					x			
water speedwell *Veronica comosa*																							x	x				x			
water star grass *Zosterella dubia*						x																						x	x		
water willow *Justicia americana*						x																						x	x		
watermelon** *Citrullus vulgaris* **																															x
wavy-leaf thistle**+ *Cirsium undulatum***																															x
waxweed** *Cuphea viscosissima* **																															x
waxy meadow rue *Thalictrum revolutum*				x	x	x					x					x									x	x					

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stn	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand						Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																																
weak-stemmed wood sedge	*Carex laxiculmis*		x																														
wedge-fruited oval sedge	*Carex suberecta*										x								x					x			x					
West Indian cat-tail	*Typha domingensis*																							x								
western horse-nettle**	*Solanum dimidiatum* **																																x
western ragweed**	*Ambrosia psilostachya* **													x	x																		x
western sunflower	*Helianthus occidentalis*								x					x	x					x		x											
western Venus' looking-glass**	*Triodanis leptocarpa* **																																x
western wheat grass**	*Agropyron smithii* **																																x
wheat**	*Triticum aestivum* **																																x
white ash	*Fraxinus americana*	X	X	x	x															x													x
white avens	*Geum canadense*	X	x	x	X	x	x																					x					x
white bedstraw**	*Galium mollugo* **																																x
white clover**	*Trifolium repens* **																																X
white grass	*Leersia virginica*		x	x	x	x	x																	x									x
white lady's slipper-ST	***Cypripedium candidum* - ST**										x	x														x							
white mulberry**	*Morus alba* **	x			x	x																											x
white mustard**	*Brassica alba* **																																x
white oak	*Quercus alba*	X	X	x	X			X															X					X					
white poplar**	*Populus alba* **									x																							x
white prairie clover	*Dalea candida*							x	x	x					x					x		x	x										
white sage**	*Artemisia ludoviciana* **																																x
white snakeroot	*Eupatorium rugosum*	x	x	x	x	x	x																					x			x	x	x
white sweet clover**	*Melilotus alba* **								x	x	x				x	x				x	x												x
white trillium	*Trillium grandiflorum*		x																														
white trout lily	*Erythronium albidum*	x	x		x																												
white turtlehead	*Chelone glabra*																							x		x	x	x					
white vervain	*Verbena urticifolia*	x			x	x	x																										x
white water buttercup	*Ranunculus longirostris*						x																						x				

Appendix 1. Continued.

Class[1]		Forest							Prairie														Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
white water crowfoot	*Ranunculus trichophyllus*																												x			
white water lily	*Nymphaea tuberosa*																												x			
white wild indigo	*Baptisia lactea*								x	x				x	x								x									
white willow**	*Salix alba* **						x																		x							x
whitlow grass	*Draba reptans*								x					x				x		x												
whorled-flower loosestrife	*Lysimachia quadriflora*									x	x				x	x	x									x	x		x			
whorled-leaf loosestrife+	*Lysimachia quadrifolia*+	x	x																													
whorled milkwort	*Polygala verticillata*								x											x		x	x									
whorled nut rush	*Scleria verticillata*																x		x							x						
wild bean	*Strophostyles helvola*													x	x																	
wild bean	*Strophostyles leiosperma*													x	x	x																
wild bergamot	*Monarda fistulosa*								x	x				x	x			x	x	x		x	x				x					
wild chervil	*Chaerophyllum procumbens*				x	x	x																									
wild cranesbill	*Geranium carolinianum*									x										x												x
wild cucumber	*Echinocystis lobata*				x	x	x																									
wild four-o'clock**	*Mirabilis nyctaginea* **																															x
wild garlic	*Allium canadense*	x	x		x				x	x					x																	
wild geranium	*Geranium maculatum*	x	x	x	x					x					x													x				
wild ginger	*Asarum canadense*	x	x		x									x													x				
wild hyacinth	*Camassia scilloides*				x													x				x	x									
wild leek	*Allium tricoccum*		x																													
wild lettuce	*Lactuca canadensis*	x								x	x				x																	x
wild licorice**	*Glycyrrhiza lepidota* **																															x
wild lily	*Lilium michiganense*		x							x					x						x											
wild lupine	*Lupinus perennis*							x														x	x									x
wild oats**	*Avena fatua* **																															x
wild onion	*Allium burdickii*		x																													
wild petunia	*Ruellia humilis* var. *longifolia*								x	x								x	x	x												
wild poinsettia	*Euphorbia dentata*													x																		x
wild rice+	*Zizania aquatica*+																							x					x			

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
wild sarsaparilla	*Aralia nudicaulis*	x	x																									x				
wild senna	*Cassia hebecarpa*				x						x															x						
wild sensitive plant	*Cassia nictitans*													x	x			x				x	x									x
wild strawberry	*Fragaria virginiana*	x							x	x					x			x		x			x									x
wild sweet crab apple	*Malus coronaria*	x																					x									
wild sweet potato vine	*Ipomoea pandurata*				x	x	x																									x
wild yam	*Dioscorea villosa*	x	x	x	x	x																						x				
willow-leaved lettuce**	*Lactuca saligna* **																															x
willow aster	*Aster praealtus*										x				x									x			x				
windmillgrass**	*Chloris verticillata* **																															x
winged loosestrife	*Lythrum alatum*									x	x	x			x	x								x		x	x				
winged monkey flower	*Mimulus alatus*				x	x	x																	x				x		x		
winter vetch**	*Vicia villosa***																															x
winterberry+	*Ilex verticillata+*				x	x	x	x													x				x							
wirestem grass	*Muhlenbergia mexicana*		x																					x								
witch grass	*Panicum capillare*						x											x														x
witch hazel	*Hamamelis virginiana*	x																														
wood anemone	*Anemone quinquefolia*	x	x								x																					
wood gray sedge	*Carex grisea*				x	x	x																					x				
wood nettle	*Laportea canadensis*		x	x	X	x	x																					x				
wood orchid-SE+	***Platanthera clavellata-SE+***															x	x								x							
wood sage	*Teucrium canadense*				x	x	x			x		x			x	x	x						x	x								
wood sandwort	*Arenaria lateriflora*	x	x		x						x				x																	
wood sorrel	*Oxalis stricta*		x	x	x										x			x														x
wood spurge	*Euphorbia commutata*					x	x																									x
wood vetch+	*Vicia caroliniana+*	x							x											x												
woodland agrimony+	*Agrimonia rostellata+*	x			x																											
woodland bluegrass	*Poa sylvestris*	x	x	x	x	x																										
woodland brome	*Bromus pubescens*	x	x																													
woodland goosefoot	*Chenopodium standleyanum*	x																				x	x									

Appendix 1. Continued.

Class[1]		Forest							Prairie													Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]		Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]		dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6]	Scientific Name[5,6]																															
woodland lettuce	*Lactuca floridana*	x			x	x																	x					x				
woodland satin grass+	*Muhlenbergia sylvatica*+	x	x		x	x																						x				
woodland sunflower	*Helianthus divaricatus*	x																			x	x	x									
wool grass	*Scirpus cyperinus*						x									x								x					x			
woolly mullein**	*Verbascum thapsus* **														x			x	x	x												x
wormseed mustard**+	*Erysimum cheiranthoides*** +																															x
yellow bartonia	*Bartonia virginica*															x											x	x	x			
yellow bellwort	*Uvularia grandiflora*		x																													
yellow coneflower	*Ratibida pinnata*								x	x								x					x									x
yellow dog-tooth violet	*Erythronium americanum*		x	x																												
yellow false foxglove	*Aureolaria grandiflora*	x																														
yellow foxtail**	*Setaria glauca* **																															X
yellow giant hyssop	*Agastache nepetoides*		x		x																											
yellow iris**	*Iris pseudacorus* **				x	x	x																	x	x				x			
yellow ironweed	*Verbesina alternifolia*				x	x	x																									
yellow meadow parsnip	*Thaspium trifoliatum* var. *flavum*	x	x		x					x	x				x																	
yellow pimpernel	*Taenidia integerrima*	x	x						x	x	x									x												
yellow pond lily	*Nuphar luteum* var. *macrophyllum*						x																						x	x		
yellow puccoon	*Lithospermum incisum*								x									x	x	x												
yellow rocket**	*Barbarea vulgaris* **								x						x								x									x
yellow sand daisy**	*Heterotheca latifolia* **												x	x																		x
yellow star grass	*Hypoxis hirsuta*								x	x					x																	
yellow stonecrop**	*Sedum sarmentosum* **				x																									x	x	x
yellow sweet clover**	*Melilotus officinalis* **								x	x										x												x
yellow violet	*Viola pubescens*	x	x	x																												
yellow water buttercup	*Ranunculus flabellaris*						x																	x	x				x			
yerba de tajo**	*Eclipta prostrata* **				x	x	x																	x								

Appendix 1. Continued.

Class[1]	Forest							Prairie												Sav		Wetland					L/P	Stm	Pri	Cu
Sub-class[2]	Upland			Floodplain			Flatwoods	Prairie				Sand					Dolomite		Hill	Shrub	Sand		Marsh	Swamp	Fen	Sedge mdw	Seep	Pond	River	Dm Clf	Cultural
Natural Community[3,4]	dm	m	wm	m	wm	w	sd	dm	m	wm	w	d	dm	m	wm	w	d	dm	gd	"	d	dm	"	ss	gf	"	"	"	mj	"	
Common name[5,6] Scientific Name[5,6]																															

[1] Class abbreviations: Sav = savanna, L/P = Lake and Pond, Stm = Stream, Pri = Primary, Cu = Cultural

[2] Sub-class abbreviations: Sedge mdw = Sedge Meadow, Dm Clf = Dolomite Cliff

[3] Natural Community abbreviations: d = dry, dm = dry-mesic, m = mesic, wm = wet-mesic, w = wet gd = glacial drift hill prairie, ss = shrub swamp, gf = graminoid fen, mj = major river, " = natural community is the same as the sub-class

[4] Bold and upper case "**X**" denotes dominant species in that natural community.

