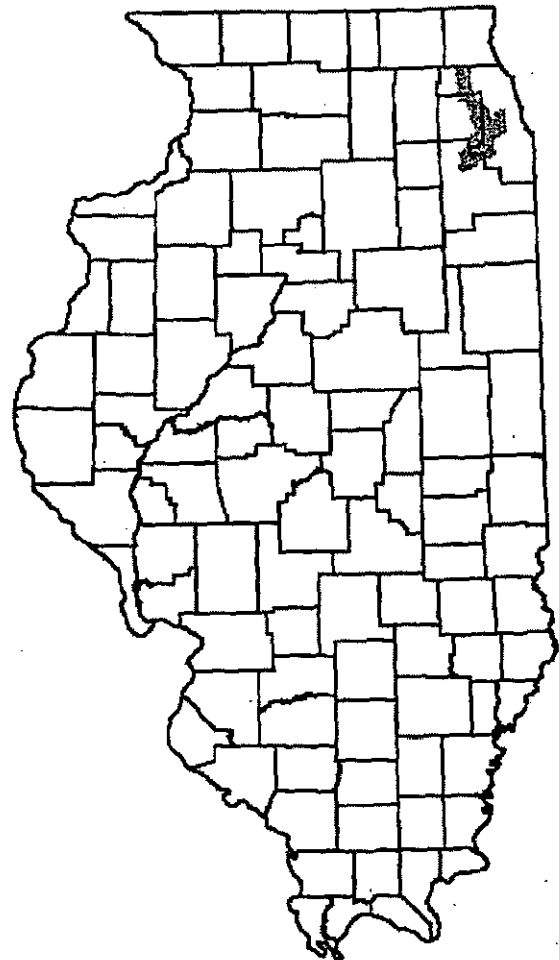




Volume 3

Living Resources

LOWER DES PLAINES RIVER AREA ASSESSMENT



LOWER DES PLAINES RIVER AREA ASSESSMENT

VOLUME 3: LIVING RESOURCES

Illinois Department of Natural Resources
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Lower Des Plaines River Area Assessment

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About This Report

The *Lower Des Plaines River Area Assessment* examines 357 square miles in northeast 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

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.

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 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.

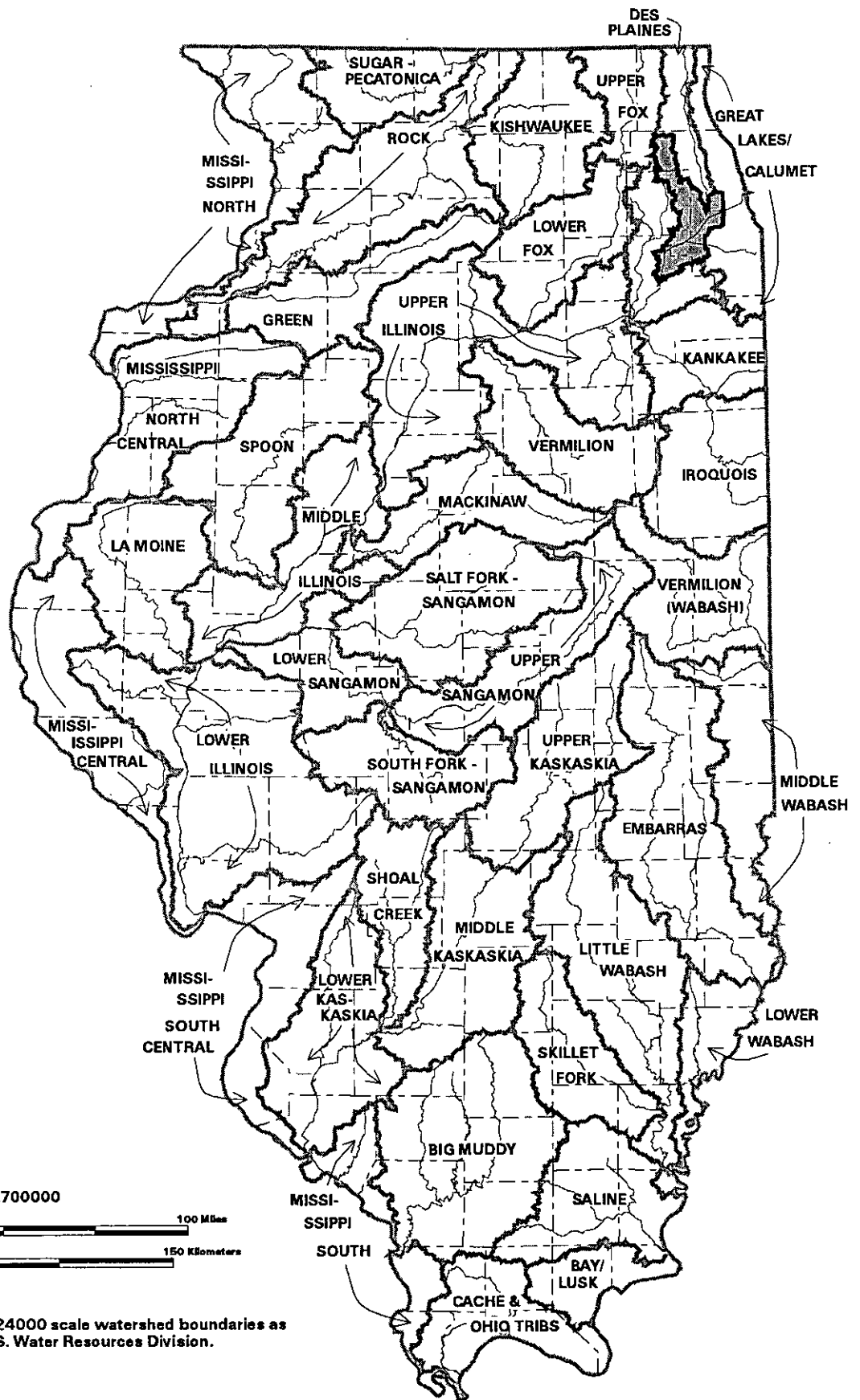
From the three initiatives was born Conservation 2000, a program to begin reversing ecosystem degradation, primarily through the Ecosystems Program, a cooperative process of public-private partnerships that are intended to merge natural resource stewardship with economic and recreational development. 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 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 Lower Des Plaines River Assessment Area

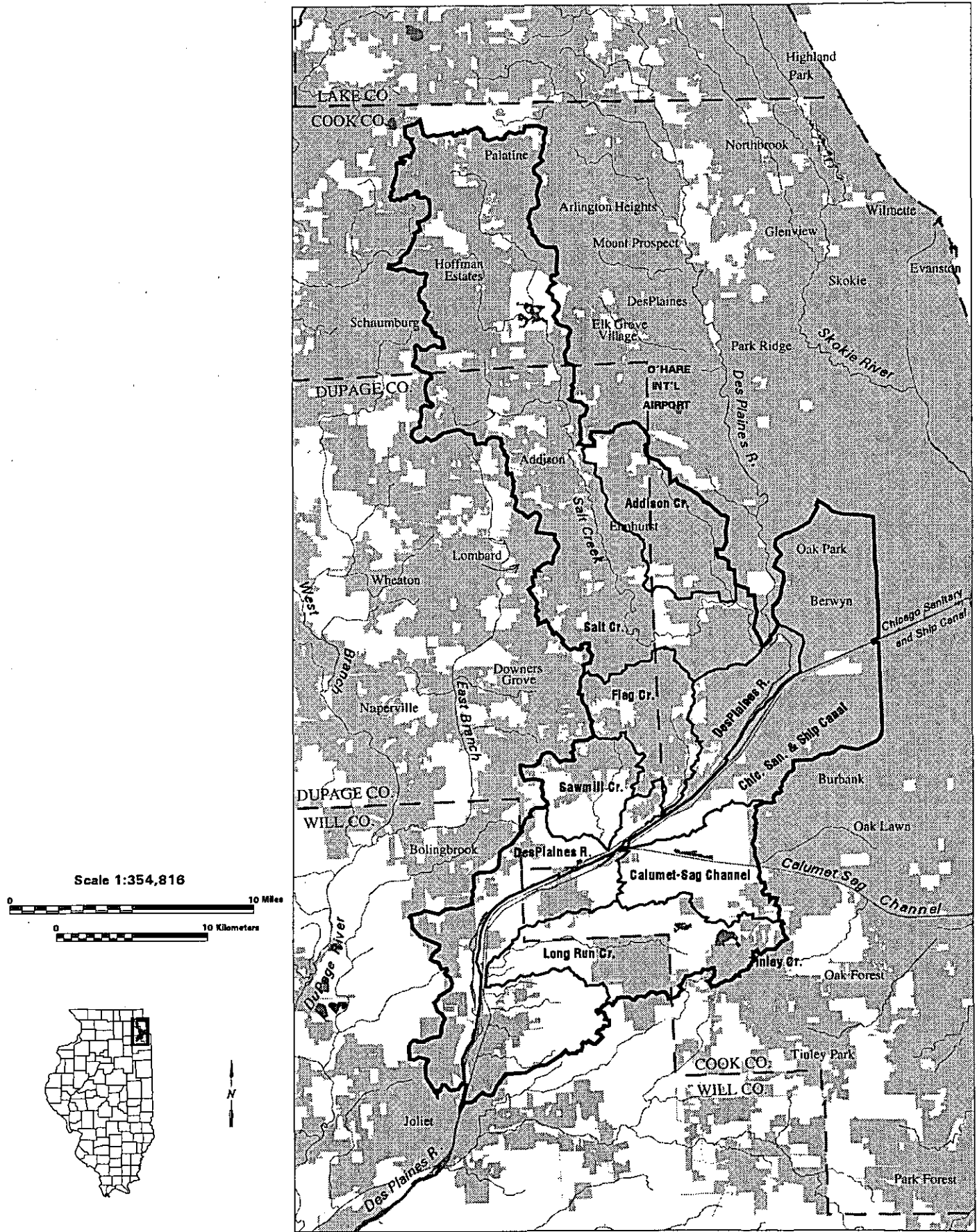
The Lower Des Plaines River Assessment Area encompasses approximately 357.5 miles² (228,807 acres) in northeast Illinois. It extends from north central Cook County down through eastern Du Page County and western Cook County into northern Will County. Major waterways include the lower Des Plaines River, Salt Creek, the Chicago Sanitary and Ship Canal, and the Calumet-Sag Channel. Much of the watershed is part of the Greater Chicago Metropolitan Region and has been extensively developed for urban and industrial use. The assessment area encompasses eight subbasins, of which two have been designated a "Resource Rich Area" because they contain significant natural community diversity. The Lower Des Plaines River 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, infrastructure, and economy of the area; 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.



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 Lower Des Plaines River Assessment Area



Subbasins in the Lower Des Plaines River Assessment Area. Subbasin boundaries depicted are those determined by the Illinois Environmental Protection Agency.

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Introduction

Physiographic Characteristics and Natural Divisions

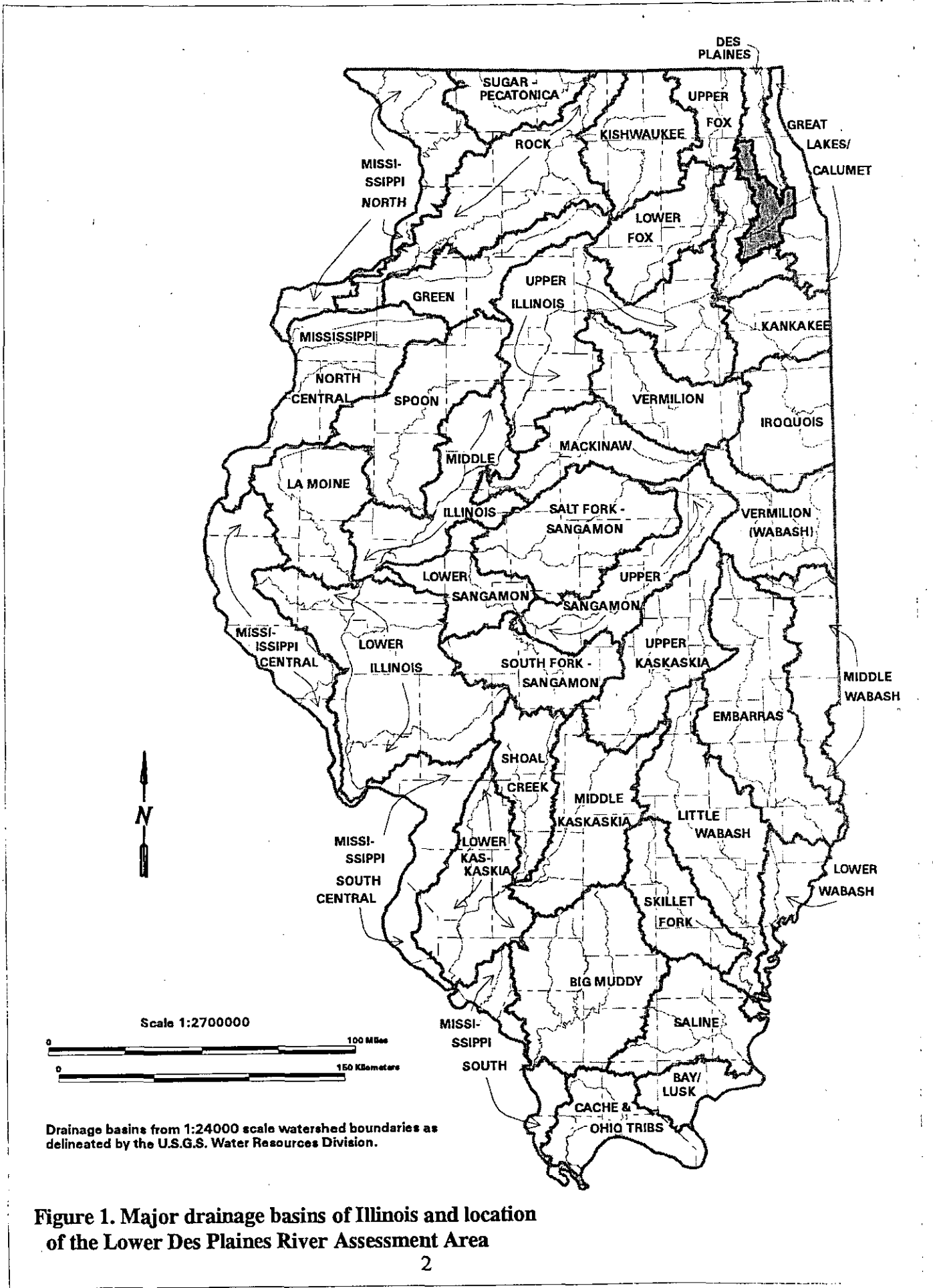
The Lower Des Plaines River Assessment Area (LDPRAA) is an approximately 357.5 square-mile (228,807 acre) area that includes portions of three Illinois counties. The LDPRAA extends from north-central Cook County down through eastern DuPage County and western Cook County into northern Will County (Figure 1). The Assessment Area includes the lower portion of the Des Plaines basin from the Chicago Sanitary and Ship Canal in Cook County to Joliet in Will County. This watershed, covering 0.64% of the total land area of Illinois, is divided into numerous subbasins the largest being Salt Creek which forms the northern reach of the Assessment Area (Figure 2).

Portions of two Natural Divisions (Schwegman et al. 1973) occur within the LDPRAA (Table 1, Figure 3) - the Northeastern Morainal Division and the Grand Prairie Division. Most of the LDPRAA (179,826 acres [78.59%]) lies within the Morainal Section of the Northeastern Morainal Division. The Morainal Section of the Northeastern Morainal Division represents the region of the most recent glaciation in Illinois and encompasses the moraines and morainic systems of the late advances of the Woodfordian Substage of Wisconsinan glaciation. The terrain is characterized as rough, with hilly to rolling uplands, ravines, and glacial lakes. The Chicago Lake Plain Section of the Northeastern Morainal Division occupies 48,628 acres (21.26%) of the east-central portion of the Assessment Area. The Chicago Lake Plain Section of the Northeastern Morainal Division is a flat, poorly drained area of lake-bed sediments deposited by glacial Lake Chicago. The original vegetation was mostly prairie and marsh. The Grand Prairie Section of the Grand Prairie Division occupies a small portion (353 acres [0.15%]) of the Assessment Area in the extreme southwest corner. The Grand Prairie Division is a vast level to gently rolling area formerly dominated by tallgrass prairie with occurrences of dolomite prairie, gravel prairie, sedge meadow, marsh, and in northeast Illinois, local areas of exposed dolomite bedrock.

Table 1. Natural divisions occurring in the Lower Des Plaines River Assessment Area.

Division & Section	Acres ¹	% of LDPRAA
Northeastern Morainal/Morainal Section	179,826.29	78.59
Northeastern Morainal/Chicago Lake Plain Section	48,628.28	21.26
Grand Prairie/Grand Prairie Section	352.50	0.15
Total:	228,807.07	100.00

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



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

Figure 1. Major drainage basins of Illinois and location of the Lower Des Plaines River Assessment Area

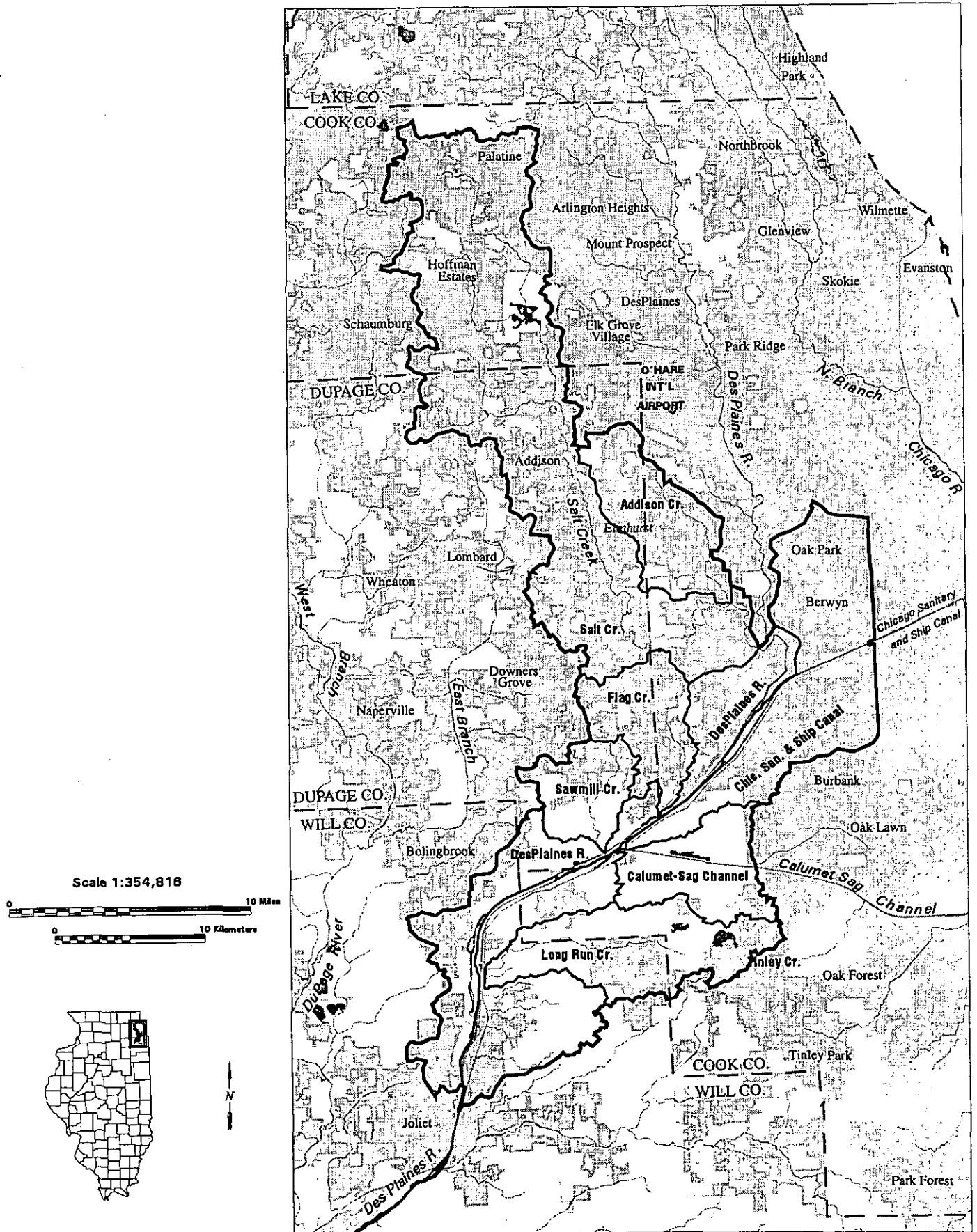


Figure 2. Subbasins in the Lower Des Plaines River Assessment Area. Subbasin boundaries depicted are those determined by the Illinois Environmental Protection Agency.