[5] Bold type indicates an Illinois watch list (WL), Illinois endangered (SE), Illinois threatened (ST), federally endangered (FE), federally threatened (FT), or possibly Illinois extripated (EXT) species.

[6] ** = non-native species, may be native elsewhere in Illinois.

Appendix 2

Incomplete list of vascular plants known from the Prairie Parklands Assessment Area (from Appendix 1), sorted by scientific name.

Scientific Name[1,2,3]	Common Name[1,2,3]	Scientific Name[1,2,3]	Common Name[1,2,3]
*Abutilon theophrasti***	velvet leaf**	*Allium sativum***	garlic**
Acalypha gracilens	slender three-seeded mercury	*Allium schoenoprasum***	chives**
		Allium tricoccum	wild leek
Acalypha rhomboidea	three-seeded mercury	*Allium vineale***	field garlic**
*Acalypha virginica***	Virginia mercury**	*Alnus glutinosa***	black alder**
Acer negundo	box elder	*Alopecurus aequalis*	short-awned foxtail
Acer nigrum	black maple	*Alopecurus carolinianus*	common foxtail
*Acer platanoides***	Norway maple**	*Alopecurus pratensis***	meadow foxtail**
Acer saccharinum	silver maple	*Amaranthus albus***	tumbleweed**
Acer saccharum	sugar maple	*Amaranthus graecizans***	prostrate amaranth**
*Achillea millefolium***	common yarrow**	*Amaranthus hybridus***	green amaranth**
*Acorus calamus***	sweet flag**	*Amaranthus powellii***	smooth pigweed**
Actaea pachypoda	doll's eyes	*Amaranthus retroflexus***	rough pigweed**
Adiantum pedatum+	maidenhair fern+	*Amaranthus rudis***	tamarisk waterhemp**
Aesculus glabra	Ohio buckeye	*Amaranthus spinosus***	spiny amaranth**
Agalinis aspera+	rough false foxglove+	*Amaranthus tuberculatus*	tall water hemp
Agalinis purpurea	false foxglove	*Ambrosia artemisiifolia*	common ragweed
Agalinis tenuifolia	slender false foxglove	*Ambrosia psilostachya***	western ragweed**
Agastache nepetoides	yellow giant hyssop	*Ambrosia trifida*	giant ragweed
Agastache scrophulariaefolia	purple giant hyssop	*Amelanchier arborea*	shadbush
Agrimonia gryposepala	tall agrimony	*Amelanchier laevis*	smooth shadbush
Agrimonia parviflora	small-fruited agrimony	*Ammania coccinea*	long-leaved ammania
Agrimonia pubescens	soft agrimony	*Amorpha canescens*	leadplant
Agrimonia rostellata+	woodland agrimony+	*Amorpha fruticosa*	false indigo bush
*Agropyron repens***	quack grass**	*Amphicarpa bracteata*	hog peanut
*Agropyron smithii***	western wheat grass**	*Andropogon gerardii*	big bluestem
*Agrostis alba***	red top**	*Andropogon virginicus***	broom sedge**
Agrostis hyemalis	hair grass	*Androsace occidentalis*	rock jasmine
Agrostis perennans+	autumn bent grass+	*Anemone canadensis*	meadow anemone
*Ailanthus altissima***	tree-of-heaven**	*Anemone caroliniana*	Carolina anemone
*Ajuga reptans***	carpet bugle**	*Anemone cylindrica*	candle anemone
*Alcea rosea***	hollyhock**	*Anemone quinquefolia*	wood anemone
Aletris farinosa	colic root	*Anemone virginiana*	tall anemone
Alisma plantago-aquatica+	water plantain+	*Angelica atropurpurea*	angelica
Alisma subcordatum	common water plantain	*Antennaria neglecta*	little pussy toes
*Alliaria petiolata***	garlic mustard**	*Antennaria plantaginifolia*	everlasting
Allium burdickii	wild onion	*Anthemis cotula***	dogfennel**
Allium canadense	wild garlic	*Anthoxanthum odoratum***	sweet vernal grass**
Allium canadense var. *mobilense***	glade onion**	*Apios americana*	groundnut
		Apocynum androsaemifolium	spreading dogbane
*Allium cepa***	onion**	*Apocynum cannabinum*	Indian hemp
Allium cernuum	nodding wild onion	*Apocynum sibiricum*	Indian hemp

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]	Scientific Name[1,2,3]	Common Name[1,2,3]
Aquilegia canadensis	columbine	*Aster dumosus*	bushy aster
*Arabidopsis thaliana***	mouse-ear cress**	*Aster ericoides*	heath aster
Arabis canadensis	sicklepod	***Aster furcatus*-ST**	**forked aster-ST**
Arabis hirsuta	hairy rock cress	*Aster laevis*	smooth aster
Arabis laevigata	smooth rock cress	*Aster lateriflorus*	side-flowered aster
Arabis shortii	toothed cress	*Aster linariifolius*	flax-leaved aster
Aralia nudicaulis	wild sarsaparilla	*Aster novae-angliae*	New England aster
Aralia racemosa	American spikenard	*Aster oblongifolius*	aromatic aster
*Arctium lappa***	great burdock**	*Aster ontarionis*	Ontario aster
*Arctium minus***	common burdock**	*Aster parviceps*+	aster+
Arenaria lateriflora	wood sandwort	*Aster pilosus*	hairy aster
***Arenaria patula*-ST**	**slender sandwort-ST**	*Aster praealtus*	willow aster
*Arenaria serpyllifolia***	thyme-leaved sandwort**	*Aster prenanthoides*	aster
Arisaema dracontium	green dragon	*Aster puniceus*	swamp aster
Arisaema triphyllum	Jack-in-the-pulpit	*Aster sagittifolius*	arrowleaf aster
*Aristida basiramea***	three-awned grass**	*Aster schreberi*	Schreber's aster
Aristida dichotoma	povertygrass	*Aster sericeus*	silky aster
Aristida longespica	three-awned grass	*Aster shortii*	Short's aster
*Aristida oligantha***	plains three-awn grass**	*Aster simplex*	panicled aster
Aristida purpurascens	arrow feather	*Aster subulatus***	saltmarsh aster**
Aristolochia serpentaria	birthwort	*Aster umbellatus*	flat top aster
Armoracia aquatica	lake cress	*Aster vimineus*	small white aster
Aronia melanocarpa	black chokecherry	*Astragalus canadensis*	Canadian milk vetch
Aronia prunifolia	chokeberry	***Astragalus tennesseensis*-SE+**	**Tennessee milk vetch-SE+**
*Artemisia annua***	sweet annie**	*Athyrium angustum*	lady fern
*Artemisia biennis***	biennial wormwood**	*Athyrium asplenioides*	southern lady fern
Artemisia caudata	beach wormwood	*Athyrium thelypteroides*	silvery spleenwort
*Artemisia ludoviciana***	white sage**	*Atriplex patula***	fat-hen saltbush**
*Artemisia vulgaris***	common wormwood**	*Atriplex rosea***	redscale**
Aruncus dioicus	goatsbeard	*Aureolaria grandiflora*	yellow false foxglove
Asarum canadense	wild ginger	*Aureolaria pedicularia*	clammy false foxglove
Asclepias amplexicaulis	sand milkweed	*Avena fatua***	wild oats**
Asclepias exaltata+	poke milkweed+	*Avena sativa***	oats**
Asclepias hirtella	tall green milkweed	*Azolla caroliniana*	mosquito fern
Asclepias incarnata	swamp milkweed	*Bacopa rotundifolia***	water hyssop**
Asclepias purpurascens	purple milkweed	*Ballota nigra***	black horehound**
Asclepias sullivantii	prairie milkweed	*Baptisia lactea*	white wild indigo
Asclepias syriaca	common milkweed	*Baptisia leucophaea*+	cream wild indigo+
Asclepias tuberosa	butterfly weed	*Barbarea vulgaris***	yellow rocket**
Asclepias verticillata	horsetail milkweed	*Bartonia virginica*	yellow bartonia
Asclepias viridiflora	green milkweed	*Berberis thunbergii***	Japanese barberry**
Asimina triloba	paw paw	*Berberis vulgaris***+**	common barberry**+
*Asparagus officinalis***	asparagus**	*Berteroa incana***	hoary alyssum**
Asplenium platyneuron	ebony spleenwort	*Betula nigra*	river birch
Asplenium rhizophyllum	walking fern	*Bidens aristosa*	swamp marigold
Aster azureus	sky-blue aster	*Bidens cernua*	nodding beggar ticks
Aster borealis+	rush aster+	*Bidens connata*	purplestem beggar ticks
*Aster brachyactis***	rayless aster**	*Bidens coronata*	tall swamp marigold
Aster cordifolius	heart-leaved aster	*Bidens frondosa*	common beggar ticks
Aster drummondii	Drummond's aster	*Bidens tripartita*	swamp tickseed

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]
Bidens vulgata	common beggar ticks
Blephilia ciliata	pagoda plant
Blephilia hirsuta	pagoda plant
Boehmeria cylindrica	false nettle
Boltonia asteroides	false aster
*Bothriochloa saccharoides***	silver bluestem**
Botrychium dissectum var. *dissectum*+	cut-leaved grape fern+
Botrychium dissectum var. *obliquum*+	bronze fern+
Botrychium virginianum	rattlesnake fern
Bouteloua curtipendula	side-oats grama
Brachyelytrum erectum	brachyelytrum
*Brassica alba***	white mustard**
*Brassica juncea***	Indian mustard**
*Brassica kaber***	charlock**
*Brassica nigra***	black mustard**
*Brassica rapa***	field mustard**
Brickellia eupatorioides	false boneset
*Bromus commutatus***+	hairy brome**+
*Bromus inermis***	smooth brome grass**
*Bromus japonicus***	Japanese brome**
Bromus kalmii+	prairie brome+
Bromus pubescens	woodland brome
Bromus purgans	brome grass
*Bromus secalinus***	rescuegrass**
*Bromus squarrosus***	nodding brome**
*Bromus tectorum***	cheat grass**
*Buchloe dactyloides***	buffalograss**
Bulbostylis capillaris	hair sedge
Cacalia atriplicifolia	Indian plantain
Cacalia plantaginea	prairie Indian plantain
***Cacalia suaveolens*-WL+**	**sweet Indian plantain-WL+**
Calamagrostis canadensis	bluejoint grass
Calamagrostis inexpansa+	bluejoint grass+
Callirhoe triangulata	clustered poppy mallow
Callitriche heterophylla	terrestrial starwort
***Calopogon tuberosus*-SE**	**grass pink orchid-SE**
Caltha palustris	cowslip
Calystegia sepium	American bindweed
Calystegia spithamea	low bindweed
Camassia scilloides	wild hyacinth
*Camelina microcarpa***	small-fruited false flax**
Campanula americana	tall bellflower
Campanula aparinoides	marsh bellflower
*Campanula rapunculoides***	garden bluebell**
Campanula uliginosa	marsh bellflower
*Campsis radicans***	trumpet creeper**
*Cannabis sativa***	marijuana**
*Capsella bursa-pastoris***	shepherd's purse**
Cardamine bulbosa	bulbous bittercress
Cardamine douglassii	northern bitter cress
*Cardamine hirsuta***+	hairy bitter cress**+
Cardamine parviflora var. *arenicola*	small-flowered bitter cress
Cardamine pensylvanica	Pennsylvania bitter cress
*Cardaria draba***	hoary cress**
*Carduus acanthoides***	musk thistle**
*Carduus nutans***	nodding musk thistle**
Carex aggregata	smooth clustered sedge
Carex albolutescens	long-fruited oval sedge
Carex albursina	sedge
Carex alopecoidea	brown-headed fox sedge
Carex annectens	gray sedge
Carex atheroides	awned sedge
Carex bicknellii	copper-shouldered oval sedge
Carex blanda	common wood sedge
Carex brevior	plains oval sedge
Carex buxbaumii	buxbaum sedge
Carex careyana	Carey's sedge
Carex cephaloidea	headed sedge
Carex cephalophora	rough-clustered sedge
Carex comosa	bristly bearded sedge
Carex conjuncta	green-headed fox sedge
Carex conoidea	prairie gray sedge
Carex crawei	Crawe's sedge
Carex cristatella	sedge
Carex davisii	awned graceful sedge
Carex emoryi	Emory's sedge
Carex festucacea+	sedge+
Carex frankii	Frank's sedge
Carex gracilescens	sedge
Carex gracillima	graceful sedge
Carex granularis	meadow sedge
Carex gravida	long-awned bracted sedge
Carex grayi	common bur sedge
Carex grisea	wood gray sedge
Carex haydenii	Hayden's sedge
Carex hirsutella	hairy green sedge
Carex hirtifolia	hairy wood sedge
Carex hitchcockiana	Hitchcock's sedge
Carex hystericina	porcupine sedge
Carex interior+	inland sedge+
Carex jamesii	James' sedge
Carex lacustris	common lake sedge
Carex laeviconica+	sedge+
Carex laevivaginata+	smooth-sheathed sedge+
Carex lanuginosa	sedge

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]
Carex laxiculmis	weak-stemmed wood sedge
Carex leavenworthii	leavenworth sedge
Carex leptalea	sedge
Carex lupulina[+]	common hop sedge[+]
Carex lurida[+]	bottlebrush sedge[+]
Carex meadii	Mead's sedge
Carex molesta	disturbed sedge
Carex muhlenbergii	sand bracted-sedge
Carex muskingumensis	Muskingum River sedge
Carex normalis[+]	spreading oval sedge[+]
Carex oligocarpa	few-fruited gray sedge
Carex pensylvanica	Pennsylvania sedge
Carex praegracilis	narrow sedge
Carex rosea	curly-styled wood sedge
Carex sartwellii	Sartwell sedge
Carex scoparia	sedge
Carex shortiana	sedge
Carex sparganioides	loose-headed bracted sedge
Carex sprengelii	long-beaked sedge
Carex squarrosa	squarrose sedge
Carex sterilis	sterile sedge
Carex stipata	common fox sedge
Carex stricta	common tussock sedge
Carex suberecta	wedge-fruited oval sedge
Carex substricta	sedge
Carex swanii	savanna sedge
Carex tenera[+]	sedge[+]
Carex tetanica	common stiff sedge
Carex tribuloides	awl-fruited sedge
Carex trichocarpa	hairy-fruited lake sedge
Carex umbellata	umbrella sedge
Carex vesicaria	tufted lake sedge
Carex virescens	slender green sedge
Carex vulpinoidea	brown fox sedge
***Carex woodii*-ST**	**pretty sedge-ST**
Carpinus caroliniana	blue beech
*Carum carvi***	caraway**
Carya cordiformis	bitternut hickory
Carya glabra	pignut hickory
Carya ovata	shagbark hickory
Cassia fasciculata	partridge pea
Cassia hebecarpa	wild senna
Cassia marilandica	Maryland senna
Cassia nictitans	wild sensitive plant
Castilleja coccinea[+]	Indian paintbrush[+]
*Catalpa speciosa***	catalpa**
Caulophyllum thalictroides	blue cohosh
Ceanothus americanus	New Jersey tea
*Celastrus orbiculatus***	oriental bittersweet**
Celastrus scandens	bittersweet
Celtis occidentalis	hackberry
Cenchrus longispinus	mat sandbur
*Centaurea calcitrata***[+]	purple star thistle**[+]
*Centaurea cyanus***	bachelor's button**
*Centaurea diffusa***	knapweed**
*Centaurea maculosa***	knapweed**
Cephalanthus occidentalis	buttonbush
Cerastium arvense	field mouse-eared chickweed
*Cerastium brachypodum***	short-stalked chickweed**
Cerastium nutans	nodding mouse-ear chickweed
*Cerastium pumilum***	dwarf mouse-ear chickweed**
*Cerastium semidecandrum***	mouse-ear chickweed**
*Cerastium vulgatum***	common mouse-ear chickweed**
*Ceratocephalus testiculatus***	bur buttercup**
Ceratophyllum demersum	coontail
Cercis canadensis	redbud
*Chaenorrhinum minus***	dwarf snapdragon**
Chaerophyllum procumbens	wild chervil
*Chamaesyce glyptosperma***	spurge**
Chamaesyce maculata	nodding spurge
Chamaesyce supina	milk spurge
*Chelidonium majus***	lesser chelandine**
Chelone glabra	white turtlehead
*Chenopodium album***	lamb's quarters**
*Chenopodium ambrosioides***	American wormseed**
*Chenopodium botrys***	Jerusalem oak**
Chenopodium desiccatum	narrow-leaved goosefoot
Chenopodium gigantospermum	maple-leaved goosefoot
*Chenopodium glaucum***	oak-leaved goosefoot**
Chenopodium standleyanum	woodland goosefoot
*Chloris verticillata***	windmillgrass**
*Chorispora tenella***	purple rocket**
Chrysopsis camporum	golden aster
*Cichorium intybus***	chickory**
Cicuta bulbifera	bulblet-bearing water hemlock
Cicuta maculata	water hemlock
Cinna arundinacea	stout wood reed
Circaea lutetiana ssp. *canadensis*	enchanter's nightshade
Cirsium altissimum	tall thistle
*Cirsium arvense***	Canada thistle**
Cirsium discolor	field thistle

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]	Scientific Name[1,2,3]	Common Name[1,2,3]
***Cirsium hillii*-ST**	**Hill's thistle-ST**	*Crypsis schoenoides***	crypsis**
Cirsium muticum	fen thistle	*Cryptogramma stelleri*+	slender cliff brake+
*Cirsium undulatum***+	wavy-leaf thistle***+	*Cryptotaenia canadensis*	honewort
*Cirsium vulgare***	bull thistle**	*Cucumis melo***	muskmelon**
*Citrullus vulgaris***	watermelon**	*Cuphea viscosissima***	waxweed**
Claytonia virginica	spring beauty	*Cuscuta campestris*	dodder
Clematis pitcheri	leatherflower	*Cuscuta coryli*	hazel dodder
Clematis virginiana	virgin's-bower	*Cuscuta glomerata*	dodder
Collinsia verna	blue-eyed Mary	*Cuscuta gronovii*	dodder
*Collomia linearis***	slender gilia **	*Cuscuta pentagona*	prairie dodder
Comandra umbellata	bastard toadflax	*Cuscuta polygonorum*	smartweed dodder
*Commelina communis***	common day flower**	*Cycloloma atriplicifolium*	tumble ringwing
Commelina erecta	narrow-leaved dayflower	*Cynanchum laeve***	blue vine**
*Conium maculatum***	poison hemlock**	*Cynoglossum officinale***	common hound's tongue**
*Consolida ambigua***	rocket larkspur**	*Cyperus acuminatus*	taperleaf flat sedge
*Convallaria majalis***	lily-of-the-valley**	*Cyperus aristatus*	awned flat sedge
*Convolvulus arvensis***	field bindweed**	*Cyperus erythrorhizos*	red-rooted nut sedge
Conyza canadensis	horseweed	*Cyperus esculentus*	common nut sedge
Conyza ramosissima	dwarf horseweed	*Cyperus ferruginescens*	rusty nut sedge
***Corallorhiza maculata*-ST+**	**spotted coral-root orchid-ST+**	*Cyperus filiculmis*	fern flat sedge
		Cyperus rivularis	brook flat sedge
Coreopsis lanceolata	lance coreopsis	*Cyperus schweinitzii*	Schweinitz's sand flat sedge
Coreopsis palmata	prairie coreopsis	*Cyperus strigosus*	straw colored flat sedge
*Coreopsis tinctoria***	prairie coreopsis**	*Cyperus* x *mesochorus*	midland sand sedge
Coreopsis tripteris	tall coreopsis	***Cypripedium candidum*-ST**	**white lady's slipper-ST**
*Coriandrum sativum***	coriander**	*Cystopteris bulbifera*	berry bladder fern
Cornus alternifolia	alternate-leaved dogwood	*Cystopteris protrusa*	fragile fern
Cornus drummondii	rough-leaved dogwood	*Dactylis glomerata***	orchard grass**
Cornus obliqua	pale dogwood	*Dalea candida*	white prairie clover
Cornus racemosa	gray dogwood	***Dalea foliosa*-SE, FE**	**leafy prairie clover-SE, FE**
Cornus rugosa+	round-leaved dogwood+	*Dalea purpurea*	purple prairie clover
Cornus stolonifera	red-osier dogwood	*Danthonia spicata*	poverty oat grass
*Coronilla varia***	crown vetch**	*Dasistoma macrophylla*	mullein foxglove
Corydalis flavula	pale corydalis	*Datura stramonium***	jimpson weed**
*Corydalis micrantha***	slender corydalis**	*Daucus carota***	Queen Anne's lace**
Corylus americana	hazelnut	*Decodon verticillatus*	swamp loosestrife
*Cosmos bipinnatus***	cosmos**	*Dentaria laciniata*	toothwort
Crataegus calpodendron	sugar hawthorn	*Deschampsia caespitosa*	tufted hair grass
Crataegus coccinea	scarlet hawthorn	*Descurainia pinnata***	tansy mustard**
Crataegus crus-galli	cock-spur hawthorn	*Desmanthus illinoensis*	Illinois bundleflower
Crataegus macrosperma	large-seeded hawthorn	*Desmodium canadense*	showy tick trefoil
Crataegus mollis	red hawthorn	*Desmodium cuspidatum*	tick trefoil
Crataegus pruinosa	plum hawthorn	*Desmodium glabellum*	tick trefoil
Crataegus punctata	dotted hawthorn	*Desmodium glutinosum*	pointed tick trefoil
Crataegus succulenta	fleshy hawthorn	*Desmodium illinoense*	Illinois tick trefoil
*Crepis tectorum***	hawksbeard**	*Desmodium nudiflorum*+	bare-stemmed tick trefoil+
Crotalaria sagittalis	rattlebox	*Desmodium sessilifolium*	sessile-leaved tick trefoil
*Croton capitatus***	doveweed**	*Dianthus armeria***	Deptford pink**
Croton glandulosus	sand croton	*Diarrhena americana*	beak grass
*Croton monanthogynus***	prairie tea**	*Dicentra canadensis*	squirrel corn