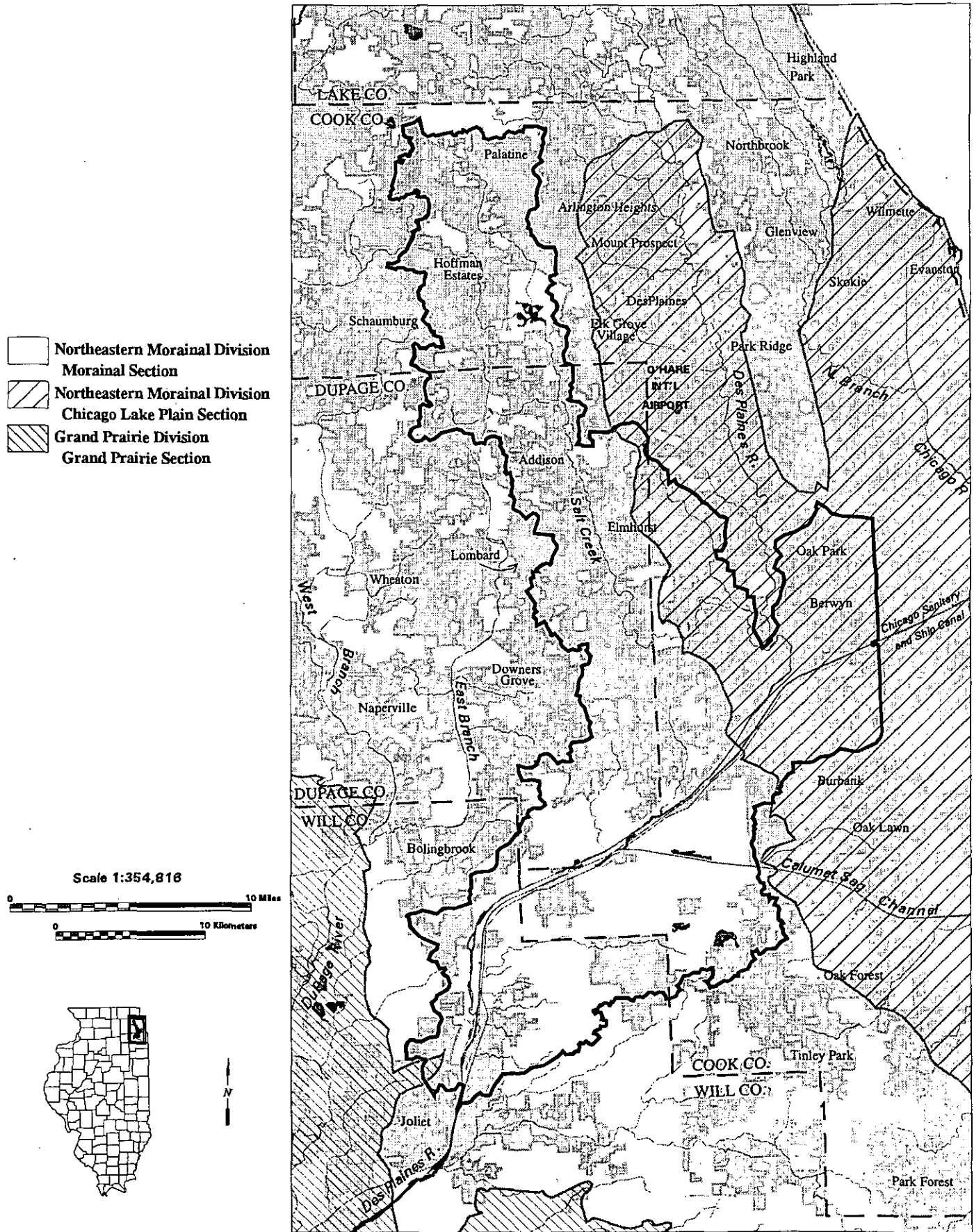


Figure 3. Natural Divisions in the Lower Des Plaines River Assessment Area based on the classification developed by Schwegman et al. (1973).

One of the significant physiographic features of the LDPRAA is the lower section of the Des Plaines River between the towns of Willow Springs and Joliet. This 20 mile valley segment was carved by glacial meltwaters that broke through the Valparaiso Moraine system draining glacial Lake Chicago. This portion of the valley is characterized by abrupt bluffs exposing the dolomite bedrock. Exposure of the dolomite bedrock, gravel ridges, and high water tables set up unique environments favoring particularly adapted plant communities (Hanson 1977).

The surface geology of the LDPRAA is primarily characterized by deep Woodfordian-aged glacial drift in the western portion with glacial lake plain deposits in the eastern most portion (Willman and Lineback 1970). The Woodfordian substage of the Wisconsinan glaciation was the last Pleistocene glacial event to occur in the area. The Woodfordian glacial drift was deposited between 20,000 and 12,000 years before present, and it consists of gently rolling end moraines and relatively level ground moraines. The glacial drift deposits generally vary from calcareous, gravelly, silty, yellow-gray tills to clayey gray tills (Willman et al. 1975). Thickness of glacial drift in the LDPRAA ranges between 50-200 feet (Willman et al. 1975). The drift deposits are capped by a thin (approximately 1-3 feet) layer of loess (Fehrenbacher et al. 1984, Willman and Frye 1970). The loess is derived partially from Wisconsinan-age lake deposits. Deposits of glacial outwash occur irregularly in the Assessment Area. Outwash found mostly in valleys consists of well sorted sand, pebbly sand, and gravel. It was deposited as outwash valley trains leading outward from Wisconsinan glacier fronts. Other outwash deposits found consist of ice-contact sand and gravel largely in kames, eskers, and deltas. In the eastern Lake Plain portion of the Assessment Area, the glacial drift is overlain by thin deposits of silt, clay, and sand deposited by calm glacial lake waters and flattened by wave erosion. In a portion of the Des Plaines River valley there is no overlying drift and the dolomite bedrock is exposed. The lower Des Plaines valley was a glacial sluiceway that drained glacial Lake Michigan. The bedrock of the LDPRAA is primarily Silurian-aged dolomite. It is exposed locally along the bluffs of the lower Des Plaines River valley and the adjacent lower DuPage River valley.

Soils in the LDPRAA developed in the loess, glacial till, outwash, and lake deposits mentioned previously. Soil type and depth vary depending on parent material, slope, drainage class, and time since deposition, but most of the soils occur within two major soil orders (Fehrenbacher et al. 1984). Mollisols are deep, dark-colored (organically rich), soils formed mainly under grassland vegetation and Alfisols are light colored, predominately forest soils with lesser amounts of organic matter. Entisols, a third order with a small distribution in the area, are light colored, recently deposited alluvial soils that have not had sufficient time to develop recognizable horizons. These may be found along rivers and streams. Most Entisols in the LDPRAA developed in sand. A large portion of the Assessment Area is underlain by the Morley-Blount-Beecher soil association. These Alfisols (with some areas of darker soils) developed in 0 - 20 inches of loess over silty clay loam glacial till, and correspond to the Woodfordian Moraines in the Morainal Section of the Northeastern Morainal Division. Along the Des Plaines River is a band of silty or loamy soil formed in thin to thick loess over limestone known as the Channahon-

Dodgeville-Ashdale soil association, a mollisol generally bordering the Morley-Blount-Beecher association. This mollisol association supports several significant plants and natural communities that are uncommon in Illinois including dolomite and gravel prairies. The Varna-Elliott-Ashkum soil association is a mollisol formed in thin layers of loess (<20-40 inches) over glacial till, and the soils vary from a silty clay-loam to a loam or sandy loam. It occurs mostly in the northern and western portions of the area. The Martinton-Milford soil association was formed in old glacial lake beds. The lacustrine sediments these soils are formed in are of silt loam, silty clay loam, silty clay, or clay texture, and they are dark colored. Locally scattered in the assessment is the Houghton-Palms-Muskego soil association which is a Histosol or organic soil. This soil group includes peats and mucks normally formed from the remains of partially decomposed plants in wetlands. The peats and mucks support several other significant plants and natural communities which are also uncommon in Illinois including bogs and fens. These organic soils are mostly restricted to the northeastern corner of Illinois.

Climate Patterns¹

The climate in the Lower Des Plaines River Assessment Area is typical of many continental locations, in that there are rather wide temperature fluctuations. The average high temperature (°F) in the summer is 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 a low of -26° F to a high of 109°F. There is an average of just over 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

Vegetation History

The pre-European settlement 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 States 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 from around 1820, prairie cover was about 83% of the LDPRAA (190,716 acres) and forest cover was about 16% (37,788 acres) of the LDPRAA (GIS database; Figure 4). A small proportion of the surface area (0.19%) was open water (around 439 acres). These figures do not adequately account for presettlement wetland and savanna acres which are

¹ Information in this section has been taken from the Lower Des Plaines River Area Assessment, Volume 2 (Illinois Department of Natural Resources 2000). See that volume for a more detailed discussion of climate patterns and long term trends.

discussed below. Hanson (1981) describes the presettlement vegetation of the Chicago Lake Plain (the eastern portion of the LDPRAA) as mostly prairie with small areas of oak savanna, wet forest, and marsh. The prairies and forests can generally be correlated with the Natural Divisions and soil types as discussed above, though, clearly, prairies were dominant in the two natural divisions represented in the Assessment Area based upon these figures. Forests generally occupied the east and north sides of streams, rivers, and wetlands as these areas were protected from fires fanned by winds from the west (Moran 1980).

The total area of savanna and/or open woodlands at that time is unclear. Savannas may have been considered to be either prairies or woodlands in early land cover figures due to the long distances recorded between trees by early surveyors in savanna/prairie areas (Moran 1980). The LDPRAA is within the general area of the transition zone between prairie and forest (Kilburn 1959, Anderson 1983, Anderson and Bowles 1999), and this region supported savanna (Nuzzo 1986). Some savanna-like areas probably were also present on thin soil over bedrock. There appears to have been only small areas of savanna in the Chicago Lake plain portion of the Assessment Area (Hanson 1981), but savannas were probably the dominant woodland type in other areas of the LDPRAA (Moran 1980). However, savannas typically were unstable and their total area and distribution varied on the pre-European settlement landscape depending on several factors including local conditions of climate and fire frequency and intensity (Taft 1997a). 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; Moran 1980; Axelrod 1985; Taft et al. 1995).

It is not possible to determine with accuracy the total amount of wetlands prior European settlement in the LDPRAA. The best estimate for the LDPRAA comes from county-wide acreage data for hydric (wetland) soils for the counties occurring in the Assessment Area (Havera et al. 1994). According to the available data, presettlement wetland cover ranged from 15% to 39% in the three counties that make up portions of the LDPRAA. Presettlement wetland cover is estimated to be about 21% (47,979 acres) of the LDPRAA based proportionately on the counties in the Assessment Area and their presettlement wetland coverage. Predominant wetland community types (following classification in White and Madany 1978) probably included wet prairie, marsh, floodplain forest, bog, fen, sedge meadow, seep, pond, and shrub swamp.

Current Land Cover

The following characterization of the land cover of the LDPRAA is based on information from the Land Cover of Illinois database (Illinois Geographic Information System), which was derived from Landsat Thematic satellite imagery acquired between 1991 and 1995. The Illinois Wetlands Inventory (IWI) provides more detailed information about the wetlands in the area. IWI data for the Lower Des Plaines River area was derived from high-altitude photography taken in 1980 and 1981. IWI data is the most recent comprehensive wetlands data available for the state.

The landscape of the LDPRAA is presently dominated by urban land uses (Table 2 and Figure 4), comprising about 66.1% of the Assessment Area. Most of the LDPRAA lies within the metropolitan Chicago area, and the eastern portion of the LDPRAA is actually in the city of Chicago. Nearly the entire northern portion of the LDPRAA (Salt Creek subbasin) is urban or built-up land.

Table 2. Current Land Cover for the Lower Des Plaines River Assessment Area¹.

Land Cover	Acres	Percent
Urban/Built-up	151,191	66.1
Upland forest	41,820	18.3
Cropland	11,562	5.1
Grassland	9,893	4.3
Nonforested wetlands	7,641	3.3
Water	4,083	1.8
Bottomland forest	2,610	1.1
Total:	228,803	100.0

¹ From the Land Cover of Illinois database (Illinois Geographic Information Service).

The next most abundant cover type is forest (Figure 5) comprising about 19.4% (44,430 acres) of the area. About 94% of remaining forest habitat is upland forest and the remainder is bottomland forest (Table 2). Forest is concentrated along the Des Plaines River, the lower Salt Creek, and near the confluence of the Des Plaines River and Calumet Sag Channel in Cook County where there are large public land holdings owned by the Forest Preserve District of Cook County. Eleven separate sites totaling about 362 acres (0.81% of remaining forest and 0.95% of estimated original forest cover) contain forest natural communities that are in a nearly undegraded condition and are considered high-quality natural areas. Many of these sites contain more than one forest community type. Forest natural areas include dry-mesic forest, mesic upland forest, mesic floodplain forest, wet-mesic floodplain forest, and northern flatwoods.

Compared with presettlement estimates, wetlands have declined dramatically in the LDPRAA. Based on the Land Cover of Illinois Database (Illinois Geographic Information System) and the Illinois Wetlands Inventory (IWI), a current estimate of wetland for the LDPRAA (bottomland forest and non-forested wetland such as marshes, wet meadows, and open water wetlands) is about 10,633 acres, or 4.6% of the LDPRAA (Figure 6, Table 3). Based on IWI data, wetlands occupy about 3.5% of the land cover for the state of Illinois (Suloway and Hubbell 1994). About 131 acres of wetlands at 14 sites in the Assessment Area (about 0.27% of estimated original wetland acreage and 1.2% of remaining wetland) are high quality and relatively undegraded. Wetlands are concentrated along the Des Plaines River, in eastern DuPage County, and scattered throughout other portions of the LDPRAA (Figure 6). Open water accounts for 1.8% of the Assessment Area (Figure 7).

Croplands account for 5.1% of the Assessment Area. The cropland is concentrated in the southern portion of the LDPRAA in Will County (Figure 8, Table 2). Grasslands make up

about 4.3% of the Assessment Area (Figure 9, Table 2). Grasslands are concentrated in the southern portion of the LDPRAA in northern Will County and southwestern Cook County. Although there are around 9,893 acres of grassland in the region, a total of only about 78 acres of high-quality (undegraded) prairie remains in the LDPRAA among 7 separate sites (approximately 0.04% of the LDPRAA).

Wetlands occupy 4.6% of the LDPRAA area compared to 3.5% of the total area of the state (Suloway and Hubbell 1994). In the LDPRAA, wetlands occupy about 10,633 acres (Table 3). Approximately 37% of the wetland acreage is shallow marsh/wet meadow wetlands (compared to 13.1% of the state's wetlands). Nearly 21% of the wetland area is bottomland forest, compared to the statewide percentage of 60.5%. Open water wetlands account for 22.5% of the wetland acreage in the Assessment Area (compared to 11.4% for the state) followed by deep marsh (12.2%), shrub-scrub (4.1%), shallow lake (3.7%), riverine (0.1%), and swamp (0.1%).

The mean size of contiguous forested wetlands is 7.7 acres (range <0.1 to 84 acres); there are 272 separate forested wetlands in the LDPRAA. Emergent wetlands range in size from less than 0.1 acre to 346 acres, with a mean size of 5.1 acres. There are 1,003 separate emergent wetlands in the LDPRAA.

Table 3. Wetlands habitat of the Lower Des Plaines River Assessment Area¹.

Category	Acreage	% of Wetland Area	% of Assessment Area
Palustrine Wetlands			
Shrub-Scrub Wetlands	436.70	4.1	0.2
Forested Wetlands			
Bottomland Forest	2,204.16	20.7	1.0
Swamp	12.72	0.1	0.0
Emergent Wetlands			
Shallow Marsh/Wet Meadow	3,898.00	36.7	1.7
Deep Marsh	1,294.69	12.2	0.6
Open Water Wetlands	2,387.36	22.5	1.0
Subtotal Palustrine	10,233.63	96.2	4.5
Lacustrine Wetlands			
Shallow Lake	394.29	3.7	0.2
Lake Shore	0.00	0.0	0.0
Emergent Lake	0.00	0.0	0.0
Subtotal Lacustrine	394.29	3.7	0.2
Riverine Wetlands			
Perennial Riverine	2.59	0.0	0.0
Intermittent Riverine	2.76	0.0	0.0
Subtotal Riverine	5.35	0.1	0.0
Total Wetlands	10,633.27	100.0	4.6

¹ Adapted from Suloway and Hubbell (1994).

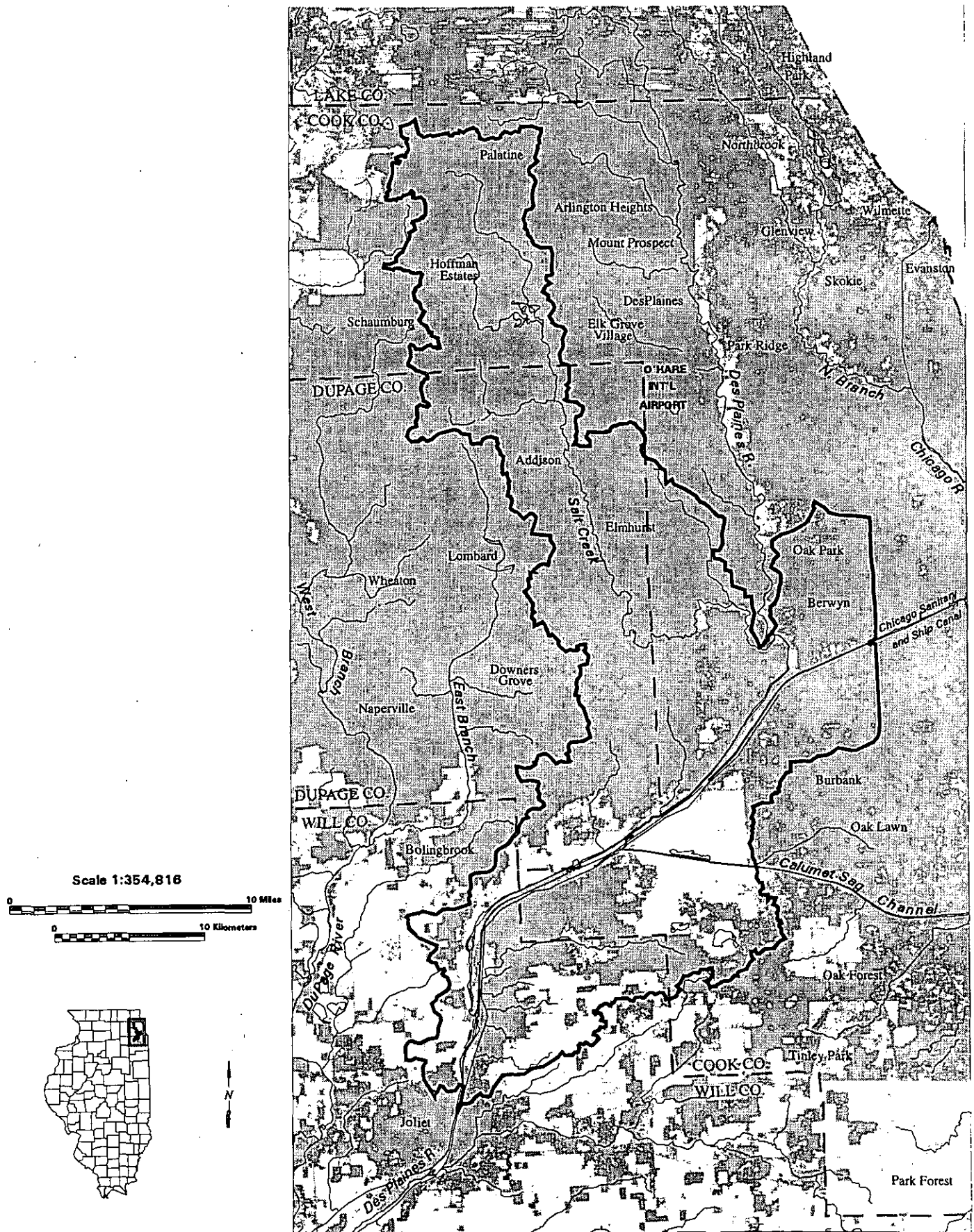


Figure 4. Urban land in the Lower Des Plaines River Assessment Area. Urban land depicted on this map includes urban/built-up land and urban grassland from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

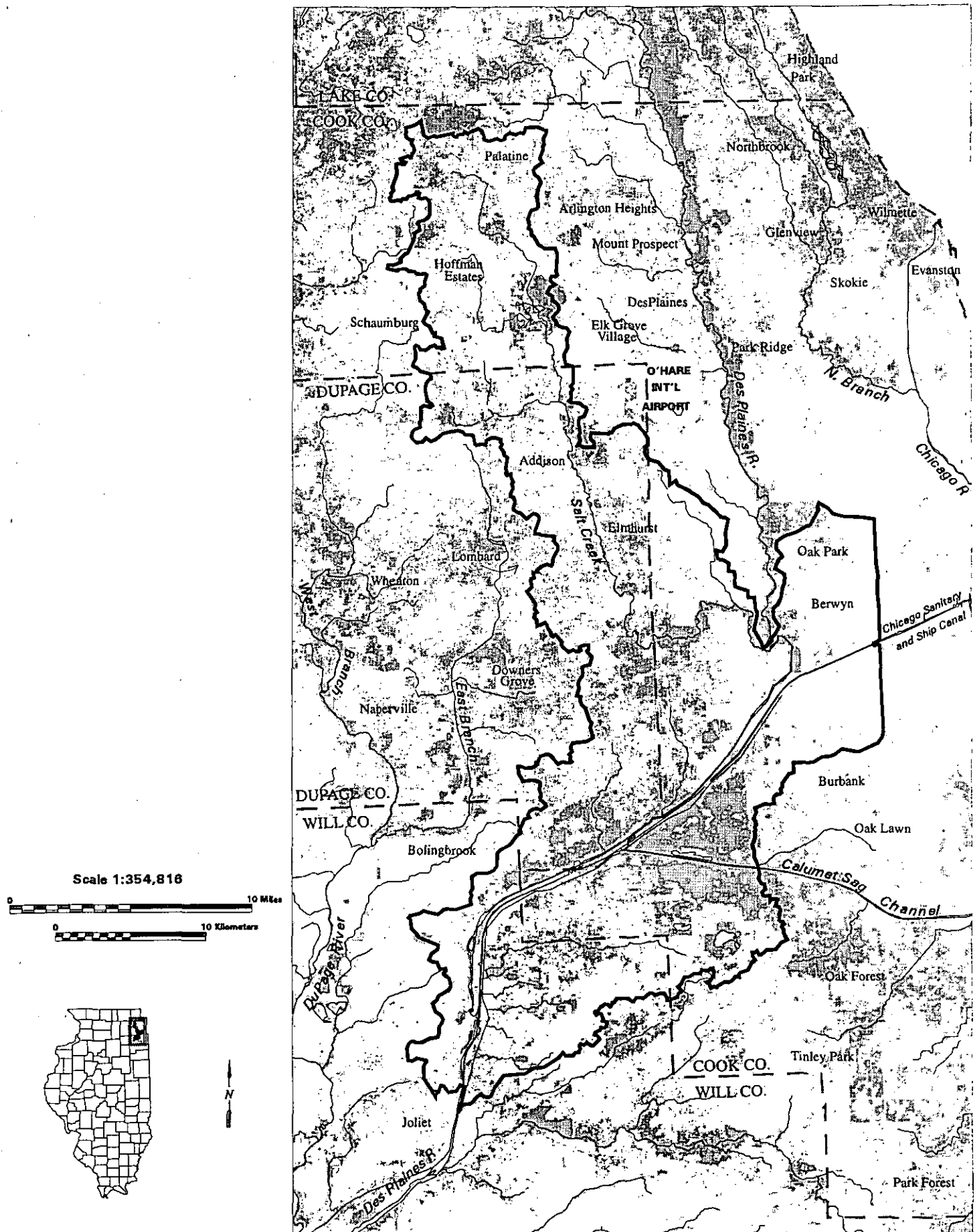


Figure 5. Forest in the Lower Des Plaines River Assessment Area. Forest depicted on this map includes upland and bottomland forest from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

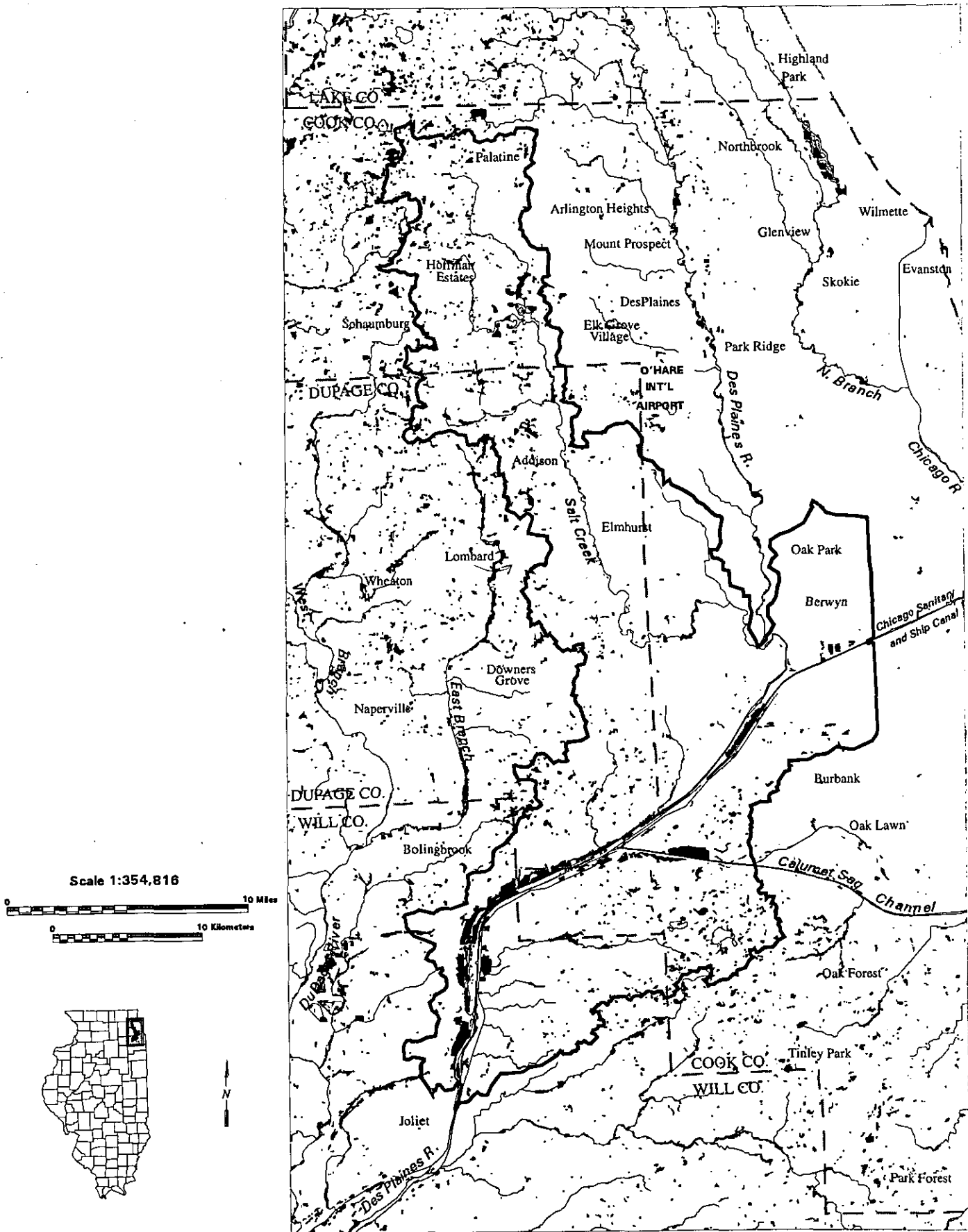


Figure 6. Wetlands in the Lower Des Plaines River Assessment Area. Wetlands depicted on this map include nonforested wetlands and bottomland forest from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

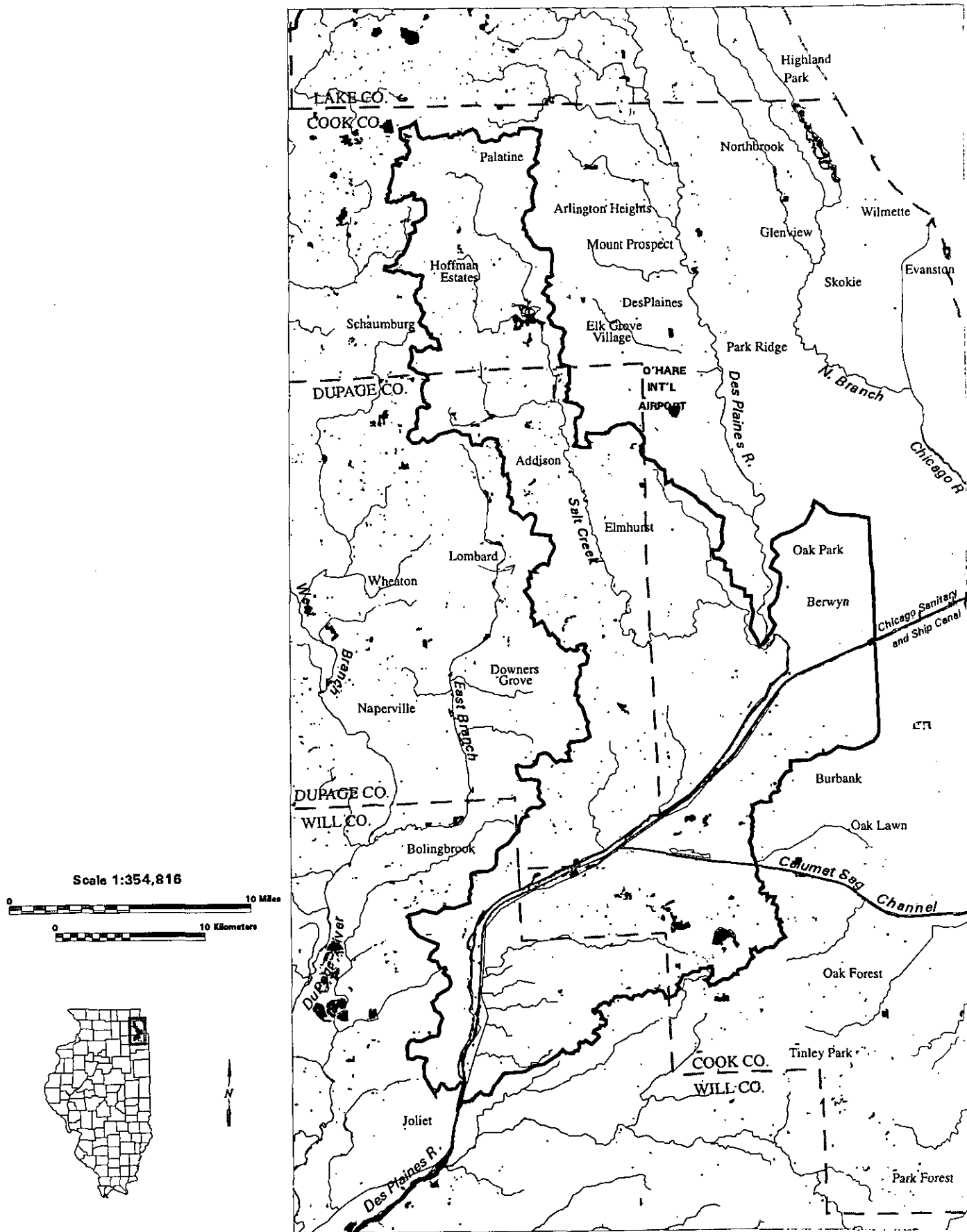


Figure 7. Open water in the Lower Des Plaines River Assessment Area from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

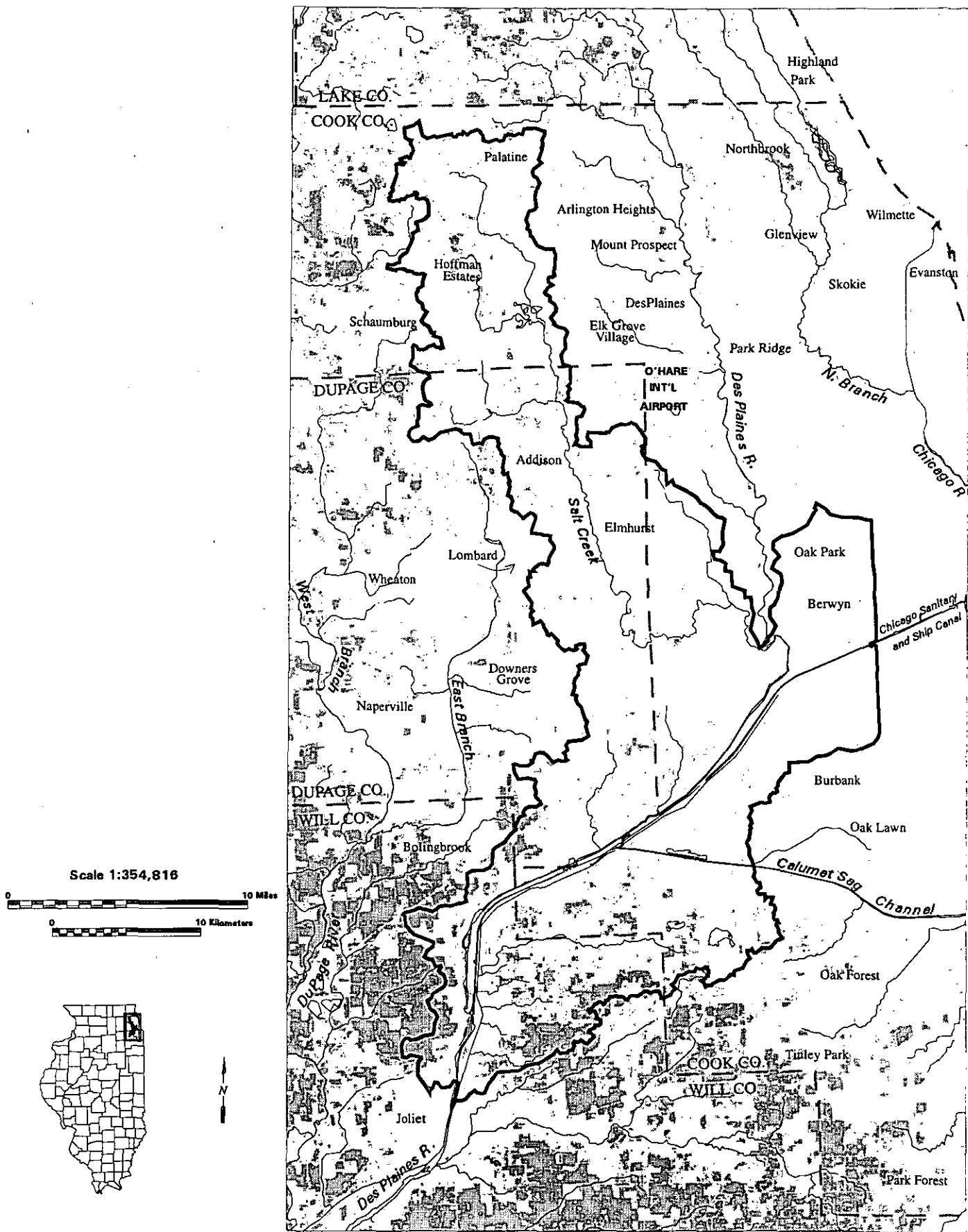


Figure 8. Cropland in the Lower Des Plaines River Assessment Area. Cropland depicted on this map includes row crops and small grains from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

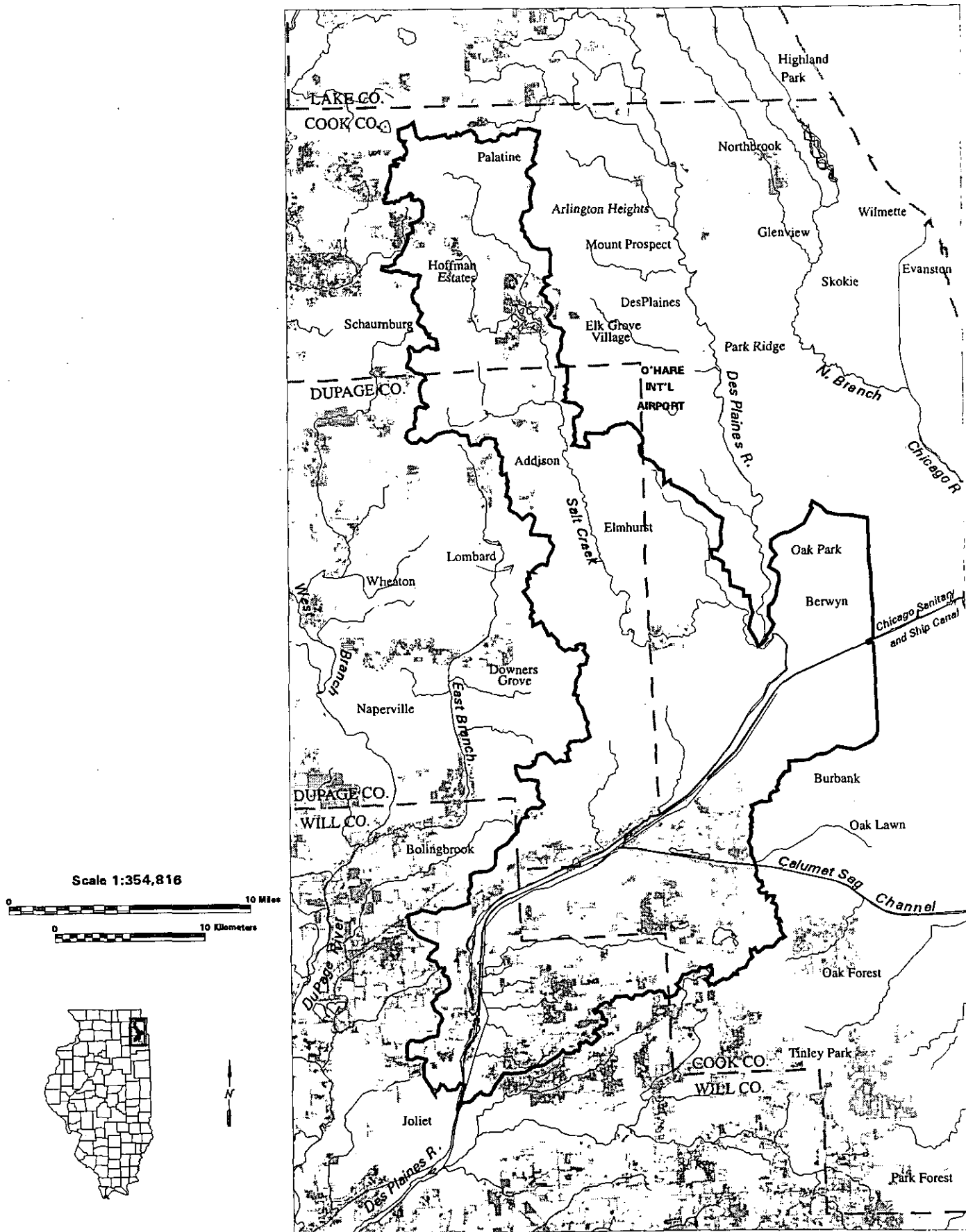


Figure 9. Grasslands in the Lower Des Plaines River Assessment Area. Grasslands depicted on this map are nonurban grasslands from the Land Cover of Illinois database, which is based on Landsat Thematic Mapper (TM) satellite imagery from 1991-1995.

Biologically Significant Features of Natural Communities

Public Land

The Lower Des Plaines River Assessment Area is part of the metropolitan region of Chicago and is heavily urbanized. Although 66% of the land in the LDPRAA is urban/built-up, 23,202 acres (10.14% of the LDPRAA) have been set aside by the county as conservation areas, forest preserves, etc. (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 Lower Des Plaines River Assessment Area¹.

Name	Acres
County Land ²	
Bensenville Ditch	22
Burr Oak	4
Centennial Trail	24
Cricket Creek	197
Deer Grove Preserve	19
Fischer Woods	114
Fox Hollow	38
Fullersburb Woods	212
Fullerton Park	155
Maple Meadows	178
Mayslake	90
Meacham Grove	230
Oak Meadows	287
Palos & Sag Preserve	14,261
Paul Douglas Preserve	868
Salt Creek Greenway	29
Salt Creek Marsh	93
Salt Creek Park	83
Salt Creek Preserve	2,776
Songbird Slough	389
Spring Creek Reservoir	73
Waterfall Glen	2,677
Wood Dale Grove	86
Wood Ridge	230
York Woods	55
York/High Ridge	12
Total county lands:	23,202

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

² County land is limited to forest preserves and similar land. Other public lands which may include natural habitat are not included because adequate information was not available.