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]	Scientific Name[1,2,3]	Common Name[1,2,3]
Dicentra cucullaria	dutchman's breeches	*Elymus villosus*	slender wild rye
Diervilla lonicera	dwarf honeysuckle	*Elymus virginicus*	Virginia wild rye
*Digitaria ischaemum***	smooth crab grass**	*Epilobium ciliatum*	northern willow herb
*Digitaria sanguinalis***	common crab grass**	*Epilobium coloratum*	cinnamon willow herb
*Diodia teres***	poorjoe**	*Epilobium leptophyllum*	bog willow herb
Dioscorea villosa	wild yam	*Epipactis helleborine***	false hellebore**
*Diplotaxis muralis***	wall rocket**	*Equisetum arvense*	common horsetail
*Dipsacus laciniatus***	cut-leaved teasel**	*Equisetum fluviatile***	water horsetail**
*Dipsacus sylvestris***	common teasel**	*Equisetum hyemale*	scouring rush
Dirca palustris	leatherwood	*Equisetum laevigatum*	smooth scouring rush
Dodecatheon meadia	shooting star	*Equisetum* x *ferrissii*	intermediate scouring rush
Draba reptans	whitlow grass	*Eragrostis capillaris***	hair love grass**
*Draba verna***	mouse-eared whitlow grass**	*Eragrostis cilianensis***	stink grass**
		Eragrostis frankii	sandbar lovegrass
***Drosera intermedia*-ST**	**narrow-leaved sundew-ST**	*Eragrostis hypnoides*	creeping lovegrass
Dryopteris carthusiana	spinulose shield fern	*Eragrostis minor***	small lovegrass**
Dryopteris cristata	crested woodfern	*Eragrostis pectinacea*	small lovegrass
Dryopteris goldiana+	Goldie's fern+	*Eragrostis spectabilis*	purple lovegrass
Dryopteris intermedia	intermediate woodfern	*Erechtites hieracifolia*	fireweed
Dryopteris x *triploidea*	triploid woodfern	*Erigenia bulbosa*	harbinger-of-spring
Dulichium arundinaceum	pond sedge	*Erigeron annuus*	daisy fleabane
*Dyssodia papposa***	fetid marigold**	*Erigeron philadelphicus*	marsh fleabane
Echinacea pallida	pale purple coneflower	*Erigeron pulchellus*	Robin's plantain
Echinacea purpurea	purple coneflower	*Erigeron strigosus*	daisy fleabane
*Echinochloa crus-galli***	barnyard grass**	*Eriochloa contracta***	narrow cupseed**
Echinochloa muricata	barnyard grass	*Eriochloa villosa***	hairy cupseed**
Echinochloa pungens	barnyard grass	*Eriophorum angustifolium*	cottonsedge
Echinocystis lobata	wild cucumber	*Erodium cicutarium***	cranebill**
Echinodorus rostratus	upright burhead	*Erucastrum gallicum***	dog mustard**
*Echinops sphaerocephalus***	globethistle**	*Eryngium yuccifolium*	rattlesnake master
*Echium vulgare***	vipers bugloss**	*Erysimum cheiranthoides***+	wormseed mustard**+
*Eclipta prostrata***	yerba de tajo**	*Erysimum repandum***	treacle mustard**
*Elaeagnus angustifolia***	Russian olive**	*Erythronium albidum*	white trout lily
*Elaeagnus umbellata***	autumn olive**	*Erythronium americanum*	yellow dog-tooth violet
Eleocharis acicularis	needle spike rush	*Euonymus alatus***	burning bush**
Eleocharis elliptica	spike rush	*Euonymus atropurpureus*	wahoo
Eleocharis elliptica var. *compressa*	spike rush	*Euonymus obovatus*	creeping euonymus
		Eupatorium altissimum	tall boneset
Eleocharis erythropoda	spike rush	*Eupatorium maculatum*	spotted Joe-Pye-weed
Eleocharis macrostachya	large-spike spike rush	*Eupatorium perfoliatum*	common boneset
Eleocharis obtusa var. *detonsa*	spike rush	*Eupatorium purpureum*	green-stem Joe-Pye-weed
		Eupatorium rugosum	white snakeroot
Eleocharis palustris	spike rush	*Eupatorium serotinum*	late boneset
*Eleusine indica***	goose grass**	*Eupatorium sessilifolium*+	sessile-leaved boneset+
Ellisia nyctelea	Aunt Lucy	*Euphorbia commutata*	wood spurge
Elodea canadensis	common waterweed	*Euphorbia corollata*	flowering spurge
Elodea nuttallii	slender waterweed	*Euphorbia cyparissias***	cypress spurge**
Elymus canadensis	Canada wild rye	*Euphorbia dentata*	wild poinsettia
Elymus hystrix	bottlebrush grass	*Euphorbia esula***	leafy spurge**
Elymus riparius	riverbank wild rye	*Euphorbia heterophylla***	spurge**

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]	Scientific Name[1,2,3]	Common Name[1,2,3]
*Euphorbia marginata***	snow-on-the-prairie**	*Glyceria septentrionalis*	floating manna grass
Euphorbia obtusata	blunt-leaved spurge	*Glyceria striata*	fowl manna grass
Euthamia graminifolia	grass-leaved goldenrod	*Glycine max***	soybean**
Euthamia gymnospermoides	grass-leaved goldenrod	*Glycyrrhiza lepidota***	wild licorice**
*Fagopyrum esculentum***	buckwheat**	*Gnaphalium obtusifolium*	old-field balsam
*Festuca arundinacea***	large fescue**	*Gratiola neglecta*	clammy hedge hyssop
Festuca obtusa	nodding fescue	*Gratiola virginiana*	round-fruited hedge hyssop
*Festuca ovina***	sheep fescue**	*Grindelia squarrosa***	rosinweed**
*Festuca pratensis***	meadow fescue**	*Gymnocladus dioica*	Kentucky coffeetree
*Festuca rubra***	red fescue**	*Hackelia virginiana*	stickseed
***Filipendula rubra*-SE**	**queen-of-the-prairie-SE**	*Hamamelis virginiana*	witch hazel
Fimbristylis autumnalis	autumn sedge	*Hedeoma hispida*	rough pennyroyal
Fimbristylis puberula	chestnut sedge	*Hedeoma pulegioides*	American pennyroyal
Floerkea proserpinacoides	false mermaid	*Helenium autumnale*	sneezeweed
Fragaria americana+	American wild strawberry+	*Helianthemum bicknellii*	frostweed
Fragaria virginiana	wild strawberry	*Helianthemum canadense*	common rockrose
Fraxinus americana	white ash	*Helianthus annuus***	common sunflower**
Fraxinus nigra	black ash	*Helianthus decapetalus*+	pale sunflower+
Fraxinus pennsylvanica	green ash	*Helianthus divaricatus*	woodland sunflower
Fraxinus quadrangulata	blue ash	*Helianthus grosseserratus*	sawtooth sunflower
*Froelichia gracilis***	cottonweed	*Helianthus hirsutus*	bristly sunflower
*Galinsoga ciliata***	Peruvian daisy**	*Helianthus maximiliani***+	Maximilian's sunflower**+
*Galinsoga parviflora***	Peruvian daisy**	*Helianthus mollis*	downy sunflower
Galium aparine	annual bedstraw	*Helianthus occidentalis*	western sunflower
Galium boreale	northern bedstraw	*Helianthus petiolaris***	Kansas sunflower**
Galium circaezans	broad-leaved galium	*Helianthus rigidus*	prairie sunflower
Galium concinnum	shining bedstraw	*Helianthus strumosus*	pale-leaved sunflower
*Galium mollugo***	white bedstraw**	*Helianthus tuberosus*	Jerusalem artichoke
Galium obtusum	stiff bedstraw	*Heliopsis helianthoides*	false sunflower
Galium tinctorium	stiff bedstraw	*Hemerocallis fulva***	orange day lily**
Galium trifidum	small bedstraw	*Hepatica nobilis* var. *acuta*	liverleaf
Galium triflorum	sweet-scented bedstraw	*Heracleum maximum*	cow parsnip
Gaura biennis	biennial gaura	*Hesperis matronalis***	dame's rocket**
Gaura longiflora	long-flowered gaura	*Heterotheca latifolia***	yellow sand daisy**
*Gaura parviflora***	small-flowered gaura**	*Heuchera richardsonii*	prairie alumroot
Gaylussacia baccata	black huckleberry	*Hibiscus laevis*	halberd-leaved rose mallow
Gentiana alba	pale gentian		
Gentiana andrewsii	closed gentian	*Hibiscus palustris*	swamp rose mallow
Gentiana puberulenta	downy gentian	*Hibiscus trionum***	flower-of-an-hour**
Gentiana saponaria	soapwort gentian	*Hieracium caespitosum***	field hawkweed**
Gentianella quinquefolia	stiff gentian	*Hieracium canadense*	Canada hawkweed
Gentianopsis crinita	fringed gentian	*Hieracium gronovii*	hairy hawkweed
Gentianopsis procera	small fringed gentian	*Hieracium longipilum*	hairy hawkweed
Geranium carolinianum	wild cranesbill	*Hieracium scabrum*	hairy hawkweed
Geranium maculatum	wild geranium	*Hierochloe odorata*	sweet grass
Geum canadense	white avens	*Holosteum umbellatum***	jagged chickweed**
Geum laciniatum	rough avens	*Hordeum jubatum***	fox-tail barley**
Geum vernum	spring avens	*Hordeum pusillum***	little barley**
*Glechoma hederacea***	creeping Charlie**	*Hordeum vulgare***	barley**
Gleditsia triacanthos	honey locust	*Houstonia longifolia*+	bluets+