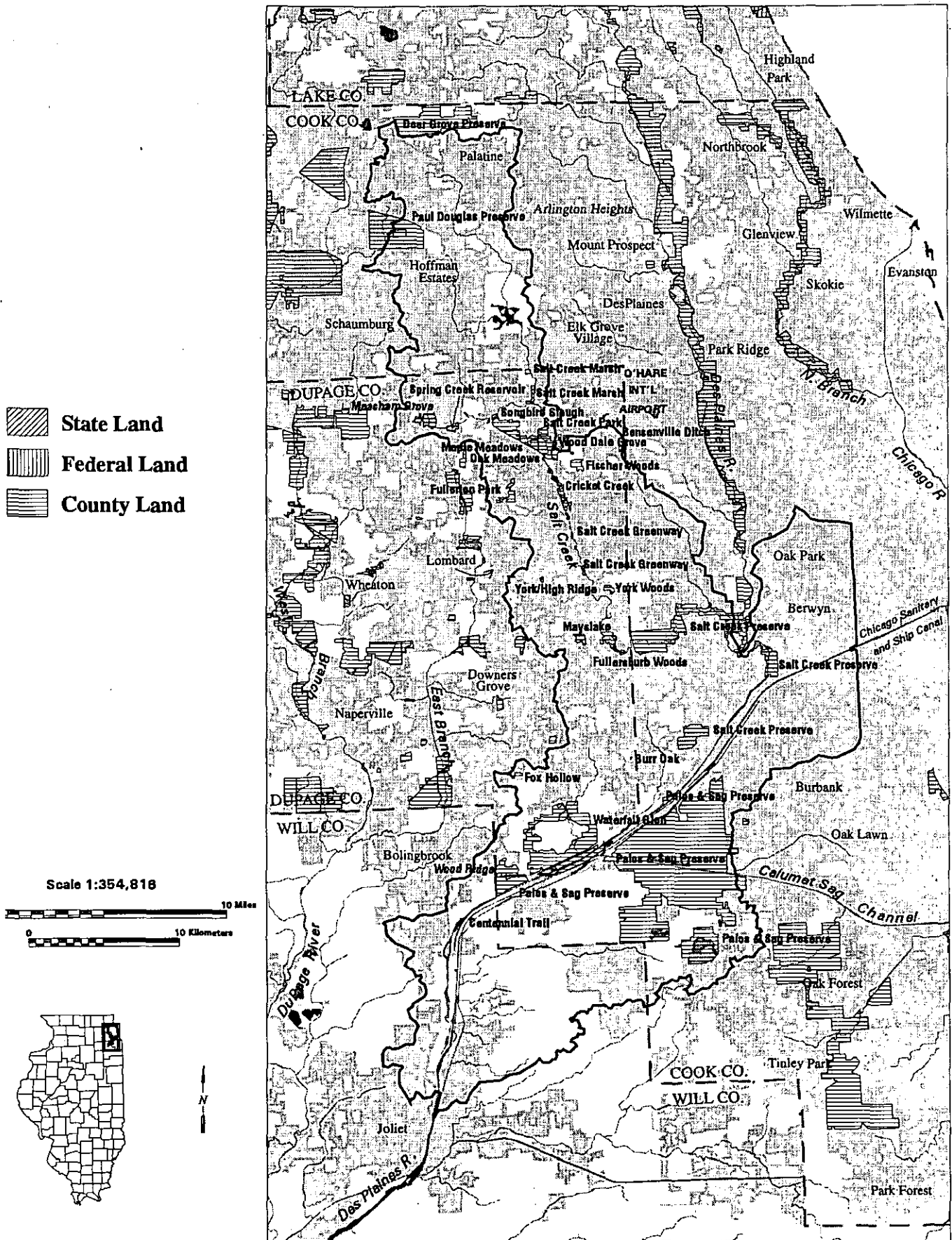


Figure 10. Public land in the Lower Des Plaines River Assessment Area. State land is limited to parks (SP), conservation areas (SCA), forests (SF), and fish and wildlife areas (SFWA) and county land to forest preserves and similar land.

Natural Areas and Nature Preserves

In 1978, an inventory of natural areas in Illinois was completed by the University of Illinois and the Natural Land Institute under a contract with the Illinois Department of Conservation (now the Illinois Department of Natural Resources). The original inventory was a three-year project that consisted of surveys to find, evaluate, describe, and classify natural areas of statewide significance (White 1978). The Illinois Natural Areas Inventory (INAI) is an ongoing process. The methods and criteria established during the original inventory are still used today to continually update the INAI by reevaluating the previously defined natural areas or finding new sites that qualify.

The INAI established seven categories of natural areas based on significant or exceptional 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 designate 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. The estimates and comparisons of natural areas within the LDPRAA 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-six sites within the boundaries of the LDPRAA have been recognized by the INAI (Table 5). Twenty of these sites contain T&E species (Category II), one site contains a unique geological feature (Category IV), one site is a community restoration and designated as a nature preserve (Category V), one site is a forest block greater than 500 acres, and twelve are high-quality (Category I), essentially undegraded sites. Among the twelve Category I sites identified within the LDPRAA are remnants of natural communities types. The Category I natural areas comprise a total of about 516 acres, or about 0.041% of Category I acreage for the entire state (White 1978). The high-quality (Category I) natural community types within the LDPRAA include remnants of dry-mesic upland forest, mesic upland forest, mesic floodplain forest, wet-mesic floodplain forest, northern flatwoods, mesic prairie, dry-mesic gravel prairie, mesic gravel prairie, dry-mesic dolomite prairie, mesic dolomite prairie, wet-mesic dolomite prairie, wet dolomite prairie, marsh, sedge meadow, seep, shrub swamp, spring community, and dolomite cliff community (Table 6).

Table 5. Natural areas in the Lower Des Plaines River Assessment Area and surrounding region¹.

NA# ²	County	Acres ^{3,4}	Name
228	Lake	28.69	Reed-Turner Woodland
251	Cook	77.96	Wolf Road Prairie Nature Preserve
253	Cook	7.62	Santa Fe Prairie
254	Cook	77.16	Somme Prairie
255	Cook	74.47	Black Partridge Woods
256	Cook	9.51	Sagawau Canyon
266	Cook	939.37	Crabtree Nature Center
267	Cook	334.55	Little Red Schoolhouse Nature Center
393	Cook	1.56	Glenbrook North High School Prairie Nature Preserve
394	Cook	9.89	Shoe Factory Road Prairie
395	Cook	5.19	James Woodworth Prairie Preserve
396	Cook	1.42	Morton Grove Prairie
397	Cook	64.13	Sidney R. Yates Flatwoods
398	Cook	33.31	Chicago Ridge Prairie Nature Preserve
399	Cook	144.64	Paw Paw Woods
400	Cook	178.42	Gensburg-markham Prairie
420	Cook	258.16	Salt Creek Woods Nature Preserve
421	Cook	5.61	Palos Fen Nature Preserve
422	Cook	1,539.33	Cap Sauers Holdings Nature Preserve
423	Cook	375.21	Cranberry Slough Nature Preserve
425	Cook	9.59	Dropseed Prairie
506	DuPage	1,394.93	Morton Arboretum
523	DuPage	43.34	Meacham Grove
524	DuPage	35.59	Churchill Prairie Nature Preserve
526	DuPage	9.19	Belmont Prairie Nature Preserve
527	DuPage	48.64	Maple Grove Forest Preserve
528	DuPage	1.53	Hinsdale Prairie
529	DuPage	54.70	Lemont East Geological Area
530	DuPage	184.77	Fullersburg Woods Nature Center
532	DuPage	1,074.20	Waterfall Glen
534	Cook	648.54	Busse Woods
535	Cook	2.83	Glencoe Botanical Area
540	Cook	4.59	Old Plank Road Prairie Nature Preserve
664	Lake	40.33	Herrman's Woods
666	Lake	2.97	Ravinia Bluff
881	Will	71.38	Material Services Prairie
883	Will	50.85	Lockport Prairie East
884	Will	171.72	Messenger Woods
886	Will	31.15	Hickory Creek Sedge Meadow
892	Will	3.06	Plaines Station Geological Area
893	Will	4.45	Markgraf Quarry
932	Will	248.52	Lockport Prairie
933	Will	495.98	Thorn Creek Woods
936	Will	199.30	Romeoville Prairie

Table 5. Continued.

NA# ²	County	Acres ^{3,4}	Name
937	Will	295.12	Pilcher Park
1007	Lake	328.61	Edward L. Ryerson Conservation Area
1039	Will	52.40	Long Run Seep
1060	Will	317.67	Lake Renwick Heron Rookery Nature Preserve
1078	Lake	24.26	Fort Sheridan Bluff
1082	Will	3.76	Rockdale Railroad Prairie
1231	Lake	1.53	Prairie White Fringed Orchid Preserve
1233	Lake	0.00	Long Grove Site
1234	Lake	0.00	Riverwoods Site
1235	Lake	37.50	Hybernia-Highmoor Prairie
1236	Lake	8.08	Buffalo Grove Prairie
1238	Lake	32.33	Cuba Marsh
1357	Cook	319.42	McGinnis Slough
1358	Cook	429.22	Vollmer Road Area
1370	Will	1.50	Mound Road Botanical Area
1371	Will	3.08	Rock Run Botanical Area
1372	Will	52.77	O'Hara Woods Nature Preserve
1375	Cook	0.00	Brookfield Prairie
1376	Cook	1.63	Sauganash Prairie
1377	Cook	0.00	Schiller Woods Prairie
1378	Cook	2.30	Hubbard Woods Site
1379	Cook	139.63	Carle Woods
1381	Cook	11.82	Palatine Prairie
1383	Cook	93.51	Gray Farm Park Marsh
<i>1384</i>	<i>Cook</i>	<i>92.18</i>	<i>Palatine Road Marsh</i>
1385	Cook	54.66	WGN Marsh
<i>1386</i>	<i>Cook</i>	<i>207.71</i>	<i>Baker's Lake</i>
1387	Cook	25.95	Clayton F. Smith Woods
1388	Cook	21.18	Miami Prairie - Indigo Oak Openings
1390	Cook	11.09	Wayside Prairie
<i>1391</i>	<i>DuPage</i>	<i>51.81</i>	<i>Swift Road Meadow</i>
1392	DuPage	162.48	Wood Dale Grove
1395	DuPage	0.00	West Dupage Forest Preserve
1397	DuPage	0.00	Herricks Lake Forest Preserve
1398	DuPage	0.00	McKee Marsh
1399	DuPage	10.36	East Branch Marsh
1400	DuPage	19.78	Songbird Slough
1402	DuPage	32.12	Prince Crossing Marsh
1403	DuPage	17.40	Route 59 Marsh
1404	DuPage	94.95	Fischer Woods
1431	Cook	0.00	Thatcher Woods Prairie
1469	Cook	70.23	Kennicott's Grove
<i>1471</i>	<i>DuPage</i>	<i>0.00</i>	<i>Lyman Woods</i>
<i>1486</i>	<i>Will</i>	<i>253.30</i>	<i>Theodore Street Marsh</i>
1495	Cook	0.00	Glenview Naval Air Station Prairie

Table 5. Continued.

NA# ²	County	Acres ^{3,4}	Name
1500	Lake	41.27	Florsheim Park
1516	DuPage	1,741.69	Springbrook Prairie

Total acres in the LDPRAA: 6172.47

¹ Bold type indicates natural areas within the LDPRAA and italics indicates natural area boundary is less than one mile from the LDPRAA boundary.

² The number of the natural area (NA#) refers to the number designated in the Natural Heritage Database (Illinois Department of Natural Resources 1999) and in Figure 11.

³ Acreage of 0.00 indicates that no figures are currently available.

Table 6. Category I natural communities in the Lower Des Plaines River Assessment Area.¹

Community type	Acres of category I in the LDPRAA			Acres of category I in Illinois			% of Illinois Category I in the LDPRAA		
	LDPRAA			IL			% of IL		
	Grade A	Grade B	Total	Grade A	Grade B	Total	Grade A	Grade B	Total
dry-mesic upland forest	0	150	150	986	2084	3070	0.00	7.20	4.89
mesic upland forest	35	109	144	1058	1473	2531	3.31	7.40	5.69
mesic floodplain forest	0	11	11	36	174	210	0.00	6.32	5.24
wet-mesic floodplain forest	0	26	26	497	2617	3114	0.00	0.99	0.83
northern flatwoods	0	31	31	0	86	86	-	36.05	36.05
mesic prairie	10	27	37	54	220	274	18.52	12.27	13.50
dry-mesic gravel prairie	1	0	1	9.5	34.0	43.5	10.53	0.00	2.30
mesic gravel prairie	4	0	4	8.9	9.7	18.6	44.94	0.00	21.51
dry-mesic dolomite prairie	2	6	8	2	10	12.0	100.00	60.00	66.67
mesic dolomite prairie	2	6	8	2	6	8.0	100.00	100.00	100.00
wet-mesic dolomite prairie	0	15	15	0	15	15.0	-	100.00	100.00
wet dolomite prairie	0	5	5	0	5	5.0	-	100.00	100.00
marsh	3	42	45	310	1920	2230	0.97	2.19	2.02
sedge meadow	0	13	13	155	533	688	0.00	2.44	1.89
seep	10	2	12	31	63	94	32.26	3.17	12.77
shrub swamp	3	1	4	281	17	298	1.07	5.88	1.34
spring community	present	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
dolomite cliff community	0	2	2	N/A	N/A	N/A	N/A	N/A	N/A
Totals:	70.0	446.0	516.0	3430.4	9266.7	12697.1			

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 legally receive the maximum protection of significant natural features. Nature preserves are formally dedicated to receive this protection. The central goal of the nature preserve system, currently with over 290 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 mostly by the Illinois Nature Preserves Commission (INPC). Preserves usually are the shared responsibility of the INPC, the Illinois Department of Natural Resources, and the land owners (McFall and Karnes 1995).

Twelve sites dedicated as Illinois Nature Preserves occur within the boundary of the LDPRAA (Table 7 and Figure 11) and four others are partially within the LDPRAA boundary totaling about 4,014 acres (about 0.02% of the LDPRAA).

Table 7. Nature preserves in the Lower Des Plaines River Assessment Area and surrounding region¹.

NP# ²	Corr - NA ³	County	Acres	Name
2	255	Cook	71.72	Black Partridge Woods
3	534	Cook	461.34+	Busse Woods
4	422	Cook	1,537.34	Cap Sauers Holdings
5	423	Cook	976.61	Cranberry Slough
7	399	Cook	118.38	Paw Paw Woods
8	420	Cook	283.67	Salt Creek Woods
10	394	Cook	13.06	Shoe Factory Road Prairie
40	1007	Lake	269.61	Edward L. Ryerson
66	933	Will	347.76	Thorn Creek Woods
73	396	Cook	2.45	Morton Grove Prairie
75	526	DuPage	10.07	Belmont Prairie
77	400	Cook	122.10	Gensburg-Markham Prairie
79	228	Lake	29.39	Reed-Turner Woodland
93	1372	Will	51.97+	O'Hara Woods
110	932	Will	221.85	Lockport Prairie
119	1386	Cook	202.12	<i>Bakers Lake</i>
120	421	Cook	23.34+	Palos Fen
121	256	Cook	9.41	Sagawau Canyon
122	254	Cook	71.39	Somme Prairie
126	936	Will	123.36	Romeoville Prairie
139	393	Cook	1.66	Glenbrook No. High School Prairie
164	251	Cook	74.28	Wolf Road Prairie
188	1039	Will	43.29	Long Run Seep
197	1235	Lake	24.50	Hybernia
203	1235	Lake	16.08	Highmoor Park
217	1060	Will	299.38	Lake Renwick
225	524	DuPage	66.62	<i>Churchill Prairie</i>
243	398	Cook	12.89	Chicago Ridge Prairie

Table 7. Nature preserves in the Lower Des Plaines River Assessment Area and surrounding region¹.

NP# ²	Corr - NA ³	County	Acres	Name
245	884	Will	0.61*	Messenger Woods
254	1381	Cook	4.62	Palatine Prairie
257	1231	Lake	4.12	Eastern Prairie Fringed Orchid Preserve
263	1469	Cook	70.57	Kennicott's Grove
264	540	Cook	13.47	Old Plank Road Prairie
265	253	Cook	11.77	Santa Fe Prairie
271	0	Will	540.25	Hickory Creek Barrens
281	0	Cook	67.21	Paintbrush Prairie
Total acres in the LDPRAA:			772.86	

¹ Bold type designates nature preserves within the LDPRAA, italics indicates natural preserve boundary is within one mile of the LDPRAA boundry, and * indicates that preserve is split by Assessment Area boundary. Agerage given is only what is found within the LDPRAA.

² The nature preserve number (NP#) refers to the number designated in the Natural Heritage database (Illinois Department of Natural Resources 1999) and in Figure 11.

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

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 endangered and threatened 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.

There are no biologically significant streams in the Assessment Area. No recent records of threatened or endangered fishes, mussels, or crustaceans are known. No mussel surveys have been conducted in any of the streams of this region; therefore, no assessment of stream quality based on mussel diversity can be made.

Natural areas within the boundary

- 251 Wolf Road Prairie Nature Preserve
- 253 Santa Fe Prairie
- 255 Black Partridge Woods
- 256 Sagawau Canyon
- 267 Little Red Schoolhouse Nature Center
- 399 Paw Paw Woods
- 420 Salt Creek Woods Nature Preserve
- 421 Palos Fen Nature Preserve
- 422 Cap Sauers Holdings Nature Preserve
- 423 Cranberry Slough Nature Preserve
- 523 Meacham Grove
- 528 Hinsdale Prairie
- 528 Lemont East Geological Area
- 530 Fullersburg Woods Nature Center
- 532 Waterfall Glen
- 534 Busse Woods
- 881 Material Services Prairie
- 883 Lockport Prairie East
- 932 Lockport Prairie
- 936 Romeoville Prairie
- 1039 Long Run Seep
- 1357 McGinnis Slough
- 1372 O'Hara Woods Nature Preserve
- 1375 Brookfield Prairie
- 1381 Palatine Prairie
- 1385 WGN Marsh
- 1392 Wood Dale Grove
- 1400 Songbird Slough
- 1404 Fischer Woods

Nature preserves within the boundary

- 2 Black Partridge Woods
- 3 Busse Woods
- 4 Cap Sauers Holdings
- 5 Cranberry Slough
- 7 Paw Paw Woods
- 8 Salt Creek Woods
- 93 O'Hara Woods
- 110 Lockport Prairie
- 120 Palos Fen
- 121 Sagawau Canyon
- 126 Romeoville Prairie
- 164 Wolf Road Prairie
- 188 Long Run Seep
- 245 Messenger Woods
- 254 Palatine Prairie
- 265 Santa Fe Prairie
- 281 Paintbrush Prairie

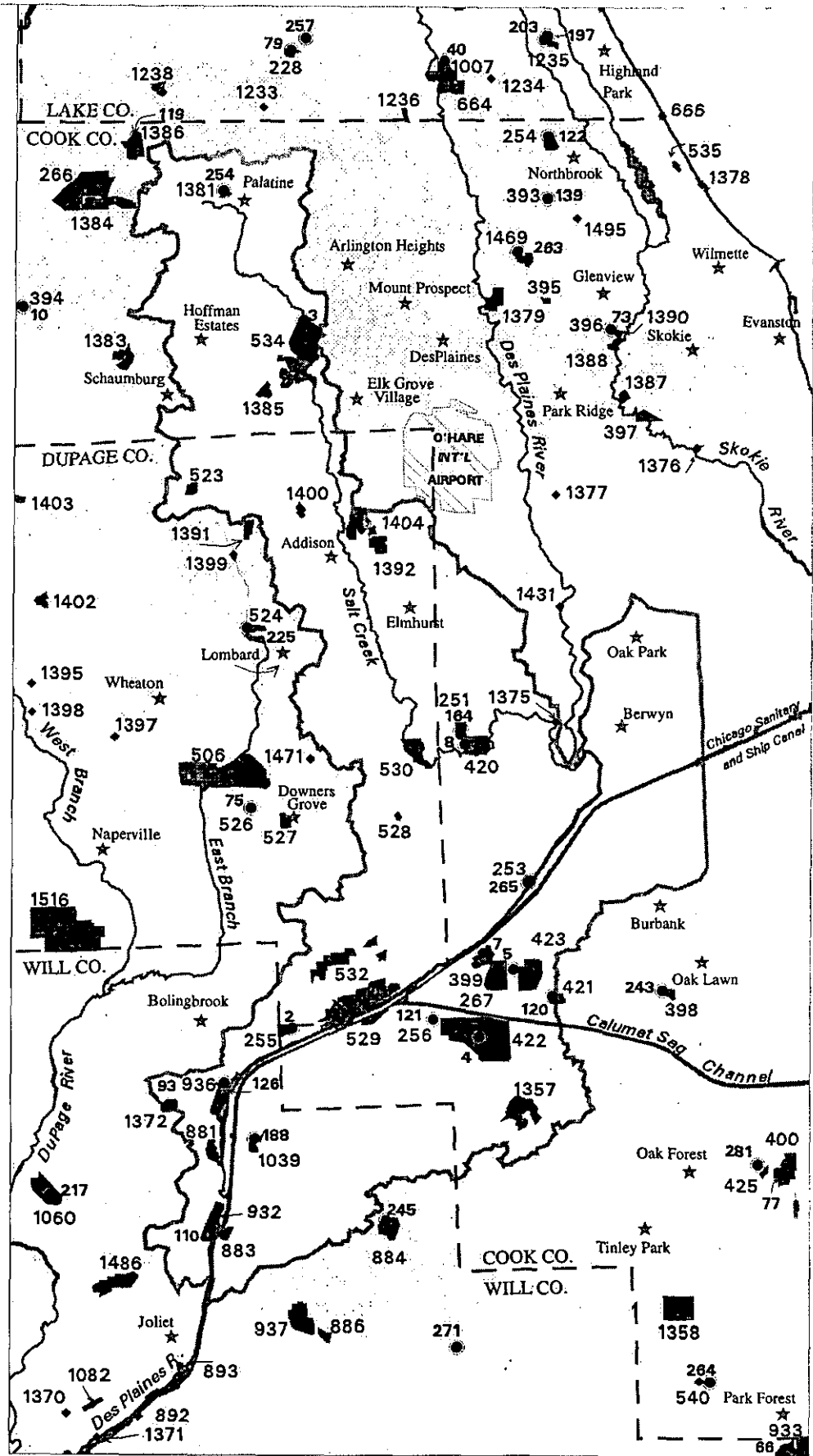
● 148 Nature preserve
● 697

■ Natural area



Nature preserves and natural areas boundaries from 1:24000 IGIS database, January, 1997.

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



Scale 1:354816



Figure 11. Natural areas, nature preserves and biologically significant stream segments in the Lower Des Plaines River Assessment Area.

Threatened and Endangered Species

At least 49 species of threatened or endangered plants and animals occur in the LDPRAA (Table 8). This number includes 4 that are federally threatened and one that is federally endangered. Only 6.89% of the state's 363 threatened or endangered plants are known to occur in the LDPRAA. For other taxa, the percentage of the state's threatened or endangered species that occur in the area are as follows: mammals (12.5%), fish (6.45%), mollusks (33.3%), reptiles (20.0%), and birds (73.5%). Additional information about threatened or endangered species is given in their respective chapters.