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]	Scientific Name[1,2,3]	Common Name[1,2,3]
Humulus lupulus	American hop	*Juniperus virginiana*	red cedar
Hybanthus concolor	green violet	*Justicia americana*	water willow
Hydrastis canadensis	golden seal	*Kochia scoparia***	burning bush**
Hydrophyllum appendiculatum	great waterleaf	*Koeleria macrantha*	June grass
Hydrophyllum virginianum	Virginia waterleaf	*Krigia biflora*	false dandelion
***Hypericum adpressum*-SE**	**shore St. John's-wort-SE**	*Krigia virginica*	dwarf dandelion
Hypericum gentianoides	pineweed	*Kummerowia stipulacea***	Korean lespedeza**
Hypericum majus	St. John's-wort	*Lactuca biennis*	tall blue lettuce
Hypericum mutilum	dwarf St. John's-wort	*Lactuca canadensis*	wild lettuce
*Hypericum perforatum***	common St. John's-wort**	*Lactuca floridana*	woodland lettuce
Hypericum punctatum	spotted St. John's-wort	***Lactuca ludoviciana*-EXT⁺**	**prairie lettuce-EXT⁺**
Hypericum pyramidatum⁺	giant St.-John's-wort⁺	*Lactuca saligna***	willow-leaved lettuce**
Hypericum sphaerocarpum	round-fruited St. John's -wort	*Lactuca sativa***	garden lettuce**
		*Lactuca serriola***	prickly lettuce**
Hypoxis hirsuta	yellow star grass	*Lamium amplexicaule***	henbit**
Ilex verticillata⁺	winterberry⁺	*Lamium purpureum***	purple dead nettle**
Impatiens capensis	spotted touch-me-not	*Laportea canadensis*	wood nettle
Impatiens pallida	pale touch-me-not	*Lappula echinata***	beggars lice**
*Inula helenium***	elecampane**	*Lapsana communis***	nipplewort**
Iodanthus pinnatifidus	purple rocket	*Lathyrus latifolius***	everlasting pea**
*Ipomoea hederacea***	ivy-leaved morning glory**	*Lathyrus palustris*	marsh vetchling
		Lathyrus venosus	veiny pea
Ipomoea pandurata	wild sweet potato vine	*Lechea minor*	pinweed
*Ipomoea purpurea***	morning glory**	*Lechea pulchella*	pinweed
*Iris germanica***	garden iris**	*Lechea tenuifolia*	narrow-leaved pinweed
*Iris pseudacorus***	yellow iris**	*Lechea villosa*	hairy pinweed
Iris shrevei	blue flag	*Leersia oryzoides*	rice cutgrass
***Isoetes butleri*-SE**	**Butler's quillwort-SE**	*Leersia virginica*	white grass
Isopyrum biternatum	false rue anenome	*Lemna gibba*	duckweed
*Iva annua***	sumpweed*	*Lemna minor⁺*	duckweed⁺
*Iva xanthifolia***⁺*	burdock sumpweed***⁺	*Lemna minuta⁺*	small duckweed⁺
*Jacquemontia tamnifolia***	tie vine**	*Lemna obscura*	obscure duckweed
Jeffersonia diphylla⁺	twin leaf⁺	*Lemna perpusilla⁺*	least duckweed⁺
***Juglans cinerea*-WL**	**butternut-WL**	*Lemna trisulca*	forked duckweed
Juglans nigra	black walnut	*Leonurus cardiaca***	motherwort**
Juncus acuminatus	knotty-leaved rush	*Leonurus marrubiastrum***	lion's-tail**
Juncus balticus	Baltic rush	*Lepidium campestre***	field peppergrass**
Juncus biflorus	rush	*Lepidium densiflorum***	small peppergrass**
Juncus brachycarpus	rush	*Lepidium perfoliatum***	clasping cress**
Juncus brachycephalus	short-headed rush	*Lepidium ruderale***	peppergrass**
Juncus bufonius	toad rush	*Lepidium virginicum*	common peppergrass
Juncus canadensis	Canadian rush	*Leptochloa acuminata***	salt meadow grass**
Juncus dudleyi	Dudley's rush	*Leptoloma cognatum*	fall witch grass
Juncus effusus	soft rush	*Lespedeza capitata*	bush clover
Juncus greenei	rush	*Lespedeza cuneata***⁺*	sericea**⁺
Juncus interior	inland rush	*Leucanthemum vulgare***	ox-eye daisy**
Juncus marginatus⁺	grass-leaved rush⁺	*Leucospora multifida*	leucospora
Juncus nodosus	jointed rush	*Liatris aspera*	rough blazing star
Juncus tenuis	path rush	*Liatris cylindracea*	cylindric blazing star
Juncus torreyi	Torrey's rush	*Liatris pycnostachya*	prairie blazing star

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]
***Liatris scariosa* var. *nieuwlandii*-ST**	**savanna blazing star -ST**
Liatris spicata	marsh blazing star
*Ligustrum obtusifolium***	border privet**
*Ligustrum vulgare***	common privet**
Lilium michiganense	wild lily
Linaria canadensis	blue toadflax
*Linaria dalmatica***	Dalmatian toadflax**
*Linaria vulgaris***	butter and eggs**
Lindernia dubia	false pimpernel
Lindernia dubia var. *anagallidea*	slender false pimpernel
Linum medium var. *texanum*	small yellow flax
*Linum perenne***	perennial flax**
Linum sulcatum	grooved yellow flax
*Linum usitatissimum***	flax**
Liparis liliifolia	twayblade orchid
Liparis loeselii	lesser twayblade orchid
Liriodendron tulipifera	tulip tree
*Lithospermum arvense***	puccoon**
Lithospermum canescens	hoary puccoon
Lithospermum caroliniense	hairy puccoon
Lithospermum incisum	yellow puccoon
Lithospermum latifolium	American gromwell
*Lithospermum officinale***	European gromwell**
Lobelia cardinalis	cardinal flower
Lobelia inflata	Indian tobacco
Lobelia kalmii	Kalm's lobelia
Lobelia siphilitica	blue lobelia
Lobelia spicata	spiked lobelia
Lobelia spicata var. *leptostachys*+	spiked lobelia+
*Lolium perenne***	crested rye grass**
Lonicera dioica+	red honeysuckle+
*Lonicera japonica***	Japanese honeysuckle**
*Lonicera maackii***	amur honeysuckle**
Lonicera prolifera	grape honeysuckle
*Lonicera tatarica***	tartarian honeysuckle**
Lonicera x *bella***	pink bush honeysuckle**
Lonicera x *heckrottii***	Heckrott's hybrid honeysuckle**
Lonicera x *muendeniensis***	Muenden's hybrid honeysuckle**
*Lonicera xylosteum***	honeysuckle**
*Lotus corniculatus***	birdsfoot trefoil
Ludwigia alternifolia	seedbox
Ludwigia palustris var. *americana*	marsh purslane
Ludwigia polycarpa	false loosestrife
Lupinus perennis	wild lupine
Luzula multiflora	common wood rush
*Lychnis alba***	evening campion**
*Lycium barbarum***	matrimony vine**
*Lycopersicon esculentum***	tomato**
***Lycopodium clavatum*-SE**	**running pine-SE**
Lycopodium digitatum	ground pine
Lycopodium lucidulum	shining clubmoss
Lycopus americanus	common water horehound
Lycopus asper	rough water horehound
Lycopus uniflorus	northern bugleweed
Lycopus virginicus	bugle weed
Lysimachia ciliata	fringed loosestrife
Lysimachia hybrida	loosestrife
Lysimachia lanceolata	lance-leaved loosestrife
*Lysimachia nummularia***	moneywort**
Lysimachia quadriflora	whorled-flower loosestrife
Lysimachia quadrifolia+	whorled-leaf loosestrife+
Lysimachia terrestris	swamp candles
Lysimachia thyrsiflora	tufted loosestrife
*Lysimachia vulgaris***	European loosestrife**
Lythrum alatum	winged loosestrife
*Lythrum salicaria***	purple loosestrife**
*Macleaya cordata***+	plume poppy**+
*Maclura pomifera***	Osage orange**
*Malcolmia africana***	Purple malcomia**
Malus coronaria	wild sweet crab apple
Malus ioensis	Iowa crabapple
*Malus prunifolia***	plum-leaved crabapple**
*Malus pumila***	apple**
*Malva neglecta***	dwarf mallow**
***Malvastrum hispidum*-SE**	**false mallow-SE**
*Marrubium vulgare***+	common horehound**+
*Matricaria maritima***	scentless chamomile**
*Matricaria matricarioides***	pineapple weed**
*Matthiola incana***	stock**
*Medicago lupulina***	black medic**
*Medicago sativa***	alfalfa**
Melica nitens	three-flowered melic grass
*Melilotus alba***	white sweet clover**
*Melilotus officinalis***	yellow sweet clover**
Menispermum canadense	moonseed
Mentha arvensis var. *villosa*	field mint
*Mentha piperita***	peppermint**
*Mentha spicata***	spearmint**
Mentha x *gentilis***	red mint**
*Mentzelia decapetala***	sand lily**
Mertensia virginica	Virginia bluebells
Mimulus alatus	winged monkey flower
Mimulus ringens	monkey flower
Minuartia stricta	stiff sandwort