Table 8. Threatened and endangered species occurring in the Lower Des Plaines River Assessment Area.¹

Common name	Scientific name	Status ^{2,3}
Plants:		
American slough grass	<i>Beckmannia syzigachne</i>	SE
beaked spike-rush	<i>Eleocharis rostellata</i>	ST
bearded wheat grass	<i>Agropyron trachycaulum</i> var. <i>unilaterale</i> (<i>Elymus trachycaulus</i>)	SE
Canada violet	<i>Viola canadensis</i> var. <i>corymbosum</i>	SE
early dark-green bulrush	<i>Scirpus hattorianus</i>	SE
earleaf foxglove	<i>Tomanthera auriculata</i>	ST
dwarf grape-fern	<i>Botrychium simplex</i>	SE
dwarf raspberry	<i>Rubus pubescens</i>	ST
grass pink orchid	<i>Calopogon tuberosus</i>	SE
inland shadbush	<i>Amelanchier interior</i>	SE
lakeside daisy	<i>Hymenoxys acaulis</i> var. <i>glabra</i> (<i>Hymenoxys herbacea</i>)	SE, FT
leafy prairie-clover	<i>Dalea foliosa</i>	SE, FE
marsh speedwell	<i>Veronica scutellata</i>	ST
mountain blue-eyed grass	<i>Sisyrinchium montanum</i>	SE
prairie white-fringed orchid	<i>Platanthera leucophaea</i>	SE, FT
purple-fringed orchid	<i>Platanthera psycodes</i>	SE
prairie bush-clover	<i>Lespedeza leptostachya</i>	SE, FT
pretty sedge	<i>Carex woodii</i>	ST
savanna blazing star	<i>Liatris scariosa</i> var. <i>nieuwlandii</i>	ST
slender bog arrow-grass	<i>Triglochin palustris</i>	ST
slender sandwort	<i>Minuartia patula</i> (<i>Arenaria patula</i>)	ST
small sundrops	<i>Oenothera perennis</i>	ST
Tennessee milk-vetch	<i>Astragalus tennesseensis</i>	SE
Tuckerman's sedge	<i>Carex tuckermanii</i>	SE
white lady's slipper orchid	<i>Cypripedium candidum</i>	ST
Birds:		
Pied-billed Grebe	<i>Podilymbus podiceps</i>	ST
American Bittern	<i>Botaurus lentiginosus</i>	SE
Least Bittern	<i>Ixobrychus exilis</i>	ST
Snowy Egret	<i>Egretta thula</i>	SE*
Little Blue Heron	<i>Egretta caerulea</i>	SE*
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	SE

Table 8. Continued.

Common name	Scientific name	Status ^{2,3}
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	SE
Osprey	<i>Pandion haliaetus</i>	SE
Bald Eagle	<i>Haliaeetus leucocephalus</i>	ST, FT*
Northern Harrier	<i>Circus cyaneus</i>	SE
Red-shouldered Hawk	<i>Buteo lineatus</i>	ST
Swainson's Hawk	<i>Buteo swainsoni</i>	SE
Peregrine Falcon	<i>Falco peregrinus</i>	SE*
King Rail	<i>Rallus elegans</i>	SE
Common Moorhen	<i>Gallinula chloropus</i>	ST
Sandhill Crane	<i>Grus canadensis</i>	ST*
Upland Sandpiper	<i>Bartramia longicauda</i>	SE
Wilson's Phalarope	<i>Phalaropus tricolor</i>	SE*
Common Tern	<i>Sterna hirundo</i>	SE*
Forster's Tern	<i>Sterna forsteri</i>	SE*
Black Tern	<i>Chilidonias niger</i>	SE
Short-eared Owl	<i>Asio flammeus</i>	SE
Brown Creeper	<i>Certhia americana</i>	ST
Henslow's Sparrow	<i>Ammodramus henslowii</i>	SE
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	SE
Mammals:		
river otter	<i>Lontra canadensis</i>	ST
Reptiles:		
spotted turtle	<i>Clemmys guttata</i>	SE
Blanding's turtle	<i>Emydoidea blandingii</i>	ST
Kirtland's snake	<i>Clonophis kirtlandii</i>	ST
Aquatic Biota:		
Fishes		
blacknose shiner	<i>Notropis heterolepis</i>	SE
greater redhorse	<i>Moxostoma valenciennesi</i>	SE
Freshwater Mussels		
spectaclecase	<i>Cumberlandia monodonta</i>	SE
slippershell mussel	<i>Alasmidonta viridis</i>	ST
salamander mussel	<i>Simpsonaias ambigua</i>	SE
purple wartyback	<i>Cyclonaias tuberculata</i>	ST
elephantear	<i>Elliptio crassidens</i>	ST
spike	<i>Elliptio dilatata</i>	ST
sheepnose	<i>Plethobasus cyphus</i>	SE
black sandshell	<i>Ligumia recta</i>	ST
rainbow	<i>Villosa iris</i>	SE

¹ As determined by the Illinois Endangered Species Protection Board (Heckert 1991, 1994; 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 LDPRAA but does not breed in the Assessment Area.

Natural Vegetation Communities

The description of the vegetation for the Lower Des Plaines River Assessment Area (LDPRAA) 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 LDPRAA to Statewide Patterns

About 601 acres of undegraded habitats remain in the LDPRAA among a total of 45 natural areas (Illinois Department of Natural Resources 1999). Not included with these figures is a cliff community recognized as a natural area; including this additional site, there is a total of 46 natural areas. The acreage total for the high-quality portions of the 45 natural areas is 0.26% of the Assessment Area compared with 0.07% for the statewide percentage of undegraded land identified by the Illinois Natural Areas Inventory (White 1978). This comparison suggests that levels of habitat degradation for all community types combined is slightly less in the LDPRAA than statewide levels. In general, it is difficult to provide precise estimates for some trend data in the LDPRAA at the level of the community class (e.g., forest, prairie, savanna, wetland) because the region historically was characterized by a complex mixture of dynamic habitat types. Nevertheless, with the data available, comparisons among community classes are outlined below.

Prairie - About 0.01% (2,300 acres) of the original area of prairie in the state persists in a high-quality condition (White 1978); no data are available for the total acreage of all prairie remaining in Illinois including degraded remnants. Much of the prairie in the LDPRAA and across Illinois was destroyed for agriculture. The 78 acres of undegraded prairie identified within the Assessment Area is about 0.04% of the original extent in the LDPRAA (Table 6). Much of the acreage of relatively undisturbed prairie in the State is from agriculturally less suitable lands such as sand deposits (~47%) or steep loess hills (~16%). When these habitat characteristics generally are lacking in a region, such as in the LDPRAA, the proportion of prairie remaining typically is very low. In this case, prairie loss and degradation in the LDPRAA appear to be slightly less than statewide trends, but still 99.96% has been destroyed or severely degraded.

Forest - About 30% of the original area of forest remains statewide (Iverson et al. 1989), though only about 0.28% of this and 0.08% of original forest area remains in a high-quality condition. About 19.4% (44,430 acres) of the LDPRAA currently is forest (IGIS database, Figure 5) compared with an estimated 16.5% (37,788 acres) forest cover for prior to European settlement. Based on these estimates, there appears to be more forest cover now than around 1820. About 362 acres of forest in the LDPRAA remain in an essentially

undegraded condition (0.81% of remaining forest and 0.95% of estimated original forest cover). Since forest-savanna-prairie boundaries varied considerably over time, interpretation of these estimates requires some caution. Nevertheless, based on these figures, post-settlement trends of forest habitat destruction and degradation appear to be less severe in the LDPRAA compared with statewide trends.

Savanna - Savannas have declined in area throughout Illinois and the Midwest, perhaps more than any other community class (Nuzzo 1986; Taft 1997a), and the LDPRAA is no exception to this trend. About 51% of Lake County was savanna around 1840 (Moran 1978) while more than 25% of DuPage County was savanna (Moran 1980) indicating savanna was a major community type in northeastern Illinois. Moran (1980) comments that savanna was the most abundant and widespread plant community in the 1830s in northeastern Illinois and southern Wisconsin. Soil mapping in the Chicago region (Wascher et al. 1960) indicates that about half of the area of the LDPRAA has (or had) soils that developed under mixed forest/prairie (i.e. savanna-like) vegetation. However, according to the results of the Illinois natural Areas Inventory (INAI), no areas of savanna remain in the LDPRAA in an undegraded condition. Northern flatwoods (included among forest types here) are present in the Assessment Area and have, or formerly had, savanna characteristics (Madany 1981). Areas of former savanna that have restoration potential are present in the Assessment Area, and restoration activities are currently underway at some sites in the Chicago region (Bowles and McBride 1998).

Wetlands - Natural wetlands in Illinois have declined statewide from pre-European settlement estimates of about 23% of the land area to about 2.6% of the state (Havera et al. 1994), or about 11% of the original total. Only about 6,000 acres in Illinois remain in a high-quality condition (White 1978), representing about 0.65% of the remaining and 0.07% of the original wetland area (Havera et al. 1994). The approximately 10,633 acres (4.6%) remaining as wetland in the LDPRAA is about 21% of the original extent, indicating that wetland loss in the Assessment Area is less than statewide trends. The 131 acres remaining in a relatively undegraded condition (about 1.2% of remaining wetlands and 0.27% of original extent) indicate that rates of wetland degradation among remaining wetlands appear to be slightly less in the LDPRAA compared with statewide trends.

The species richness of vascular plants within the LDPRAA at the time of European settlement is unknown. About 826 plant taxa have been reported from within the Assessment Area (Appendix 1); about 158 of these (18.9%) are not native to the Assessment Area and most of these adventive species are not native to North America. This should be considered an incomplete listing of species as it probably underestimates species richness of both native and, particularly, non-native taxa in the LDPRAA. This estimate of species richness compares to approximately 2,200 native taxa and 3,102 total taxa reported from Illinois (Mohlenbrock 1986). Based on available information, about 30.5% of the native vascular plants from Illinois occur in the LDPRAA.

The extraordinary loss of habitat in the LDPRAA has resulted in reduction in population sizes for many species, particularly those sensitive to habitat degradation. As populations

decline in size, they become more likely to undergo local extirpation. Richness of native species has probably declined in the LDPRAA since European settlement as a result of habitat destruction and degradation, reduced population sizes, and local extirpations; in contrast, non-native taxa have increased capitalizing on the human-disturbed landscape. 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 six prairie-plant taxa have been extirpated from the state (modified from the five taxa reported in Taft 1995). However, numerous prairie species now occur at low population levels in Illinois, and about 103 are listed as threatened or endangered (Herkert 1991, Taft 1995).

Illinois Threatened and Endangered Species

Twenty-five plant species presently listed by the Illinois Endangered species Protection board (IESPB) as threatened or endangered (T&E) have been reported from within the LDPRAA (Table 9). Based on Herkert (1991, 1994), and recent revisions to the list of T&E species that resulted in some deletions and changes in listing status (Illinois Endangered Species Protection Board 1999), there are 10 state threatened, 11 state endangered, three federally threatened, and one federally endangered plant species in the LDPRAA. Outside of the LDPRAA, but within the region shown in Figure 2, are records for an additional 40 T&E plant species. Sixteen of the T&E species listed for the area have populations both within and nearby the LDPRAA (Table 9). This concentration of rare taxa is due largely to the combination of large-scale habitat destruction and degradation and the presence of several unique community types that support many species at the edge of their ranges (e.g. bogs, fens, marl flats, dolomite prairie, gravel prairie). Habitat loss and degradation among once common natural communities such as prairie and savanna also has contributed to the abundance of rare taxa in the region. While many of the T&E species may be found in more than one natural community type, prairies and wetlands support most of the T&E species in the LDPRAA.

Among the 25 species listed by the IESPB as threatened or endangered in the LDPRAA, three are listed as federally endangered by the U.S. Fish and Wildlife Agency (1988, 1989). They are prairie bush clover (*Lespedeza leptostachya*), lakeside daisy (*Hymenoxys acaulis* var. *glabra*), and prairie white-fringed orchid (*Platanthera leucophaea*). Leafy prairie clover (*Dalea foliosa*) is listed as a federally endangered species.

Prairie bush clover is one of the rarest prairie plants due to its intolerance of any level of plowing or grazing (Clewell 1966). There are only three extant populations in northeastern Illinois; all in prairie remnants, and one is in the LDPRAA (Swink and Wilhelm 1994). Prairie bush clover is also found in upland prairies on gravelly moraines from central Minnesota south to northwestern Iowa. Clewell reported only finding one population in northern Iowa in 1964. Clewell also believed that recent (as of 1966) plowing of remnant virgin tracts by farmers interested in capitalizing on the Federal Soil Bank Program probably contributed to the pending extinction of prairie bush clover (Clewell 1966).

Prairie white-fringed orchid was formerly widespread in prairie and wetland communities throughout the northern half of Illinois. However, habitat destruction and degradation have reduced *P. leucophaea* to scattered localities primarily in northeastern Illinois. In recent years, a few populations have been found in degraded prairie and wetland remnants in northeastern Illinois. Prairie and wetland habitats, even somewhat degraded remnants, within the LDPRAA may support small, undetected populations of this species. Though this orchid is a very distinctive species, it can be surprisingly cryptic. The best search time for this species is in late June or early July when flowering occurs. Annual fluctuation in population size has been positively correlated to rainfall amount (Bowles et al. 1992).

Lakeside daisy is known from only one locality in the Chicago Region, near Rockdale in Will County, where the original population was extirpated. It occurred on a dry gravelly site. This species is self-incompatible, so small populations are not able to produce viable seeds. This plant has been reintroduced to the Lockport Prairie in a dolomitic prairie similar to the one at Rockdale (Swink and Wilhelm 1994).

Leafy prairie clover was originally widespread in northern Illinois, but highly localized in mesic dolomite prairie habitat. It was thought to have been extirpated from the state, but four populations were discovered along the Des Plaines River in the 1970s. It is also extant in limestone glades in northern Alabama and central Tennessee. While dolomite and gravel prairie habitat is rare, it has been found that leafy prairie clover can persist in the seed bank, so sites where it has been extirpated could still support viable populations (Baskin and Baskin 1998).

Table 9. Plant species listed by the Illinois Endangered Species Protection Board as threatened or endangered in Illinois that occur in or near the Lower Des Plaines River Assessment Area.

Common Name	Scientific Name	Status ¹	Habitat ²	Range in U.S. & Vicinity of LDPRAA	EOR in ³	EOR near ⁴
arbor vitae	<i>Thuja occidentalis</i>	ST	calcareous springy slopes; fens; swamps	Eastern Canada and adjacent NE U.S. Extant pops. in Lake, Cook, Kane, and LaSalle cos.	-	4
aster, forked	<i>Aster furcatus</i>	ST	seepage zones along wooded bluffs and stream banks	EC U.S.; restricted to northern and central IL an adjoining states. Extant pops. in Winnebago, McHenry, Lake, Lee, LaSalle, Kendall, Grundy, Kanakee, and Tazewell cos. Formerly Will Co.	-	2
bedstraw, bog	<i>Galium labradoricum</i>	ST	bogs; fens; sedge meadows	Eastern Canada and NE U.S. Extant pops. in McHenry, Lake, and Kane cos.	-	1
blazing star, savanna	<i>Liatris scariosa</i> var. <i>nieuwlandii</i>	ST	Silt-loam savannas	NE & NC U.S. Scattered in IL, from Chicago area SW to Calhoun co. Known pops. in Cook and Will cos.	2	3

Table 9. Continued.

Common Name	Scientific Name	Status ¹	Habitat ²	Range in U.S. & Vicinity of LDPRAA	EOR in ³	EOR near ⁴
blue-eyed grass, mountain	<i>Sisyrinchium montanum</i>	SE	mesic prairies	Boreal Canada and adjacent northern U.S. Known in Lake and Cook cos.; formerly DuPage Co.	1	6
buffalo berry	<i>Shepherdia canadensis</i>	SE	calcareous bluffs; beach ridges;	Boreal Canada and Alaska, and adjacent northern U.S. Extant population in Lake Co.; formerly Cook Co.	-	2
bugbane, false	<i>Cimicifuga racemosa</i>	SE	forested seeps; mesic forests	EC and NE U.S. and adjacent Canada. Extant population in Kendall Co.; formerly Cook Co.	-	1
bulrush, alkali	<i>Scirpus paludosus</i>	SE	saline marshes; highway right-of-ways	Western U.S. and adjacent Canada and Mexico. Extant pops. in Cook and LaSalle cos.	-	1
burnet, American	<i>Sanguisorba canadensis</i>	SE	wet-mesic calcareous prairies	Boreal eastern Canada, south into NE U.S. and the Appalachians. Extant pops in Will & Cass cos.	-	2
bog arrow-grass, slender	<i>Triglochin palustris</i>	ST	fens; pannes;	Northern U.S. into the Rocky Mtns. Known pops. in McHenry, Lake, Will, and Cook cos.	2	-
bulrush, early dark green	<i>Scirpus hattorianus</i>	SE	open wetlands	Northeast U.S. A little known species; extant pops. from Cook, DuPage, Kankakee, and Lake cos.	1	2
bush-clover, prairie	<i>Lespedeza leptostachya</i>	SE, FT	dry gravel and sand prairies	IL, WI, IA, and MN. Known pops in Cook, DuPage, McHenry, Winnebago, Ogle, and Lee cos.	2	1
clover, buffalo	<i>Trifolium reflexum</i>	SE	dry-mesic savannas; flatwoods; prairies	Eastern and central U.S. and adj. Canada. Known from 4 cos. in the SW/4 of IL. Formerly Cook and Will cos.	-	1
corn salad	<i>Valerianella chenopodifolia</i>	SE	mesic forests; floodplain forests	NE and central U.S. and adj. Canada. Extant population in Will Co.	-	1
cranberry, large	<i>Vaccinium macrocarpon</i>	SE	bogs	NE U.S. and adj. Canada. Extant pops. in McHenry, Lake, and Cook cos.; formerly Will Co.	-	1
cranesbill, northern	<i>Geranium bicknellii</i>	SE	dry woodland openings; rock outcrops; disturbed sites following fire	Cen. and E. Canada, and adj. northern U.S. Extant pops. in Lake Co. Formerly Cook and DuPage cos.	-	2
crowfoot, seaside	<i>Ranunculus cymbalaria</i>	SE	saline and brackish shores; marsh	Circumboreal, S. into NE and Cen. U.S. to Mexico. Extant pops. in Lake and Cook cos. Formerly McHenry, Kane, an DuPage cos.	-	1
foxglove, earleaf	<i>Tomanthera auriculata</i>	ST	disturbed prairies and savannas	OH to MN, south to KA and MO. Scattered in IL from Chicago area south to Bond Co.	3	4

Table 9. Continued.

Common Name	Scientific Name	Status ¹	Habitat ²	Range in U.S. & Vicinity of LDPRAA	EOR in ³	EOR near ⁴
grape-fern, dwarf	<i>Botrychium simplex</i>	SE	disturbed sand prairies; successional sand forests	Circumboreal, south into the Rocky Mtns. and N. U.S. Pops. possibly in Cook, Winnebago, and Lee cos.	-	1
grass, grove blue	<i>Poa alsodes</i>	SE	mesic forests	E. Canada, S. into NE U.S. and the Appalachians. Extant pops. in Lake, Calhoun, Jackson, & Pope cos.	-	1
grass, marram	<i>Ammophila breviligulata</i>	SE	open sand dunes	Atlantic coast and the shores of the Great Lakes, including northern IL. Known pops. in Lake & Cook cos.	-	2
grass, millet	<i>Milium effusum</i>	SE	wet-mesic forest openings	E. Canada and NE U.S. Extant pops. in Cook Co.; formerly Kane and Tazewell cos.	-	1
grape-fern, northern	<i>Botrychium multifidum</i>	SE	mesic forest; sand savannas; successional habitats	Circumboreal, south into NE U.S. Known from Lake and Cook cos. Known pops. in Stephenson, Carroll, and Jo Davies cos.; formerly Will, Lake, McHenry, Boone, and Lee cos.	1	-
grass, American slough	<i>Beckmannia syzigachne</i>	SE	wet prairies	Western and NC U.S. Known pops. in Lake and Cook cos.; formerly from McDonough Co.	1	3
grass, bearded wheat	<i>Agropyron trachycaulum</i> var. <i>unilaterale</i> [<i>Elymus trachycaulus</i>]	SE	mesic prairies; dolomite outcrops; sand prairies	S. Canada and adjacent northern U.S. into northern IL. Known pops. in Cook and Lake cos.; also Jo Daviess and Winnebago cos.; formerly DuPage, McHenry, and Tazewell cos.	1	1
juniper, ground	<i>Juniperus communis</i>	ST	L. Michigan dunes; glacial till bluffs	Circumpolar, S. into NE U.S. and northern IL. Extant pops. in Lake and Winnebago cos.; formerly Cook Co.	-	3
lakeside daisy	<i>Hymenoxys acaulis</i> var. <i>glabra</i> [<i>Hymenoxys herbacea</i>]	SE, FT	dolomite prairies; gravel bluffs	Known from Will and Tazewell cos. IL; Ottawa Co. Ohio; Manitoulin Island and Bruce Peninsula, Ontario.	1	-
milk-vetch, Tennessee	<i>Astragalus tennesseensis</i>	SE	dolomite and dry	TN, AL, and IL. Known pops. in Tazewell Co.; formerly Lake, Will, Kankakee, Grundy, LaSalle, Ogle, Rock Island and Mason cos.	1	-
milkweed, oval	<i>Asclepias ovalifolia</i>	SE	prairies and savannas	NC U.S. and adj. Canada. Known pops. in Cook Co. Formerly in Lake, McHenry, Kendall, and Kankakee cos.	-	1
milkweed, woolly	<i>Asclepias otarioides</i> [<i>Asclepias lanuginosa</i>]	SE	dry gravel prairies	NC U.S. Known pops. in Cook, McHenry, DeKalb, Winnebago, Ogle, and Jo Davies cos. Formerly in Will and DuPage cos.	-	1

Table 9. Continued.

Common Name	Scientific Name	Status ¹	Habitat ²	Range in U.S. & Vicinity of LDPRAA	EOR in ³	EOR near ⁴
orchid, grass pink	<i>Calopogon tuberosus</i>	SE	prairies; bogs; fens	Eastern U.S. and adjacent Canada. Known pops. McHenry, Lake, Cook, and Will cos.	1	1
orchid, prairie white-fringed	<i>Platanthera leucophaea</i>	SE, FT	mesic to wet prairies	EC and eastern U.S., also Ontario. Locally rare in NE Illinois.	4	9
orchid, purple-fringed	<i>Platanthera psycodes</i>	SE	flatwood openings; mesic sand prairies	Boreal eastern Canada, south into ND-U.S. and the Appalachians. Known pops. in Lake and Cook cos.	1	1
orchid, spotted coral-root	<i>Corallorhiza maculata</i>	ST	mesic forests	S. Canada, S. into the NE U.S. and the Appalachians. Extant pops. in Will, DuPage, McHenry, and Winnebago cos.; formerly Cook Co.	-	-
orchid, tubercled	<i>Platanthera flava</i> var. <i>herbiola</i>	SE	wet-mesic sand prairies, open wet forests	NE U.S. and adj. Canada. Extant pops. in Lake, Cook, Will, Iroquois, Whiteside, Mason, and Washington cos.	-	1
orchid, white lady's slipper	<i>Cypripedium candidum</i>	ST	wet-mesic prairies; fens	NC and NE U.S. Known pops. McHenry, Lake, Cook, DuPage, Winnebago, and Will cos.	3	4
plaintain, heart-leaved	<i>Plantago cordata</i>	SE	sand or gravel bars of shallow, clear-water streams	Extant pops. in Kane, Tazewell, Union, Saline, Pope, and Johnson cos. Formerly Lake, Cook, DuPage, and Will cos.	-	1
poplar, balsam	<i>Populus balsamifera</i>	SE	L. Michigan bluffs and adjacent sand dunes	Boreal and subarctic Canada and Alaska, S. into northernmost U.S. Extant pops. in Lake, Cook, and McHenry cos.	-	1
prairie-clover, leafy	<i>Dalea foliosa</i>	SE, FE	mesic dolomite prairies	TN to AL; disjunct in IL. Known pops. in Will Co.	4	-
queen-of-the-prairie	<i>Filipendula rubra</i>	SE*	fens; mesic sand prairies; seeps	Eastern U.S. Extant pops. in McHenry, Lake, Cook, Lee, Bureau, LaSalle, Grundy, and Vermilion cos. Formerly Will Co.	-	1*, 2
raspberry, dwarf	<i>Rubus pubescens</i>	ST	mesic forests; bogs; fens	NE U.S. into the Rocky Mtns. Extant pops. in Cook, DuPage, Kane, and Lake cos.; formerly Winnebago Co.	2	3
raspberry, purple flowering	<i>Rubus odoratus</i>	SE	forest clearings and other disturbed sites	E. Canada, south into NE U.S. and Appalachians. Extant pops. in Lake, McHenry, and Kane cos. Formerly Cook and LaSalle cos.	-	1
running pine	<i>Lycopodium clavatum</i>	SE	sand forest; talus and ledges of St. Peter's sandstone; seeps	Circumboreal, S. into northern U.S. Extant pops. in DuPage, Will, Ogle, and Rock Island cos.	-	1
rush, Richardson's	<i>Juncus alpinus</i>	SE	fens; wet sand prairies; interdunal swales	Circumboreal, S. into northern U.S. Extant pops. in McHenry, Lake, DuPage, and Cook cos.	-	1

Table 9. Continued.

Common Name	Scientific Name	Status ¹	Habitat ²	Range in U.S. & Vicinity of LDPRAA	EOR in ³	EOR near ⁴
sandwort, slender	<i>Minuartia patula</i> [<i>Arenaria patula</i>]	ST	rock ledges; dolomite prairies	Occurs from IN and MN to VA, AL, and TX. Known from Cook, Will, DuPage, Kendall, and Grundy cos.	4	-
sea rocket	<i>Cakile edentula</i>	ST	open beaches; sand dunes	Atlantic coast; Great Lakes shores; Iceland; Azores. Known pops. in Cook and Lake cos.	-	4
sedge, golden	<i>Carex aurea</i>	SE	interdunal swales; wet meadows	Canada, S. into northern U.S. Known pops. in Lake, Cook, and Kane cos.; formerly Menard Co.	-	3
sedge, little green	<i>Carex viridula</i>	ST	dune swales; spring runs; marl flats; disturbed calcareous sites	Boreal Alaska and Canada, adj. NE U.S., S. in the Rocky Mtns. Extant pops. in McHenry, Lake, DuPage, Cook, and Kankakee cos.	-	4
sedge, pretty	<i>Carex woodii</i>	ST	mesic calcareous forests	NE U.S. and adjacent Canada. Known pops. in Cook, Lake, Winnebago, and Jo Davies cos.; formerly Will and Kankakee cos.	2	5
sedge, swollen	<i>Carex intumescens</i>	ST	forested wetlands	Eastern U.S. and adjacent Canada. Extant population in Johnson Co.; formerly Cook Co.	-	2
sedge, Tuckerman's	<i>Carex tuckermanii</i>	SE	flatwoods and wet-mesic forests	NC U.S., and north to adjacent Canada. Known pops. in Lake and DuPage cos.; formerly Cook and Winnebago cos.	4	2
shadbush	<i>Amelanchier sanguinea</i>	SE	wooded lake and river bluffs	NE U.S. and adj. Canada, and S. in the Appalachians. Known pops. in Lake, Cook, Kane, & LaSalle cos.	-	1
shadbush, inland	<i>Amelanchier interior</i>	SE	sand or dolomite stream bluffs; bogs	Found mainly in MN, WI, E. IA, and N MI. Known pops. in Winnebago, Jo Davies, and DuPage cos.; formerly Lake Co.	2	-
Solomon's seal, downy	<i>Polygonatum pubescens</i>	SE	mesic forests	NE U.S. and adjacent Canada. Extant pops. in Winnebago, Lake, Cook, and Will cos. Formerly DuPage Co.	-	5
speedwell, marsh	<i>Veronica scutellata</i>	ST	marshes; graminoid fens	NE U.S. and into the Rocky Mtns. Known pops. in Lake, Cook, DuPage, Will, and Iroquois cos.	3	3
spike-rush, beaked	<i>Eleocharis rostellata</i>	ST	graminoid fens; marl flats	Atlantic coast and locally inland. Known pops. in Cook, Kendall, Lake, McHenry, and Will cos.	1	-
spurge, seaside	<i>Chamaesyce polygonifolia</i>	SE	beach & foredunes of L. Michigan	Atlantic coast and shores of the Great Lakes. Extant pops. in Lake Co.; formerly Cook Co.	-	2
sundew, narrow-leaved	<i>Drosera intermedia</i>	ST	peat bogs; wet sand prairies	NE U.S. and adjacent Canada, S. in the coastal plain and Texas. Extant pops. in Iroquois, Will, Grundy, Cook, and Kane cos.	-	1

Table 9. Continued.

Common Name	Scientific Name	Status ¹	Habitat ²	Range in U.S. & Vicinity of LDPRAA	EOR in ³	EOR near ⁴
sundrops, small	<i>Oenothera perennis</i>	ST	sand and gravel prairies; dry rocky prairie slopes	Eastern U.S. and adj. Canada. Known pops. in Cook, Lake, and Winnebago cos.; formerly Will Co.	2	8
thistle, Hill's	<i>Cirsium hillii</i>	ST	prairies	NE U.S. and adj. Canada. Extant pops. in DuPage, McHenry, and DeKalb cos.; formerly Cook Co.	-	1*
vetchling, pale	<i>Lathyrus ochroleucus</i>	ST	dry savannas; dry ravines	Boreal Canada, south into NE U.S. Extant pops. in Lake, McHenry, Ogle, and Jo Davies cos.; formerly Cook and DuPage cos.	-	1
violet, American dog	<i>Viola conspersa</i>	ST	mesic forests; flatwoods	Eastern Canada, south into NE U.S., and the Appalachians	-	11
violet, Canada	<i>Viola canadensis</i> var. <i>corymbosum</i>	SE	mesic forests	N. U.S. and adj. Canada, S. into the Appalachians and the Rocky Mtns. Known pops. in Will, Jo Davies, Carroll, and Whiteside cos.	1	-
violet, hairy white	<i>Viola incognita</i>	SE	flatwoods; forested fens; mesic forests	Boreal E. Canada and adjacent NE U.S. Extant pops. in Lake, Cook, and Jo Davies cos.	-	2
willow-herb, downy	<i>Epilobium strictum</i>	ST	forests fens; fens; seeps	NE U.S. and adj. Canada. Extant pops. in Lake and McHenry cos.	-	1

¹ SE = state endangered, ST = state threatened, FT = federally threatened, FE = federally endangered.

² Habitats listed focus on Illinois occurrences. For Illinois distribution, only presumed extant populations are considered.

³ EOR in = Element Occurrence Record. The number of populations known to occur within the Lower Des Plaines River Assessment Area. Information from the Illinois Natural Heritage Database (Illinois Department of Natural Resources 1999).

⁴ EOR near = Element Occurrence Record. The number of populations known to occur outside the Lower Des Plaines River Assessment Area but within the area mapped in Figure 2. * = population occurs within one mile of boundary. Information from the Illinois Natural Heritage Database (Illinois Department of Natural Resources 1999).

Disturbance, Habitat Quality, and Restoration Potential

While habitat loss has been extensive within the LDPRAA, most natural communities remaining in the Assessment Area also have experienced anthropogenic disturbances resulting in habitat degradation to different degrees. 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 below.

Disturbance is a general term referring to any perturbation. Plant communities and ecosystems are **degraded** when recovery to original condition is unlikely under normal circumstances. Degraded lands can be distinguished further by those that may be *restored*, *rehabilitated*, or *reclaimed*. Restoration of degraded lands to prehuman perturbation

condition can be accomplished through management efforts. Degraded lands may possibly be rehabilitated to a condition somewhat similar to the original but where compositional differences remain (Lovejoy 1975). Reclamation of degraded lands for only limited use is seen in severe examples (e.g., strip mining). 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. 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 (Gehlhausen et al., *in press*). 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 1996a, 1997a). 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, vegetation cover 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) invasions also often result in lowered ecological integrity (loss of species and processes). Adventive plant taxa in a system may be sorting into disturbance or habitat niches that result in the replacement of native plant taxa. The establishment of adventive taxa can result in arrested development of a natural community and interfere with rates of recovery processes to predisturbance conditions. 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 LDPRAA, including exotic species control measures, are offered in the Summary and Recommendations section following Natural Communities Descriptions.

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 A and B communities are designated as significant or exceptional features, although many natural areas include some Grade C-quality habitats. Increasingly, it is recognized that large habitat remnants, although perhaps mostly Grade C quality, have unique contributions to conservation efforts. One forest remnant (Cap Sauers Holding) that exceeds 500 acres in size occurs in the LDPRAA, including both Grade C and better-quality habitats. This large forest block is a particularly unique and biologically valuable aspect of the LDPRAA.

Nature preserves are areas of land or water in public or private ownership that legally receive the maximum protection of significant natural features. Nature preserves are formally dedicated to receive this protection. The central goal of the nature preserve system, currently with over 290 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 mostly by the Illinois Nature Preserves Commission (INPC). Preserves usually are the shared responsibility of the INPC, the Illinois Department of Natural Resources, and the land owners (McFall and Karnes 1995).

Twelve sites dedicated as Illinois Nature Preserves occur within the boundary of the LDPRAA (Table 7, Figure 11) and four others are partially within the LDPRAA boundary totaling about 4,014 acres (about 0.02% of the LDPRAA). The high-quality natural communities within the LDPRAA include remnants of dry-mesic upland forest, mesic upland forest, mesic floodplain forest, wet-mesic floodplain forest, northern flatwoods, mesic prairie, dry-mesic gravel prairie, mesic gravel prairie, dry-mesic dolomite prairie, mesic dolomite prairie, wet-mesic dolomite prairie, wet dolomite prairie, marsh, sedge meadow, seep, shrub swamp, spring community, and dolomite cliff community (Table 6). Nature preserves in the LDPRAA occur throughout much of the area with eleven in Cook County and five in Will County. There are no nature preserves in the LDPRAA that occur in DuPage County. Each contains noteworthy remnants of natural communities including areas recognized by the INAI. In addition, there are many public land holdings within and

outside the LDPRAA that are crucial to the maintenance and preservation of biodiversity in the region (Table 4, Figures 10 and 11). The brief descriptions below are summarized from McFall and Karnes (1995).

Black Partridge Woods (Cook County) - Black Partridge Woods in Cook County was one of the first dedicated nature preserves in Illinois. This 80 acre site is owned by the Forest Preserve District of Cook County. The rivers bluffs, ravine forests, and spring-fed streams represent communities typical of the Morainal Section of the Northeastern Morainal Natural Division. The main natural community present is mesic forests.

Busse Forest (Cook County) - Busse Forest was one of the first areas to be dedicated as an Illinois nature preserve. This 440 acre site is owned by the Forest Preserve District of Cook County. The site contains flatwoods, upland forest, and marsh communities of the Morainal Section of the Northeastern Morainal Natural Division. Deer overbrowsing has been problem at the preserve.

Cap Sauers Holdings (Cook County) - This 1520 acre site owned by the Forest Preserve District of Cook County is the largest nature preserve in northeastern Illinois. Most of the site is composed of young upland forests and disturbed prairie and oak savanna communities. Dominant geological features include the rolling topography typical of the Valparaiso Moraine of the Northeastern Morainal Division and an esker.

Cranberry Slough (Cook County) - This 372 acre site owned by the Forest Preserve District of Cook County typifies the rolling topography of the Valparaiso Moraine of the Northeastern Morainal Division. Formerly, the site supported a mosaic of prairie and oak savanna. Currently, the steep slopes support both young upland forests and remnants of degraded prairie. The kettleholes currently support sedge meadow and marsh communities.

Lockport Prairie (Cook County) - This 254 acre site is located in the floodplain along the Des Plaines River. The dolomite prairie is a high quality remnant on shallow limestone soils. This type of community has almost completely disappeared from the Midwest. The site also supports a high quality fen, a marsh, and disturbed prairie on the dry ridges. The site is owned by the Metropolitan Water Reclamation District (MWRD) of Greater Chicago but is leased and managed by the Forest Preserve District of Cook County.

Long Run Seep (Will County) - This 41 acre preserve contains a calcareous seep representative of the Northeastern Morainal Division. Two exotic plant species, purple loosestrife and glossy buckthorn, are threatening the native plant communities of the seep. The Illinois Department of Natural Resources owns the site.

Messenger Woods (Will County) - This 410 acre preserve contains significant examples of dry-mesic and mesic upland forest. Wet-mesic upland forest, mesic floodplain forest, wet-mesic floodplain forest, shrub swamp, and wet prairie are also represented here. The site is owned by the Will County Forest Preserve District.

O'Hara Woods (Will County) - The 70 acre O'hara Woods is a natural prairie grove containing undisturbed mesic upland forest and savanna once typical of the Northeastern Morainal Natural Division. It is one of the last undisturbed maple prairie groves remaining in northeastern Illinois. Floodplain and seep natural communities are also present at the site. It is owned by the Village of Romeoville.

Palatine Prairie (Cook County) - This preserve is a 2.5 acre prairie that contains examples of dry-mesic, mesic, and wet-mesic prairie; sedge meadow; and marsh communities. Palatine Prairie is owned by the Palatine Park District and the MWRD.

Palos Fen (Cook County) - Palos fen is a 48 acre graminoid fen, marsh, and oak savanna located at the base of Tinley Moraine where meltwaters from glacial Lake Chicago formerly escaped into the Des Plaines River. The slopes of the moraine support old open-grown oaks and shagbark hickory. This site preserves the only graminoid fen identified in the INAI that has survived on the Chicago Lake Plain. The whole site is 70 acres in size, and it is owned by the Forest Preserve District of Cook County.

Paw Paw Woods (Cook County) - This 105 acre site contains bluff and floodplain communities native to the Des Plaines River Valley. These communities were once common in the Morainal Section of the Northeastern Morainal Natural Division. The location of the preserve in a highly populated urban area makes it an extremely valuable natural resource. The preserve is owned by the Forest Preserve District of Cook County.

Romeoville Prairie (Will County) - The 108 acre Romeoville Prairie contains wet to mesic dolomite prairie, marsh, sedge meadow, springs, fens, and floodplain forest on shallow soil over limestone bedrock. The preserve is located in an area that provided an outlet for glacial Lake Chicago at the end the last glacial period. The large volumes of water eroded away the glacial deposits and carved bluffs up to 50 feet high. The site is owned by the Forest Preserve District of Will County.

Sagawau Canyon (Cook County) - This 12 acre preserve is located in the Des Plaines River Valley, and it has high quality dolomite canyon, cliff, and ravine forests of the Morainal Section of the Northeastern Morainal Natural Division. The site is owned by the Forest Preserve District of Cook County.

Salt Creek Woods (Cook County) - This 245 acre site owned by the Forest Preserve District of Cook County was formerly composed primarily of upland oak-dominated woodland, floodplain woods along Salt Creek, and some prairie. Although nearly all of the prairie that formerly occurred on this site has been lost, important elements of the prairie survive at nearby Wolf Road Prairie.

Santa Fe Prairie (Cook County) - The 10.8 acre Santa Fe Prairie contains some of the only remaining dry-mesic and mesic gravel prairie in Illinois. In addition the site also supports wet prairie and marsh. It is located along the Des Plaines River in Hodgkins. The site is owned by the Burlington-Northern Santa Fe Corporation.

Wolf Road Prairie (Cook County) - With 44 dedicated acres (80 acres total), the Wolf Road Prairie is an excellent example of the original tallgrass prairie of Illinois, and it is one of the largest prairie remnants of its type remaining in the Chicago area. Marsh and oak savanna are also represented at this site. The site is owned by the Illinois Department of Natural Resources and the the Forest Preserve District of Cook County.

Terrestrial Natural Community Descriptions

The natural community classification system used in this report was developed by White and Madany (1978) for use in the INAI. Based on this classification, nine natural community classes have been recognized in Illinois. They are: **Forest, Prairie, Savanna, Wetland, Lake and Pond, Stream, Primary, Cave, and Cultural.**

A **natural community** is a group of organisms that are interrelated with each other and their environment (White 1978). *Natural communities* are classified by considering many natural features and choosing the dominant features to identify, name, and describe them. Important characteristics for identifying and delineating natural communities include physiognomy, soil moisture, substrate, soil reaction, species composition, vegetation structure, and topographic position. In this classification system, vegetation is commonly used to identify, name, and describe natural communities, but plant communities are not necessarily synonymous with natural communities. Plant communities are features of natural communities, and more than one plant community may exist in a natural community. The descriptions that follow rely heavily on lists of characteristic plant species to differentiate the natural community types. *Soil moisture is a basic characteristic used to distinguish the natural 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 within the LDPRAA (Table 10) were determined by examining data from several sources. These include descriptions of existing natural community types as well as natural communities inferred to have occurred prior to European settlement and large-scale alteration of the landscape. Since native vegetation in the LDPRAA has been so greatly converted, modified, and degraded, some of the following community types may no longer persist.

Surprisingly, published descriptions of vegetation in the region are limited in number and focus mostly on areas outside the LDPRAA boundary (e.g., Sheviak and Haney 1973, Taft and Solecki 1990, Bowles et al. 1996, Young 1986, Wilhelm 1991) or are too general to provide detailed community descriptions (e.g., Cowles 1901a, 1901b, Fuller 1935). *Plants of the Chicago Region* (Swink and Wilhelm 1994), an indispensable botanical resource for the several county (and State) Chicago region, primarily is an annotated checklist with distribution maps and keys. However, it also contains fairly detailed community

descriptions for the many varied habitat types in the region, including many found in the LDPRAA. However, because of the greater regional scope, many taxa characteristic of certain habitat types are not typical of habitats in the LDPRAA. Specific data sources used for the following accounts include unpublished Illinois Department of Natural Resources Natural Heritage database records on community types found in INAI natural areas, descriptions of vegetation in unpublished technical reports (Taft 1989a, 1989b, 1990a, 1990b, 1991, 1992a, 1994, 1996b, 1997b, 1999), unpublished field notes from Critical Trends Assessment Project botanists (Carroll 1999, Dassler 1999), and, courtesy of the Illinois Nature Preserves Commission, community descriptions in proposals for nature preserve dedications (Packard 1981; Picken and Paulson 1981; Racicot 1984; Greenberg 1986; Glass 1989; Keibler 1993; DeMauro 1994; Byers 1995; Byers and Johnson 1996). Individual biologists and others that contributed to site and community descriptions among unpublished materials in the INPC and Illinois Natural History Survey (INHS) files include: John Taft, John Schwegman, Robert Betz, Marlin Bowles, Margaret Cole, Steve Byers, Randy Nýboer, Marty Jones, Chris Anchor, Douglas Wallace, Steven Apfelbaum, Ray Schulenberg, Gerould Wilhelm, Steve Packard, Lydia Myers, and Barbara Turner.