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]
*Mirabilis albida***	pale umbrellawort**
*Mirabilis jalapa***	four-o'clock**
*Mirabilis linearis***	narrow-leaved umbrellawort**
*Mirabilis nyctaginea***	wild four-o'clock**
Mitchella repens	partridge berry
Mitella diphylla+	Bishop's cap+
*Mollugo verticillatus***	carpet weed**
Monarda clinopodia	basil bee-balm
Monarda fistulosa	wild bergamot
Monarda punctata	horsemint
*Monolepis nuttalliana***	povertyweed**
Monotropa hypopithys	pinesap
Monotropa uniflora	Indian pipe
*Morus alba***	white mulberry**
Morus rubra	red mulberry
*Muhlenbergia asperifolia***	rough muhly**
Muhlenbergia cuspidata	prairie satin grass
Muhlenbergia frondosa	common satin grass
Muhlenbergia glomerata	marsh wild timothy
Muhlenbergia mexicana	wirestem grass
Muhlenbergia schreberi	nimble will
Muhlenbergia sylvatica+	woodland satin grass+
Muhlenbergia tenuiflora	slender satin grass
*Myosotis scorpioides***	common forget-me-not**
Myosotis verna+	scorpion grass+
*Myosoton aquaticum***	giant chickweed**
*Myosurus minimus***	mousetail**
Myriophyllum pinnatum	rough water milfoil
Myriophyllum spicatum+	water milfoil+
Myriophyllum verticillatum	water milfoil
Najas flexilis	naiad
Najas guadalupensis+	southern naiad+
Napaea dioica	glade mallow
*Narcissus pseudonarcissus***	daffodil**
*Nasturtium officinale***	water cress**
Nelumbo lutea	American lotus
*Nepeta cataria***	catnip**
Nuphar luteum var. *macrophyllum*	yellow pond lily
Nuphar variegatum	bullhead lily
Nymphaea odorata	fragrant water lily
Nymphaea tuberosa	white water lily
Nyssa sylvatica	sour gum
Oenothera biennis	evening primrose
Oenothera laciniata	ragged evening primrose
Oenothera pilosella	prairie sundrops
Oenothera rhombipetala	sand evening primrose
*Oenothera speciosa***	pink prairie primrose**
Onoclea sensibilis	sensitive fern
Onosmodium hispidissimum	marbleseed
Ophioglossum vulgatum	adder's-tongue fern
Opuntia humifusa	prickly-pear
Opuntia macrorhiza	plains prickly-pear
Orchis spectabilis+	showy orchis+
*Ornithogalum umbellatum***	star-of-Bethlehem**
Orobanche uniflora+	one-flowered broomrape+
Oryzopsis racemosa	black-seeded rice grass
Osmorhiza claytonii	sweet cicely
Osmorhiza longistylis	anise-root
Osmunda cinnamomea	cinnamon fern
Osmunda claytoniana	interrupted fern
Osmunda regalis var. *spectabilis*	royal fern
Ostrya virginiana	hop hornbeam
*Oxalis corniculata***	creeping sorrel**
Oxalis dillenii	sorrel
Oxalis stricta	wood sorrel
Oxalis violacea	purple oxalis
Oxypolis rigidior	meadow parsnip
Panax quinquefolius	ginseng
Panicum auburne	panic grass
Panicum capillare	witch grass
Panicum clandestinum	deer-tongue grass
Panicum depauperatum	starved panic grass
Panicum dichotomiflorum	spreading witch grass
Panicum flexile	slender panic grass
Panicum implicatum	old field panic grass
Panicum lanuginosum	hairy panic-grass
Panicum latifolium	broad-leaved panic grass
Panicum leibergii	panic grass
Panicum lindheimeri+	smooth woolly panic grass+
Panicum linearifolium	panic grass
Panicum meridionale+	panic grass+
*Panicum miliaceum***	broom-corn millet**
Panicum oligosanthes	panic grass
Panicum oligosanthes var. *scribnerianum*	Scribner's panic grass
Panicum perlongum	panic grass
Panicum rigidulum	munro grass
Panicum villosissimum	hairy panic grass
Panicum villosissimum var. *praecocius*+	hairy panic grass+
Panicum virgatum	prairie switchgrass
*Papaver somniferum***	opium poppy**
Parietaria pensylvanica	pellitory
Parnassia glauca	grass-of-parnassus
Paronychia canadensis	tall forked chickweed
Paronychia fastigiata	low forked chickweed

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]
Parthenium integrifolium	American feverfew
Parthenocissus inserta	thicket Virginia creeper
Parthenocissus quinquefolius	Virginia creeper
*Parthenocissus tricuspidata***	Boston ivy**
Paspalum ciliatifolium	bead grass
*Paspalum laeve***	smooth bead grass**
*Pastinaca sativa***	parsnip**
Pedicularis canadensis	lousewort
Pedicularis lanceolata	swamp wood betony
Pellaea glabella+	smooth cliff brake+
Penstemon calycosus	smooth beard-tongue
Penstemon digitalis	foxglove beard-tongue
Penstemon hirsutus	hairy beard-tongue
Penstemon pallidus	prairie beard-tongue
*Penstemon tubaeflorus***	beard-tongue**
Penthorum sedoides	ditch stonecrop
Perideridia americana	thicket parsley
*Perilla frutescens***	beef-steak plant**
Petunia x *hybrida***	garden petunia**
*Phalaris arundinacea***	reed canary grass**
Phegopteris hexagonoptera	broad beech fern
*Phleum pratense***	Timothy**
Phlox bifida	cleft phlox
Phlox divaricata	common phlox
Phlox glaberrima	smooth phlox
Phlox maculata+	spotted phlox+
*Phlox paniculata***	garden phlox**
Phlox pilosa	downy phlox
Phragmites australis	common reed
Phryma leptostachya	lopseed
Phyla lanceolata	fog-fruit
Physalis heterophylla	clammy ground cherry
Physalis subglabrata	smooth ground cherry
Physalis virginiana	ground cherry
Physostegia speciosa	false dragonhead
Physostegia virginiana	false dragonhead
Phytolacca americana	pokeweed
Pilea fontana+	bog clearweed+
Pilea pumila	clearweed
Plantago aristata	bracted plantain
*Plantago lanceolata***	buckhorn plantain**
*Plantago major***	common plantain**
*Plantago patagonica***	salt and pepper plant**
Plantago rugelii	Rugel's plantain
Plantago virginica	dwarf plantain
***Platanthera clavellata*-SE+**	**wood orchid-SE+**
***Platanthera flava* var. *herbiola*-SE**	**tubercled orchid-SE**
Platanthera hyperborea var. *huronense*	northern bog orchid
Platanthera lacera+	ragged fringed orchid+
***Platanthera leucophaea*-SE, FT**	**prairie white fringed orchid-SE, FT**
Platanthera viridis+	bracted green orchid+
Platanus occidentalis	sycamore
*Poa annua***	annual bluegrass**
*Poa arida***	plains bluegrass**
*Poa bulbosa***	bulbous bluegrass**
*Poa compressa***	Canada bluegrass**
Poa palustris	swamp bluegrass
*Poa pratensis***	Kentucky bluegrass**
Poa sylvestris	woodland bluegrass
*Poa trivialis***	least bluegrass**
Podophyllum peltatum	mayapple
***Pogonia ophioglossoides*-SE+**	**snake-mouth orchid-SE+**
Polanisia dodecandra	clammy weed
Polemonium reptans	Jacob's ladder
Polygala cruciata var. *aquilonia*+	cross milkwort+
Polygala polygama var. *obtusata*	purple milkwort
Polygala sanguinea	field milkwort
Polygala senega	Seneca snakeroot
Polygala verticillata	whorled milkwort
Polygonatum commutatum	Solomon's seal
Polygonum achoreum	beak-seeded knotweed
Polygonum amphibium	water smartweed
*Polygonum arenastrum***	common knotweed**.
Polygonum buxiforme	boxwood knotweed
***Polygonum careyi*-SE+**	**Carey's heartease-SE+**
*Polygonum cespitosum***	creeping smartweed**
*Polygonum convolvulus***	black bindweed**
*Polygonum cuspidatum***	Japanese fleece flower**
Polygonum hydropiper	common smartweed
Polygonum hydropiperoides	mild water pepper
Polygonum lapathifolium	heartsease
*Polygonum orientale***	prince's feather**
Polygonum pensylvanicum	smartweed
*Polygonum persicaria***	lady's thumb**
Polygonum punctatum	dotted smartweed
Polygonum ramosissimum	knotweed
Polygonum sagittatum	arrowleaf tearthumb
Polygonum scandens	climbing false buckwheat
Polygonum tenue	slender knotweed
Polygonum virginianum	Virginia knotweed
Polymnia canadensis	leafcup
Polypodium virginianum	polypody
Polystichum acrostichoides+	Christmas fern+
Polytaenia nuttallii	prairie parsley
Pontederia cordata	pickerelweed

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]	Scientific Name[1,2,3]	Common Name[1,2,3]
*Populus alba***	white poplar**	*Quercus prinoides* var. *acuminata*	chinquapin oak
*Populus canescens***	gray poplar**	*Quercus rubra*	red oak
Populus deltoides	cottonwood	*Quercus velutina*	black oak
Populus grandidentata	big tooth aspen	*Ranunculus abortivus*	small-flowered crowfoot
Populus tremuloides	quaking aspen	*Ranunculus acris***	tall buttercup**
*Portulaca oleracea***	purslane**	***Ranunculus cymbalaria*-SE⁺**	**seaside crowfoot-SE⁺**
*Potamogeton crispus***	curly pondweed**	*Ranunculus fascicularius*	early buttercup
Potamogeton diversifolius	pondweed	*Ranunculus flabellaris*	yellow water buttercup
Potamogeton foliosus	leafy pondweed	*Ranunculus hispidus* var. *nitidus*	rough buttercup
Potamogeton nodosus	pondweed	*Ranunculus longirostris*	white water buttercup
Potamogeton pectinatus	fennel-leaved pondweed	*Ranunculus pensylvanicus*	bristly buttercup
Potamogeton pusillus	thread-leaved pondweed	*Ranunculus recurvatus*	hooked buttercup
***Potamogeton vaseyi*-EXT⁺**	**Vasey's pondweed-EXT⁺**	*Ranunculus repens***	creeping buttercup**
Potentilla anserina	silverweed	***Ranunculus rhomboideus*-ST⁺**	**prairie buttercup-ST⁺**
*Potentilla argentea***	silvery cinquefoil**	*Ranunculus sceleratus*	cursed crowfoot
Potentilla arguta	prairie cinquefoil	*Ranunculus septentrionalis*	swamp buttercup
*Potentilla norvegica***	rough cinquefoil**	*Ranunculus trichophyllus*	white water crowfoot
*Potentilla recta***	sulfur cinquefoil**	*Raphanus sativus***	radish**
Potentilla simplex	common cinquefoil	*Ratibida pinnata*	yellow coneflower
Prenanthes alba	lion's foot	*Rhamnus cathartica***	common buckthorn**
Prenanthes aspera	rough white lettuce	*Rhamnus frangula***	glossy buckthorn**
Prenanthes crepidinea	great white lettuce	*Rhamnus lanceolata*	lance-leaved buckthorn
Prenanthes racemosa	glaucous white lettuce	*Rhexia virginica*⁺	meadow beauty⁺
*Prionopsis ciliatus***	golden daisy**	*Rhus aromatica*	aromatic sumac
Proserpinaca palustris	mermaid weed	*Rhus copallina*	dwarf sumac
*Prunella vulgaris***	self heal **	*Rhus glabra*	smooth sumac
Prunus americana	American plum	*Rhus typhina*	staghorn sumac
*Prunus augustifolia***	chickasaw plum**	*Rhynchospora capillacea*	thread-leaved beakrush
*Prunus mahaleb***	mahaleb cherry**	*Rhynchospora capitellata*	beakrush
Prunus nigra⁺	Canadian plum⁺	*Ribes americanum*	American black currant
*Prunus persica***	peach**	*Ribes cynosbati*	prickly gooseberry
Prunus serotina	black cherry	*Ribes missouriense*	Missouri gooseberry
Prunus susquehanae	sand cherry	*Ribes odoratum***	buffalo current**
Prunus virginiana	common chokecherry	*Robinia hispida***	bristly locust**
Psoralea onobrychis	French grass	*Robinia pseudoacacia***	black locust**
Psoralea tenuiflora	scurf-pea	*Rorippa islandica* ssp. *hispida*	hairy marsh yellow cress
Ptelea trifoliata	wafer ash	*Rorippa islandica* var. *fernaldiana*	marsh cress
Pteridium aquilinum	bracken fern	*Rorippa sessiliflora*	sessile-flowered yellow cress
*Puccinellia distans***	alkali grass**	*Rorippa sylvestris***	creeping yellow cress**
Pycnanthemum pilosum	hairy mountain mint	*Rosa blanda*	meadow rose
Pycnanthemum tenuifolium	slender mountain mint	*Rosa carolina*	pasture rose
Pycnanthemum virginianum	common mountain mint	*Rosa eglanteria***⁺	sweetbrier***⁺
Pyrola elliptica	large-leaved shinleaf	*Rosa multiflora***	multiflora rose**
*Pyrus communis***	pear**	*Rosa palustris*	swamp rose
Quercus alba	white oak	*Rosa setigera*	prairie rose
Quercus bicolor	swamp white oak	*Rosa suffulta*⁺	sunshine rose⁺
Quercus ellipsoidalis	Hill's oak		
Quercus imbricaria	shingle oak		
Quercus macrocarpa	bur oak		
Quercus palustris⁺	pin oak⁺		

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]
Rosa x *rudiuscula*	rough rose
Rotala ramosior	tooth-cup
Rubus allegheniensis	common blackberry
Rubus argutus	sand blackberry
Rubus flagellaris	dewberry
Rubus hispidus	swamp dewberry
Rubus occidentalis	black raspberry
Rubus ostryifolius	hornbeam-leaved blackberry
Rubus pensylvanicus	common blackberry
***Rubus setosus*-SE**	**bristly blackberry-SE**
Rubus strigosus[+]	red raspberry[+]
Rudbeckia fulgida var. *sullivantii*	Sullivant's orange coneflower
Rudbeckia hirta	black-eyed Susan
Rudbeckia laciniata	goldenglow
Rudbeckia subtomentosa	fragrant coneflower
Rudbeckia triloba	brown-eyed Susan
Ruellia humilis	hairy ruellia
Ruellia humilis var. *longifolia*	wild petunia
Ruellia strepens	smooth ruellia
*Rumex acetosella***	sour dock**
Rumex altissimus	pale dock
*Rumex crispus***	curly dock**
Rumex maritimus	shoreline dock
*Rumex mexicanus***	dock**
*Rumex obtusifolius***	bitter dock**
Rumex orbiculatus	great water dock
Rumex verticillatus	swamp dock
*Sagina procumbens***	pearlwort**
Sagittaria brevirostra	short-beaked arrowhead
Sagittaria calycina[+]	arrowhead[+]
Sagittaria cuneata	arum-leaved arrowhead
Sagittaria graminea	grass-leaved arrowhead
Sagittaria latifolia	common arrowhead
*Salix alba***	white willow**
Salix amygdaloides	peach-leaved willow
Salix discolor	pussy willow
Salix eriocephala	heart-leaved willow
Salix exigua	sandbar willow
Salix humilis	prairie willow
Salix lucida	shining willow
Salix nigra	black willow
Salix petiolaris	meadow willow
*Salix purpurea***	purple willow**
Salix rigida	heart-leaved willow
Salix x *glatfelteri*	hybrid black willow
Salix x *rubens***	hybrid crack willow**
*Salsola kali***	tumbleweed**
*Salvia reflexa***	Rocky Mountain sage**
Sambucus canadensis	elderberry
Sanguinaria canadensis	bloodroot
***Sanguisorba canadensis*-SE**	**American burnet-SE**
*Sanguisorba minor***	garden burnet**
Sanicula canadensis	black snakeroot
Sanicula gregaria	common snakeroot
Sanicula trifoliata[+]	large-fruited black snakeroot[+]
*Saponaria officinalis***	bouncing bet**
*Saponaria vaccaria***	cow herb**
Sassafras albidum	sassafras
Satureja arkansana	low calamint
Saururus cernuus	lizard's tail
Saxifraga pensylvanica	swamp saxifrage
Schizachyrium scoparium	little bluestem
Scirpus acutus	great bulrush
Scirpus americanus	American bulrush
Scirpus atrovirens	dark green rush
Scirpus cyperinus	wool grass
Scirpus fluviatilis	river bulrush
Scirpus micranthus	small bulrush
Scirpus paludosus SE**	**alkali bulrush** SE**
Scirpus pendulus	red bulrush
Scirpus validus	bulrush
Scleria triglomerata	tall nut rush
Scleria verticillata	whorled nut rush
*Sclerochloa dura***	fairground grass**
Scrophularia lanceolata	early figwort
Scrophularia marilandica	late figwort
Scutellaria epilobiifolia	marsh skullcap
Scutellaria galericulata	marsh skullcap
Scutellaria lateriflora	blue skullcap
Scutellaria leonardii	small skullcap
Scutellaria ovata	heart-leaved skullcap
Scutellaria parvula	small skullcap
*Secale cereale***	rye**
*Sedum acre***	mossy stonecrop**
*Sedum purpureum***	live-forever**
*Sedum sarmentosum***	yellow stonecrop**
*Sedum spurium***	false wild stonecrop**
Sedum ternatum	three-leaved stonecrop
Selaginella eclipes	Great Lakes spikemoss
Senecio aureus[+]	golden ragwort[+]
*Senecio glabellus***	butterweed**
Senecio pauperculus	balsam groundsel
Senecio plattensis	prairie groundsel
*Senecio vulgaris***	common groundsel**
*Setaria faberi***	giant foxtail**
*Setaria geniculata***	perennial foxtail**
*Setaria glauca***	yellow foxtail**
*Setaria verticillata***	bristly foxtail**