The botanical nomenclature used follows Mohlenbrock (1986). Scientific names corresponding to the common names used in this text, as well as habitats of occurrence, are listed in Appendix 1. Appendix 2 sorts this species list by Latin name.

Table 10. Terrestrial natural communities known or believed to have occurred formerly in the Lower Des Plaines River Assessment Area.¹

FOREST	WETLAND	PRAIRIE
Upland forest	Marsh	Prairie
dry-mesic upland forest	marsh	dry prairie
mesic upland forest	Swamp	dry-mesic prairie
wet-mesic upland forest	shrub swamp	mesic prairie
Floodplain forest	Bog	wet prairie
mesic floodplain forest	Fen	Gravel Prairie
wet-mesic floodplain forest	graminoid fen	dry gravel prairie
wet floodplain forest	Sedge Meadow	dry-mesic gravel prairie
Flatwoods	sedge meadow	mesic gravel prairie
northern flatwoods	Seep and Spring	Dolomite Prairie
	seep	dry dolomite prairie
	calcareous seep	dry-mesic dolomite prairie
CULTURAL	LAKE & POND	mesic dolomite prairie
cropland	Pond	wet-mesic dolomite prairie
pastureland	Lake	wet dolomite prairie
successional field		
developed land (urban)	PRIMARY	SAVANNA
tree plantation	Cliff	Savanna
artificial pond	dolomite cliff community	dry-mesic savanna
artificial lake		mesic savanna
prairie restoration		
wetland reconstruction		

¹ Adapted from the Illinois Natural Areas Inventory's community classification (White and Madany 1978).

Forest

Forests are communities that are dominated by trees, with an average canopy cover usually greater than 80%. Forests in the LDPRAA 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 pre-European settlement fires, forests in the LDPRAA historically have been concentrated on the slopes, ravines, and bottomlands associated with the major drainages and in protected areas associated with moraines (Figure 5). The subclasses of forests in Illinois include Upland forest, Sand forest, Floodplain forest, and Flatwoods. All the forest subclasses are found in the LDPRAA except for Sand Forest (Table 10). The distinct community types within each subclass are described below. Approximately 16.5% (37,788 acres) of the LDPRAA was once forested based upon information in the Government Land Office survey records. Currently, about 19.4% (44,430 acres) of the LDPRAA is forested, but only about 432 acres at 11 sites within the LDPRAA (0.97% of the remaining forest, 1.1% of the originally forested area, and 0.2% of the total land area) remains as high-quality undegraded forest (Table 6; Illinois Department of Natural Resources 1999). Reasons for a greater amount of forest cover currently than prior to European settlement may be attributed to fire suppression (see discussion under Savanna) and tree planting.

Common **ecological problems** associated with forest communities, in general, include habitat degradation, fragmentation, exotic species invasions, altered hydrology and water-chemistry of surface waters, and fire absence, particularly in upland forests and flatwoods. A typical source of habitat degradation in forests is overgrazing, not only by domestic livestock but also by white-tailed deer which have increased substantially in numbers recently (Anderson 1997). This grazing often produces changes in forest compositional and structural characteristics. Like in much of Illinois, grazing-sensitive species probably have been eliminated from many forest remnants in the LDPRAA. In contrast, species that increase with grazing (e.g., thorn-bearing taxa [e.g., red haw, honey locust, Missouri gooseberry, and *Rubus* spp.], exotic species [e.g., Osage orange, multiflora rosa, and garlic mustard], and certain weedy native species) are often abundant in grazed forests. In many cases, 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. In the Chicago region, even sites that have not been degraded by past grazing are infested with numerous exotic species. Some of these are particularly abundant and pernicious and represent great threats to the long-term maintenance of biodiversity in the region. Complete restoration of these degraded sites may not be possible without intensive management including efforts at reintroduction of native species. Finally, fire absence in upland forest communities typically results in compositional changes in more mesic sites and primarily structural changes in drier sites, such as increases in both stem density of woody plants and shade. The result is often a reduction in cover and diversity of the herbaceous ground flora, typically the most diverse stratum in Illinois woodlands (e.g. Taft et al. 1995).

Upland Forest - The total extent of upland forest in the LDPRAA is estimated to be about 41,820 acres or about 18.3% of the LDPRAA (Illinois Geographic Information System). Upland forest communities can be classified further 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). The following community types occur in the LDPRAA.

Dry-Mesic Upland Forest - This natural community occurs in the LDPRAA on the upper slopes and ridges of the dissected terrain bordering the Des Plaines River and major tributaries. The total extent in the LDPRAA is unknown. A total of 150 acres of dry-mesic upland forest among four sites in the LDPRAA are recognized as high quality and of statewide significance by the INAI (Table 6). This accounts for about 4.9% of the total undegraded Dry-Mesic Upland Forest (Grades A & B) remaining in Illinois. An additional 50 acres of Dry-Mesic Upland Forest occurs along a portion of the LDPRAA border that is also considered high-quality (Messenger Woods) by the INAI, and some of the acreage at this site may occur within the Assessment Area boundary. If the 50 acres at Messenger Woods was added to the Assessment Area total, the LDPRAA would have 6.5% of the statewide total Dry-mesic upland forest.

Dominant **canopy trees** are shagbark hickory, white ash, white oak, red oak, and black oak. Common to occasional **subcanopy trees** include sugar maple, Juneberry, blue beech, hop hornbeam, eastern redbud, witch hazel, black cherry, common blackberry, 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 woodland agrimony, wild ginger, ebony spleenwort, tall anemone, pussy toes, heart-leaved aster, Short's aster, ear-leaved brome grass, sedges (e.g. *Carex blanda*, *C. hirsutella*, *C. pennsylvanica*), poverty oat grass, pointed tick trefoil, spring beauty, bottlebrush grass, white snakeroot, shining bedstraw, stickseed, common satin grass, common cinquefoil, black snakeroot, false Solomon's seal, elm-leaved goldenrod, and early horse gentian.

One species listed by the Illinois Endangered Species Protection Board (IESPB), the northern cranesbill, is known from two dry-mesic forests outside the LDPRAA (Table 9). This species is known to increase following ground fire (Herkert 1991). The major **ecological problems** associated with Dry-Mesic Upland Forests in the LDPRAA are degradation from grazing (past grazing by domestic stock, present grazing by large deer herds), habitat fragmentation, fire absence, and invasion by non-native species. Though White and Madany (1978) did not recognize woodland as a separate subclass of forest, dry-mesic upland forests in the LDPRAA could be classified as *Dry-Mesic Woodland* to emphasize the structurally intermediate form between forest and savanna that presumably was characteristic of these sites prior to the alteration of the regional fire regime during post-settlement eras. Fire absence also can lead towards an increased importance of sugar maple in the subcanopy stratum and potentially lesser importance of oaks in the canopy. Where oaks have been removed by selective logging practices, black cherry, shagbark

hickory, slippery elm, and possibly sugar maple are among the species that can gain prominence in the canopy. Non-native species in dry-mesic upland forest include multiflora rose, Japanese barberry, burning bush, garlic mustard, various bush honeysuckles, common buckthorn, and European highbush cranberry. The latter four taxa (group of taxa including the bush honeysuckles) are among the most pernicious species and form one of the most challenging exotic species problems in Illinois and North America.

Mesic Upland Forest - Mesic Upland Forest is probably the most prevalent upland forest type in the LDPRAA, though no data are available on the total extent. Mesic Upland Forests are found on lower slopes, in ravines, on high terraces of the major streams and tributaries, and occasionally as isolated remnants of former large blocks of forest. A total of 144 acres of this community type among four sites in the LDPRAA is recognized by the INAI as high quality and of statewide ecological significance (Table 6). This is about 0.32% of the remaining forest cover in the LDPRAA, and 5.6% of the total undegraded mesic upland forest remaining in Illinois (White 1978; IDNR Natural Heritage Database). Similar to the situation with Dry-Mesic Upland Forest, one site (Messenger Woods) occurs partially in and out of the LDPRAA and contains additional area (70 acres) of undegraded mesic upland forest. If this total is added to the amount completely within the Assessment Area, the new total is 214 acres; about 0.48% of the remaining Upland Forest in the LDPRAA and about 8.5% of the statewide category I total.

Species composition is relatively rich including numerous taxa at each forest stratum. Sometimes no species are dominant. Characteristic **canopy tree** species include bur oak, white oak, red oak, white ash, sugar maple, shagbark hickory, and basswood. Occasional tree species include: black maple, bitternut hickory, hackberry, black walnut, black oak, black ash, and American elm. **Subcanopy** species include Ohio buckeye, hawthorns (e.g., *Crataegus crus-galli*, *C. mollis*, and *C. pruinosa*), blue beech, hop hornbeam, black cherry, witch hazel, slippery elm, and box elder. Numerous native **shrub** species are present including: gray dogwood, alternate-leaved dogwood, hazelnut, wahoo, running strawberry bush, wild plum, choke cherry, prickly gooseberry, Missouri gooseberry, black raspberry, common blackberry, elderberry, bladdernut, maple-leaved arrowwood, nannyberry, black haw, downy arrowwood, and prickly ash. **Woody vines** include Virginia creeper, bristly green briar, poison ivy, and riverbank grape. **Herbaceous groundcover** composition includes a rich assortment of species, particularly spring ephemerals. Selected taxa reported from the LDPRAA include: white baneberry, wild leek, wild garlic, sicklepod, wild sarsaparilla, 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, sharp-lobed hepatica, great waterleaf, false rue anemone, sweet cicely, Virginia bluebells, common phlox, mayapple, Solomon's seal, bloodroot, false Solomon's seal, black snakeroot, common snakeroot, starry campion, rue anemone, white trillium, prairie trillium, horse gentian, bellwort, and downy blue violet.

Species of Mesic Upland Forests reported from the Assessment Area that are listed as threatened or endangered by the IESPB include northern grape fern, pretty sedge (*Carex woodii*), dwarf raspberry, and Canada violet. Additional T&E species near the Assessment Area include false bugbane, spotted coral-root orchid, millet grass, grove blue grass, downy Solomon's seal, corn salad, hairy white violet, and dog violet. Data on status, habitat, and distribution for these taxa are included in Table 9. The major **ecological problems** associated with Mesic Upland Forests are degradation from grazing, habitat fragmentation including residential developments, and exotic species invasion. Among the more abundant exotic species within mesic upland forest include the shrubs multiflora rose, Japanese barberry, burning bush, common buckthorn, European highbush cranberry, the bush honeysuckles (especially *Lonicera maackii*), and the herb garlic mustard. The latter four taxa are extremely pernicious ecologically and pose among the most severe threats to community integrity in the Assessment Area and Illinois. Dame's rocket (*Hesperis matronalis*) is an exotic herbaceous species that occurs in the region and appears to fit the model of a potentially serious invasive pest in Mesic Upland and Floodplain Forest systems. This attractive and fragrant plant easily escapes from cultivation.

Wet-Mesic Upland Forest - Small stands of this natural community type may be found locally in Mesic Upland Forest complexes in the LDPRAA, but no data are available on the total extent. However, no high-quality remnants have been identified within the LDPRAA. Examples of this forest type have been found at Messenger Woods (DeMauro 1994), and other localized examples are present in the region (eg. Thorn Creek Woods in Will County [Solecki and Taft 1986]). Typically, Wet-Mesic Upland Forest occurs where there are localized drainage limitations within an upland forest. Often, drainage is limited by a slowly permeable subsoil horizon. Areas of seepage may contribute to locally saturated soils and can support this natural community. Where depressions occur in an upland forest, ponding may occur for variable periods. Characteristic **canopy** species include slippery elm, green ash, and swamp white oak. Other less dominant species may include shagbark hickory, bur oak, and white ash. A subcanopy often is absent. Groundcover species may include a few wetland sedges and ferns.

Tuckerman's sedge is a state endangered plant that is restricted to Wet-Mesic Upland Forests and Northern Flatwoods in the region. Many of the **ecological problems** that plague Wet-Mesic Forests are the same as for Mesic Forests.

Floodplain Forest - These are characterized by edaphic conditions of poor drainage and slow permeability. Local areas of sand and gravel increase permeability. Floodplain Forest communities in Illinois include *Mesic*, *Wet-Mesic*, and *Wet Floodplain Forest* and are classified according to characteristics of flooding. Wet Floodplain Forest occurs in the floodplain bordering rivers and, for this report, includes the river bank. Wet-Mesic to Mesic Floodplain Forests occur on low and high terraces, respectively. The total extent of Floodplain Forest in the LDPRAA is estimated to be about 2,610 acres, or about 1.1% of the total area (IGIS database). 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. Generally, flooding is of shorter duration and less frequency in mesic floodplain forests. Wet-Mesic Floodplain Forests are intermediate. Diversity of species composition tends to increase from Wet to Mesic Floodplain Forest. Compositional changes favoring more flood tolerant tree species like silver maple appear to have occurred since presettlement conditions along some Illinois streams (e.g., King and Johnson 1977, Nelson et al. 1994) and may have occurred in floodplain forests within the LDPRAA.

Ecological problems in floodplain forests involve siltation from silt-laden flood waters, changes in the hydrological regime (e.g., stream entrenchment or increased flooding duration and frequency due to changes in the upper watershed), fragmentation, grazing, exotic species invasion, the construction of barge or recreational facilities, and agricultural development. A description of the composition of Floodplain Forest for the LDPRAA follows.

Mesic Floodplain Forest - There is no estimate of the proportion of the approximately 2,610 acres of Floodplain Forest within the LDPRAA that is Mesic Floodplain Forest. A total of 11 acres at one site (Paw Paw Woods) within the LDPRAA has been identified as a high-quality, undegraded natural community (Table 6). Compared with other Floodplain Forest communities, a relatively greater importance of upland tree species often can be found in this high terrace community since the relatively brief flooding duration and lower flooding frequency pose fewer limitations to these species.

Common to occasional **canopy trees** typically 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 paw paw, red hawthorn, red mulberry, and slippery elm. **Shrubs** include redbud, Missouri gooseberry, and bladdernut. **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, paniced aster, lady fern, spring beauty, tall bellflower, sedges (e.g. *Carex blanda*, *C. davisii*, *C. jamesii*), wild chervil, blue-eyed Mary, sweet cicely, honewort, Virginia blue bells, mayapple, Solomon's seal, common snakeroot, Virginia wild rye grass, nodding fescue grass, common wood reed, white avens, swamp buttercup, wood sage, and wild yam.

One watch-list species, the butternut (*Juglans cinerea*), can occur in Mesic Floodplain Forest natural communities in the LDPRAA, but it is more typical of mesic forested slopes. Corn salad (*Valerianella chenopodiifolia*) is a state endangered plant that can be found in Floodplain Forests. There are populations of corn salad in the region but outside the LDPRAA (Table 9).

The major **ecological problems** associated with Mesic Floodplain Forests are extended flooding, draining, clearing for agriculture, degradation from grazing, overbrowsing by

increasing deer populations, exotic species introductions, and logging. Since this is a moist forest, fire is not considered to be a maintaining factor, and if intense could be detrimental to the community. Among the common exotic species are the trees white mulberry and Osage orange, the shrubs common buckthorn, amur honeysuckle and multiflora rose, and herbaceous species garlic mustard, creeping Charlie, dame's rocket, moneywort, orange day lily, and reed canary grass.

Wet-Mesic Floodplain Forest - There is no estimate of the proportion of the approximately 2,610 acres of Floodplain Forest within the LDPRAA that is Wet-Mesic Floodplain forest. A total of 26 acres at one site (Paw Paw Woods) within the LDPRAA has been identified as a Grade B, relatively undegraded natural community (Table 6). Composition of this community type can be relatively rich because it includes some species from Mesic Upland Forest as well as species from Wet Floodplain Forest.

Common to occasional **canopy trees** include silver maple, bitternut hickory, hackberry, honey locust, green ash, black walnut, eastern cottonwood, 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 green briar, and riverbank grape. **Groundcover** species include giant ragweed, green dragon, panicled aster, common beggar's 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 grass, cleavers, white avens, cow parsnip, wood nettle, orange jewelweed, clearweed, woodland bluegrass, swamp buttercup, smooth hedge nettle, Virginia bluebells, common phlox, wild goldenglow, black snakeroot, common snakeroot, and Missouri violet.

No threatened or endangered plant species currently are known from Wet-Mesic Floodplain Forest in the LDPRAA. **Ecological problems** include changes in the watershed that alter the flooding regime, severe grazing, and exotic species introductions. Since this is a moist forest, fire is not considered to be a maintaining factor, and may actually be detrimental to the community. Exotic species can be numerous and abundant and include garlic mustard, common burdock, helleborine, creeping Charlie, yellow iris, amur honeysuckle, Tartarian honeysuckle, motherwort, moneywort, white mulberry, self-heal, common buckthorn, glossy buckthorn, multiflora rose, bittersweet nightshade, and European highbush cranberry. The lesser celandine (*Ranunculus ficaria*) is an exotic species that recently has begun to spread in floodplain habitats in the Chicago region (Swink and Wilhelm 1994) and could become locally abundant, particularly where soil is bare.

Wet Floodplain Forest - There is no estimate of the proportion of the Floodplain Forest within the LDPRAA that is Wet Floodplain Forest. No examples of high-quality Wet Floodplain Forest are known within the Assessment Area. Wet Floodplain Forest is typically found on the lowest terrace adjacent to a river or stream. 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 eastern cottonwood. **Subcanopy trees** include box elder, 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, wild goldenglow, panicked aster, several sedges (e.g. *Carex grayi*, *C. tribuloides*), blue lobelia, honewort, Virginia wild rye grass, cleavers, white avens, orange jewel weed, clearweed, late boneset, creeping lovegrass, smooth hedge nettle, wild cucumber, rice cutgrass, fog fruit, dotted smartweed, common smartweed, common cocklebur, tall water hemp, and Missouri violet.

One Illinois endangered species, the heart-leaved plantain (*Plantago cordata*), is known from this plant community outside the Assessment Area in DuPage County. It is generally found along clear streams (Table 9).

Ecological problems in the Wet Floodplain Forest are similar to those listed for the other floodplain forest communities.

Flatwoods - Flatwoods are open woodlands of level uplands and terraces that occur on impervious subsoil horizons (claypans) and have seasonally wet and dry soils (White and Madany 1978, Taft et al. 1995). Microdepressions often retain water during wet periods and wetland species can be locally common. Local patterns in available water-holding capacity, including depth to the claypan, and cation content of the soil are important variables explaining tree species composition, diversity, and density in southern flatwoods (Taft et al. 1995). In Illinois, three different flatwoods community types are distinguished based on bioregional and edaphic factors. These include *Southern Flatwoods*, *Sand Flatwoods*, and *Northern Flatwoods*; the latter is a community type found in the LDPRAA. Maintenance of groundcover species diversity in all flatwoods communities appears to be dependent on periodic fire.

Northern Flatwoods - Northern Flatwoods in Illinois are found on poorly drained sites within the Valparaiso morainic system (White and Madany 1978), largely within the LDPRAA. There is no estimate currently available for the total amount of presettlement Northern Flatwoods in Illinois or the LDPRAA. A total of 31 acres of high-quality northern flatwoods (about 36% of the statewide total) have been identified at a single site from within the Assessment Area (Table 6). An additional site outside the LDPRAA exists with about 54 acres of high-quality Northern Flatwoods. These two sites together constitute essentially all of the undegraded Northern Flatwoods known from Illinois. There may be remnants in the Assessment Area with restoration potential. Little

comprehensive data currently are available on the structure, composition, and diversity patterns in Northern Flatwoods. However, general trends may be similar to Southern Flatwoods (Taft et al. 1995) where the groundcover stratum by far supports the greatest species diversity and long periods of fire absence appears to lead to significant reduction in overall plant species diversity. The composition is described briefly below.