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]	Scientific Name[1,2,3]	Common Name[1,2,3]
*Setaria viridis***	common foxtail**	*Sonchus arvensis* var. *glabrescens***	smooth sow thistle**
Sicyos angulatus	bur cucumber	*Sonchus asper***	spiny sow thistle**
*Sida spinosa***	sida**	*Sonchus oleraceus***	sow thistle**
Silene antirrhina	sleepy catchfly	*Sorbus aucuparia***	mountain ash**
*Silene armeria***	sweet William**	*Sorghastrum nutans*	Indiangrass
*Silene cserei***	Caesar's campion**	*Sorghum bicolor***	sorghum**
*Silene cucubalus***	bladder catchfly**	*Sorghum halepense***	Johnsongrass**
Silene nivea+	showy campion+	*Sparganium eurycarpum*	common burreed
*Silene noctiflora***	night flowering catchfly**	*Spartina pectinata*	prairie cord grass
Silene stellata	starry catchfly	*Spergularia marina***	lesser salt spurrey**
Silene virginica+	firepink+	*Spermolepis inermis***	scaleseed**
Silphium integrifolium	rosinweed	*Sphenopholis obtusata*	prairie wedge grass
Silphium laciniatum	compass plant	*Spiraea alba*	meadowsweet
Silphium perfoliatum	cup plant	*Spiraea tomentosa*	hardhack
Silphium terebinthinaceum	prairie dock	*Spiranthes cernua*	nodding ladies' tresses
*Sisymbrium altissimum***	tumble mustard**	*Spiranthes lacera*+	slender ladies' tresses+
*Sisymbrium officinale***	hedge mustard**	*Spiranthes magnicamporum*	Dune ladies' tresses
Sisyrinchium albidum	blue-eyed grass	*Spirodela polyrhiza*	giant duckweed
Sisyrinchium angustifolium	common blue-eyed grass	*Sporobolus asper*	rough dropseed
Sisyrinchium campestre+	prairie blue-eyed grass+	*Sporobolus clandestinus*	rough rushgrass
Sium suave	water parsnip	*Sporobolus cryptandrus*	sand dropseed
Smilacina racemosa	false Solomon's seal	*Sporobolus heterolepis*	northern prairie dropseed
Smilacina stellata	small false Solomon's seal	*Sporobolus neglectus*	puffsheath dropseed
Smilax ecirrhata	upright carrion flower	*Sporobolus vaginiflorus*	sheathing dropseed
Smilax hispida	bristly greenbrier	*Stachys aspera*+	rough hedge nettle+
Smilax illinoensis	Illinois carrion flower	*Stachys hispida*	rough hedge nettle
Smilax lasioneuron	common carrion flower	*Stachys palustris*	bristly hedge nettle
*Solanum carolinense***	horse-nettle**	*Stachys tenuifolia*	smooth hedge nettle
*Solanum cornutum***	buffalo bur**	*Staphylea trifolia*	bladdernut
*Solanum dimidiatum***	western horse-nettle**	*Stellaria graminea***	common stitchwort**
*Solanum dulcamara***	bittersweet nightshade**	*Stellaria longifolia*+	chickweed+
Solanum ptycanthum	black nightshade	*Stellaria media***	common chickweed**
*Solanum triflorum***+	three-flowered nightshade**+	*Stellaria pallida***	pale chickweed**
Solidago caesia	bluestem goldenrod	***Stellaria pubera*-SE**+	**great chickweed-SE**+
Solidago canadensis	Canada goldenrod	*Stipa spartea*	porcupine grass
Solidago flexicaulis	broadleaf goldenrod	*Strophostyles helvola*	wild bean
Solidago gigantea	late golden rod	*Strophostyles leiosperma*	wild bean
Solidago juncea	early goldenrod	*Suaeda depressa***	sea blite**
Solidago missouriensis	Missouri goldenrod	*Symphoricarpos orbiculatus***	buckbrush**
Solidago nemoralis	field goldenrod	*Symplocarpus foetidus*	skunk cabbage
Solidago ohioensis	Ohio goldenrod	*Syringa vulgaris***	lilac**
Solidago patula	rough-leaf goldenrod	*Taenidia integerrima*	yellow pimpernel
Solidago ptarmicoides	few-flowered goldenrod	*Tanacetum vulgare***	tansy**
Solidago riddellii	Riddell's goldenrod	*Taraxacum laevigatum***	red-seeded dandelion**
Solidago rigida	common prairie goldenrod	*Taraxacum officinale***	dandelion**
*Solidago sempervirens***	seaside goldenrod**	*Tephrosia virginiana*	goat's rue
Solidago speciosa	showy goldenrod	*Teucrium canadense*	wood sage
Solidago uliginosa	bog goldenrod	*Thalictrum dasycarpum*	purple meadow rue
Solidago ulmifolia	elm-leaved goldenrod	*Thalictrum dioicum*	early meadow rue

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]
Thalictrum revolutum	waxy meadow rue
Thalictrum thalictroides	rue anenome
Thaspium barbinode[+]	celery-leaved meadow parsnip[+]
Thaspium trifoliatum	meadow parsnip
Thaspium trifoliatum var. *flavum*	yellow meadow parsnip
Thelypteris palustris	marsh fern
*Thlaspi arvense***	field penny cress**
***Thuja occidentalis*-ST**[+]	**arbor vitae-ST**[+]
*Thymelaea passerina***	sparrow weed**
Tilia americana	basswood
***Tofieldia glutinosa*-ST**[+]	**false asphodel-ST**[+]
***Tomanthera auriculata*-ST**	**ear-leafed foxglove-ST**
*Torilis arvensis***	field hedge parsley**
*Torilis japonica***	hedge parsley**
Toxicodendron radicans	poison ivy
Tradescantia ohiensis	Ohio spiderwort
*Tragopogon dubius***	goat's beard**
*Tragopogon porrifolius***	salsify**
*Tragopogon pratensis***	common goat's beard**
Triadenum fraseri	Fraser's St.-John's-wort
Triadenum virginicum[+]	marsh St. John's-wort[+]
*Tribulus terrestris***	puncture vine**
Trichostema brachiatum	false pennyroyal
*Tridens flavus***	purpletop**
*Trifolium campestre***	low hop clover**
*Trifolium hybridum***	Alsike clover**
*Trifolium pratense***	red clover**
***Trifolium reflexum*-SE**	**buffalo clover-SE**
*Trifolium repens***	white clover**
Trillium flexipes[+]	Gleason's trillium[+]
Trillium grandiflorum	white trillium
Trillium nivale	snow trillium
Trillium recurvatum	prairie trillium
Trillium sessile	sessile trillium
*Triodanis leptocarpa***	western Venus' looking-glass**
Triodanis perfoliata	Venus' looking-glass
Triosteum aurantiacum	early horse gentian
Triosteum illinoensis	Illinois horse gentian
Triosteum perfoliatum	horse gentian
Triplasis purpurea	purple sandgrass
*Triticum aestivum***	wheat**
*Triticum cylindricum***	jointed goat grass**
*Typha augustifolia***	narrow-leaved cat-tail**
Typha domingensis	West Indian cat-tail
Typha latifolia	common cat-tail
Typha x *glauca*	hybrid cat-tail
Ulmus americana	American elm
*Ulmus pumila***	Siberian elm**
Ulmus rubra	slippery elm
***Ulmus thomasii*-SE**	**rock elm-SE**
Ulmus x *notha***	hybrid elm**
Urtica dioica	common nettle
Utricularia vulgaris	common bladderwort
Uvularia grandiflora	yellow bellwort
Vaccinium augustifolium	low-bush blueberry
Valeriana edulis	common valerian
***Valerianella chenopodiifolia*-SE**	**corn salad-SE**
Valerianella intermedia[+]	corn salad[+]
Vallisneria americana	eelgrass
*Verbascum blattaria***	moth mullein**
*Verbascum thapsus***	woolly mullein**
Verbena bracteata	creeping vervain
Verbena hastata	blue vervain
Verbena simplex	narrow-leaved vervain
Verbena stricta	hoary vervain
Verbena urticifolia	white vervain
Verbena x *deamii*	Deam's vervain
Verbesina alternifolia	yellow ironweed
Vernonia fasciculata	common ironweed
Vernonia gigantea	tall ironweed
Vernonia missurica	Missouri ironweed
*Veronica arvensis***	corn speedwell**
Veronica comosa	water speedwell
*Veronica officinalis***	common speedwell**
Veronica peregrina	purslane speedwell
*Veronica polita***	lawn speedwell**
*Veronica serpyllifolia***	thyme-leaved speedwell**
Veronicastrum virginicum	culver's root
Viburnum acerifolium	maple-leaved arrowwood
Viburnum lentago	nannyberry
*Viburnum opulus***	European highbush cranberry**
Viburnum prunifolium	black haw
Viburnum rafinesquianum	downy arrowwood
Viburnum recognitum	smooth arrowwood
Viburnum trilobum[+]	highbush cranberry[+]
Vicia americana	American vetch
Vicia caroliniana[+]	wood vetch[+]
*Vicia villosa***	winter vetch**
*Vinca minor***	common periwinkle**
Viola cucullata[+]	hooded violet[+]
Viola fimbriatula	sand violet
Viola lanceolata	lance-leaved violet
Viola missouriensis	Missouri violet
Viola nephrophylla[+]	kidney-leaf violet[+]
Viola pedata	birdfoot violet

Appendix 2. Continued.

Scientific Name[1,2,3]	Common Name[1,2,3]	Scientific Name[1,2,3]	Common Name[1,2,3]
Viola pedatifida	prairie violet	*Wolffia columbiana*+	water meal+
Viola pratincola	common blue violet	*Woodsia obtusa*+	common woodsia+
Viola pubescens	yellow violet	*Xanthium strumarium*	common cocklebur
*Viola rafinesquii***	Rafinesque's violet**	*Xyris torta*	twisted-leaf yellow-eyed grass
Viola sagittata	arrow-leaved violet		
Viola sororia	downy-blue violet	*Yucca flaccida***	Adam's needle**
Viola striata	cream violet	*Zanthoxylum americanum*	prickly ash
*Viola tricolor***	Johnny-jump-up**	*Zea mays***	corn**
Viola triloba	cleft violet	*Zizania aquatica*+	wild rice+
Vitis riparia	riverbank grape	*Zizia aptera*	prairie parsnip
Vitis vulpina+	frost grape+	*Zizia aurea*	golden Alexanders
Vulpia octoflora	six-weeks fescue	*Zosterella dubia*	water star grass

[1] Bold type indicates an Illinois endangered (SE), Illinois threatened (ST), and/or federally threatened (FT) species; EXT indicates the species is extripated from the State of Illinois.

[2] ** = non-native species, may be native in other areas of Illinois.

[3] + = historical record only