Common **canopy** species include swamp white oak, white oak, and Hill's oak; occasional species include green ash, black ash, red maple, silver maple, American elm, red oak, and bur oak. **Subcanopy** species include box elder, big-tooth aspen, and trembling aspen. **Shrubs** include common dewberry and Iowa crabapple. **Vines** include Virginia creeper and poison ivy. **Groundcover** species include a remarkable diversity of sedges (*Carex* species) including: *Carex alopecoidea*, *C. amphibola*, *C. annectans*, *C. blanda*, *C. caroliniana*, *C. conjuncta*, *C. cristatella*, *C. crus-corvii*, *C. gracillima*, *C. granularis*, *C. grayi*, *C. hirtifolia*, *C. jamesii*, *C. lupuliformis*, *C. lupulina*, *C. muskingumensis*, *C. oligocarpa*, *C. retroflexa*, *C. rosea*, *C. sparganioides*, *C. squarrosa*, *C. tenera*, *C. tribuloides*, and *C. tuckermanii*, a species listed as endangered by the IESPB (Herkert 1991). Other groundcover species include tall agrimony, autumn bent grass, green dragon, wild sarsaparilla, common wood reed, common water plantain (ponds), swamp milkweed, Virginia rye, fowl manna grass, white avens, Virginia waterleaf, orange jewelweed, white grass, white snakeroot, sensitive fern, blue flag (ponds), false Solomon's seal, red trillium, spinulose shield fern, rattlesnake plantain (rare), and swamp buttercup.

Species listed by the IESPB as threatened and endangered (Herkert 1991) that have been reported from Northern Flatwoods include Tuckerman's sedge, purple fringed orchid, dwarf raspberry, buffalo clover, American dog violet, and hairy white violet (Table 9). **Ecological problems** associated with northern flatwoods include fire absence, habitat degradation from grazing and other disturbances, and exotic species invasion. Exotic species include common and glossy buckthorn, Tartarian honeysuckle, and garlic mustard. Altered hydrology due to urbanization and surface-water pollution by deicing salts are suspected compounding sources of habitat degradation and altered species composition (Johnson no date).

Prairie

The Prairie natural community class includes natural communities dominated by grasses on mineral soil. Low shrubs may dominate locally; trees may be present, but less than ten percent of the area has a tree canopy (White and Madany 1981). Six prairie subclasses are recognized in Illinois: Prairie (tallgrass prairie on silt-loam soils), Sand Prairie, Gravel Prairie, Dolomite Prairie, Hill Prairie (including loess and glacial drift hill prairie), and Shrub Prairie (White and Madany 1978). Considering the distribution of prairie and forest in Illinois at the time of European settlement (about 1820) about 83% of the LDPRAA was thought to be tallgrass prairie (Anderson 1970, GIS database). This estimate may be a bit high because some of areas may have actually been savanna (Moran 1980). Among the subclasses, Prairie, Gravel Prairie, Dolomite Prairie, and possibly Shrub Prairie are/were

present in the Assessment Area (Table 10). The subclasses, like upland forest communities, are further distinguished by 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 prairie natural communities among these soil-moisture variations. Silt-loam prairies mostly have been destroyed for agricultural development; nevertheless, remnants have survived in the LDPRAA. Shrub Prairie is prairie dominated by shrubs and is represented today primarily by mesic-to-wet-mesic sandy sites, particularly in the Kankakee Sand Area and the southern portion of the Chicago Lake Plain (White and Madany 1978). Such soils do not appear to occur within the LDPRAA. Another Shrub Prairie type, though no undegraded remnants currently are known, is the silt-loam prairie with strong dominance of hazel and wild plum (White and Madany 1981). This community type has also been referred to as barrens (Bowles and McBride 1994).

Common **ecological problems** associated with Prairie, in general, include *fragmentation, exotic species invasions, fire absence, and habitat degradation*. Small, isolated fragments tend to support many species at low population levels (thus prone to local extinction) too remote to be enhanced through natural mechanisms of species dispersal. Small, isolated prairie remnants also may be lacking appropriate pollinator species for successful sexual reproduction of many outcrossing species. The greater edge-to-volume ratios of small sites offer greater opportunities for exotic species invasions since the matrix 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 results in ecological changes such as encroachment of woody plants that can eliminate many shade-intolerant prairie species. Fire absence also can lead to a severe invasion of exotic cool-season grasses like the ubiquitous species meadow fescue, smooth brome, and Kentucky bluegrass. Exotic species and woody encroachment pose some of the most severe threats to the integrity of existing high-quality prairie remnants in the LDPRAA. Overgrazing by domestic stock and deer can degrade prairie remnants by eliminating many species and promoting the increase of several weedy native and non-native taxa. Soil disturbances such as past efforts at cultivation, grazing by hooved mammals, or soil scraping (typical of many railroad rights-of-way) result in loss of species and opportunities for the establishment of weedy taxa. All of these factors, and combinations of factors, tend to result in loss of species diversity and ecological integrity for all prairie community types.

Prairie - Although approximately up to 80% of the LDPRAA was once Prairie, only about 37 acres (0.02% of original extent) among one soil-moisture class (mesic) remains in a high-quality, undegraded, condition (Table 6). In addition, there may be noteworthy remnants of Prairie in railroad rights-of-way within the LDPRAA that persist in a degraded condition. An unknown quantity remains that with proper management may be restored to a higher-quality condition. Many common prairie species respond in predictable ways along soil-moisture gradients. However, where gradients are not interrupted, species respond individually to soil moisture differences and the separate community types can merge gradually and imperceptibly forming complexes of associations. The characteristic species of each soil-moisture class for tallgrass prairie are described below.

Dry-Mesic Prairie - No areas of high-quality Dry-Mesic Prairie are known from the LDPRAA. If present historically, they probably occurred on crests and upper slopes of the major moraines on well-drained and somewhat permeable soils with moderate water-holding capacity. Degraded remnants with potential for rehabilitation may be present in the LDPRAA. The following is a general description for dry-mesic prairie in Illinois; some taxa (e.g., June grass, sessile-leaved tick trefoil) have not been verified from prairie within the LDPRAA but probably are present.

Common **grass** species include side oats gramma, panic grass, June grass, little blue stem grass, Indian grass, prairie dropseed, and porcupine grass. Common to occasional **sedge** species include *Carex bicknellii*, *C. meadii*, and *C. tetanica*. Characteristic **forbs** include: green milkweed, sky-blue aster, heath aster, false boneset, false toadflax, purple prairie clover, sessile-leaved tick trefoil, pale-purple coneflower, flowering spurge, rough blazing star, hoary puccoon, wild bergamont, black-eyed Susan, wild petunia, rosinweed, showy goldenrod, and yellow pimpernel. **Shrubs** include: leadplant, New-Jersey tea, smooth sumac, pasture rose, and prairie willow.

Typical **ecological problems** in remnants include fire absence (and consequential woody plant encroachment), habitat degradation from soil disturbances, and exotic species invasion and establishment. Common exotic species include: white sweet clover, yellow sweet clover, parsnip, Canada blue grass, and Kentucky bluegrass.

Mesic Prairie - Mesic Prairie occurs in an intermediate soil-moisture zone in the landscape between Dry-Mesic Prairie and Wet-Mesic Prairie. Soils can be moderately well drained but often are saturated during short periods of the growing season. These favorable moisture conditions allow for the greatest diversity of plant species. 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) remnants. The 80 acre Wolf Road Prairie boasts a species list of 320 plants. There are only about 37 acres of high-quality, undegraded mesic prairie identified in the LDPRAA all at one site (Wolf Road Prairie). This amount is 47% of the high-quality prairie remaining in the LDPRAA but only 0.02% of the original prairie cover in the LDPRAA.

Common **grass** species include big bluestem, Canada wild rye, prairie switch grass, little bluestem, Indian grass, prairie dropseed, and porcupine grass. Common to occasional **sedge** species include *Carex bicknellii*, *C. meadii*, and *C. tetanica*. Characteristic **forbs** include a diverse assemblage of species such as: nodding onion, thimbleweed, little pussy toes, Sullivant's milkweed, orange butterfly weed, heath aster, New England aster, smooth aster, white wild indigo, cream false wild indigo, wild hyacinth, tall coreopsis, white prairie clover, purple prairie clover, showy tick trefoil, shooting star, pale purple coneflower, flowering spurge, rattlesnake master, downy gentian, prairie sunflower, prairie alumroot, yellow star-grass, round-headed bush clover, prairie blazing star, rough blazing star, prairie lily, hoary puccoon, spike lobelia, lance-leaved loosestrife, wild bergamont, wild quinine, lousewort, prairie sundrops, prairie phlox, prairie cinquefoil, slender mountain mint, yellow coneflower, black-eyed Susan, rosinweed, compass plant, prairie

dock, blue-eyed grass, Missouri goldenrod, common spiderwort, common ironweed, Culver's root, prairie violet, and golden Alexanders.

At least five plant species listed as endangered or threatened by the IESPB (Herkert 1991) occur in Mesic Prairies in the LDPRAA. These species are mountain blue-eyed grass, bearded wheat grass, prairie white-fringed orchid, small sundrops, and earleaf foxglove. Data on status and distribution of these taxa are included in Table 9. Typical **ecological problems** in mesic prairie remnants include fire absence (and consequential woody plant encroachment), soil disturbances, and exotic species invasion and establishment. Common **exotic** species in Mesic Prairies include the following taxa: common yarrow, asparagus, smooth brome grass, Queen Anne's lace, orange day lily, amur honeysuckle, white sweet clover, yellow sweet clover, parsnip, Canada bluegrass, Kentucky bluegrass, and white poplar. Despite a history of fire management even high-quality prairie remnants often have a strong presence of the exotic, cool-season grasses Kentucky and Canada bluegrass. Control methods are summarized in the "Summary and Recommendations" section. Evidence of leaf burn and mortality of plants at the edges of prairies bordering cropland in central Illinois suggests that herbicide drift can be a problem, at least to edge species, and may be an unrealized confounding factor throughout prairie remnants where they occur adjacent to cropland. Off-road vehicle use in railroad right-of-ways, and other trespass, is becoming an increasingly damaging problem for these prairie remnants.

Wet-Mesic Prairie - This prairie community occurs in an intermediate zone between mesic prairie and wet prairie on somewhat poorly drained sites. Inundation periods are more brief than in wet prairie; surface water is present after heavy rains, and the water table is near the surface. There are no high-quality, undegraded remnants remaining in the LDPRAA, but degraded remnants do remain. Wet-Mesic Prairie and the following community type, Wet Prairie, often merge with Sedge Meadow, Marsh, and (occasionally) Graminoid Fen or Seep communities forming diverse wetland/prairie complexes.

Grass composition is a mixture of Mesic Prairie and Wet Prairie species and includes: big blue stem grass, blue-joint grass, sweet grass, and prairie cord grass. Common to occasional **sedges** includes *Carex buxbaumii*, *C. cristatella*, *C. gravida*, *C. granularis*, *C. lanuginosa*, *C. stipata*, *C. stricta*, and *C. vulpinoidea*. Characteristic **forbs** include meadow anemone, New England aster, white wild indigo, shooting star, northern bedstraw, narrow-leaved loosestrife, yellow star-grass, prairie sundrops, cowbane, grass-leaf goldenrod, closed gentian, sawtooth sunflower, rough avens, sneezeweed, winged loosestrife, marsh phlox, false dragonhead, common mountain mint, balsam ragwort, prairie dock, Riddell's goldenrod, purple meadow rue, common spiderwort, hairy wood nettle, Culver's root, and wood sage. **Shrubs** are uncommon but may include petioled willow and pussy willow.

Species of Wet-Mesic Prairie in the LDPRAA that are listed by the IESPB (Herkert 1991, 1994) as threatened or endangered include two orchids: white lady's slipper and prairie white-fringed orchid (Table 9). Prairie white-fringed orchid is also listed as threatened by the US Fish and Wildlife Service (1989). White lady's slipper orchid is known from three

localities in the LDPRAA. Prairie white-fringed orchid has been reported from four sites in the LDPRAA. However, at three of these sites this species occurs at low population levels and in some recent years has not been seen (Illinois Department of Natural Resources 1999). The biology of these two orchids has been described by Bowles (1983). Population levels of prairie white-fringed orchid appear to coincide directly with regional rainfall (Bowles et al. 1992). Queen-of-the-prairie is a state endangered plant that can be found in Wet-Mesic Prairies. There is one population known outside of the Assessment Area but within the one-mile buffer zone. **Ecological problems** in Wet-Mesic Prairie are associated primarily with enhanced drainage from tile. Fire absence can result in woody plant encroachment. Exotic species include Kentucky bluegrass, purple loosestrife, reed canary grass, and bittersweet nightshade.

Wet Prairie - Wet Prairies occurred on poorly drained and slowly permeable soils. Surface water is present during the winter and spring, and the soil is nearly always saturated. Plant species diversity is lower than in other prairie communities. There are no high-quality, undegraded remnants remaining in the LDPRAA, but degraded remnants do remain.

The characteristic **grass** species for the community type are prairie cord grass and blue-joint grass; sweet grass occurs occasionally. **Sedges** are often common including *Carex atherodes*, *C. cristatella*, *C. granularis*, *C. lacustris*, *C. lanuginosa*, and *C. stipata*. **Common forbs** include New England aster, swamp milkweed, tall swamp marigold, prairie Indian plantain, marsh marigold (near seeps), spotted Joe-Pye weed, common boneset, stiff bedstraw, sneezeweed, sawtooth sunflower, winged loosestrife, marsh phlox, common mountain mint, blue flag, marsh vetchling, common water horehound, monkey flower, water smartweed, blue skullcap, late goldenrod, hairy hedge nettle, wood sage, tall water parsnip, waxy meadow rue, and blue vervain. **Shrubs** may include meadow rose, meadow sweet, and petioled willow.

American slough grass, a state endangered plant, and the prairie white-fringed orchid can sometimes be found in Wet Prairies within the LDPRAA. American slough grass is known from only one site within Assessment Area. **Ecological problems** include altered hydrology due to urbanization and this can effect the soil moisture and flooding regime. Exotic species include reed canary grass, a species that can become dominant with soil disturbance and when flooding duration and siltation increases.

Gravel Prairie - The Gravel Prairie subclass includes prairies on gravel or very 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. This is one of the rarest prairie communities in Illinois due to habitat degradation and quarrying, and only about five acres of high-quality, undegraded gravel prairie at two sites have been identified in the LDPRAA (Table 6). An estimate of the total remaining Gravel Prairie in the LDPRAA is unknown as is the pre-European settlement acreage. Descriptions of these natural community types follows.

Dry Gravel Prairie - These prairies are on steep gravel slopes, and the grasses average less than one meter in height. They occur on kames and eskers in the Northeastern Morainal Natural Division and on the slopes of gravel terraces along major rivers. No high-quality remnants of this community are known within the LDPRAA, but there are examples nearby in Kane and Cook counties.

Dominant plant species in this community include the **grasses** little bluestem, Indian grass, porcupine grass, side-oats grama, and prairie dropseed, and the **forbs** few-flowered goldenrod, grooved yellow flax, scurf-pea, small skullcap, stiff sandwort, and yellow puccoon.

Three threatened and endangered plants are known from Dry Gravel Prairie in the LDPRAA. These are prairie bush clover, Tennessee milk-vetch, and small sundrops. Additionally, prairie bush clover is listed by the U.S. Fish and Wildlife Service as a federally endangered species. This plant is known from two sites within the LDPRAA. Hill's thistle is a state threatened species that often occurs in Dry Gravel Prairies, and it is found at one site within the one mile buffer zone outside of the LDPRAA.

Ecological problems in 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 grass; 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.

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 in sites slightly more moist than those of dry gravel prairies. The grass is intermediate in height between Dry Gravel Prairie and Mesic Gravel Prairie. There is only one acre of high-quality, undegraded Dry-Mesic Gravel Prairie at one site (Santa Fe Prairie) in the LDPRAA. This represents about 2.2% of the total grade A and B Dry-Mesic Gravel Prairie in the state and 1.3% of the high-quality prairie remaining in the LDPRAA (Table 6).

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

The same threatened and endangered plants found in Dry Gravel Prairie can also occur in Dry-Mesic Gravel Prairie. The **ecological problems** in this community are the same as listed previously for Dry Gravel Prairie.

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. There is one site (Santa Fe Prairie) with about four acres of high-quality, undegraded Mesic Gravel Prairie. This represents about 21.5% of grade A and B mesic gravel prairie remaining in the state and 5.1% of the high-quality prairie remaining in the LDPRAA (Table 6).

Characteristic or dominant plants in the mesic gravel prairie include the **grasses** big bluestem, prairie brome grass, Indian grass, and prairie dropseed, and the **forbs** low calamint, common valerian, small skullcap, and prairie dock.

The same threatened and endangered plants found in Dry Gravel Prairie and Dry-Mesic Prairie also can occur in Mesic Gravel Prairie. The **ecological problems** in this community also are the same as listed previously.

Dolomite Prairie - Dolomite Prairies occur where dolomite (a form of limestone) is usually less than a few feet below the soil surface. The close proximity of this bedrock strongly influences soil chemistry, permeability, and drainage. Dolomite prairies typically have calcareous soils due to the close proximity of limestone in the rooting zone. Soil moisture (drainage class) depends on topographic position, soil parent material, and soil thickness. The following natural community types are recognized in Illinois: *Dry*, *Dry-Mesic*, *Mesic*, *Wet-Mesic*, and *Wet Dolomite Prairie*. Typical Dolomite Prairies are usually a patchwork of all of these community types because of variable local conditions. All of these natural community types are represented in the LDPRAA. All except the *Dry Dolomite Prairie* are represented by high-quality remnants within the LDPRAA. Typically with sites shallow soils a high soil pH and 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 four species listed as state endangered (Table 9).

Dolomite Prairies occur only locally in the LDPRAA. Dolomite prairie has never been very common, even before European settlement, due to the deep layers of glacial till that covers northeastern Illinois and the underlying bedrock. Dolomite Prairie can be found along the lower Des Plaines River in the southern portion of the Assessment Area where dolomite bedrock is close to the surface. The lower Des Plaines valley was the outlet for the draining of glacial Lake Chicago, and the torrent of waters washed away much of the overlying till. The best examples of Dolomite Prairie in the Assessment Area occur near the cities of Lockport and Romeoville in Will County and outside the LDPRAA in the Prairie Parklands Assessment Area (Hill 1999). About 42 acres of high-quality Dolomite Prairie remain in Illinois (Table 6). Most of the sites that carried this type of prairie were either destroyed by quarrying for flagstone or mining for gravel (J. White, pers. comm.).

Dry Dolomite Prairie - The soils in this prairie type are extremely shallow to negligible and patches of dolomite pavement (exposed bedrock) are common. Due to the droughty conditions, the grass is shorter than one meter. There are no high-quality, undegraded

remnants of Dry Dolomite Prairie remaining in the LDPRAA, but degraded remnants do remain. Characteristic **grass** species are side-oats grama, prairie satin grass, and little bluestem. Characteristic **forbs** include Ohio horse mint, false boneset, and hairy beard tongue.

Dry-Mesic Dolomite Prairie - In this community type the soil depth is slightly deeper over the bedrock than in the dry dolomite prairie, and the prairie is relatively lower in topographic position allowing slightly more water retention in the soil. Grass height is taller and the diversity generally is greater compared with Dry Dolomite Prairie. There are eight acres of Dry-Mesic Dolomite Prairie at one site that remains in a high-quality, undegraded condition. This is over half of the total grade A and B Dry-Mesic Dolomite Prairie for the whole state and about 10.3% of the remaining high-quality prairie in the LDPRAA. The total area of Dry-Mesic Dolomite Prairie remaining in the Assessment Area is unknown.

Representative species found in this community include the **grasses**: little bluestem, side-oats grama, prairie satin grass, tufted hair grass, porcupine grass, Scribner's panic grass, and prairie switchgrass, and the **forbs**: low calamint, false 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, Ohio horse mint, false boneset, and wild petunia.

The lakeside daisy is a species that is unique to Dry and Dry-Mesic Dolomite and Gravel Prairie (Table 9). It is listed by the U.S. Fish and Wildlife Service as federally endangered (Herkert 1991). This species is only found at one location in Will County where it has been reintroduced into the Lockport Prairie. It is also being grown in a prairie recreation at the Morton Arboretum. This species is self incompatible, so preservation of its habitat and proper management of large, genetically diverse populations is crucial to the survival of this species. Slender sandwort, a state endangered species, is almost exclusively restricted to this natural community where the soils are shallow. Slender sandwort is known from four sites within the LDPRAA.

Ecological 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 problematic exotic species that invade this natural community are Canada bluegrass, Kentucky bluegrass, common St. John's-wort, and mullein.

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. Eight acres of high-quality, undegraded Mesic Dolomite Prairie have been identified at one site (Lockport Prairie) in the

Assessment Area. This constitutes all of the grade A and B Mesic Dolomite Prairie that exists in Illinois and 10.3% of the high-quality Prairie remaining in the LDPRAA. Degraded Mesic Dolomite Prairie also exists within the LDPRAA, mostly along the Des Plaines River (Taft 1989a).

Characteristic **grass** species found include: big bluestem, tufted hair grass, prairie dropseed, little bluestem, and Indian grass. Typical **forbs** include: short green milkweed, prairie alum root, round-fruited St. John's wort, northern bedstraw, Ohio horse mint, stiff goldenrod, prairie cinquefoil, and nodding wild onion.

There are two species listed by the IESPB that occur in Mesic Dolomite Prairie found within the LDPRAA that are listed as threatened and endangered (IESPB 1999). They are Tennessee milk vetch and leafy prairie clover. While Tennessee milk vetch can be found in calcareous Gravel Prairies also, leafy prairie clover is almost exclusively restricted to Dolomite Prairies. Leafy prairie clover is listed as a federally endangered species by the U.S. Fish and Wildlife Service (1993), and it is only known from stations along the Des Plaines River and limestone glades in central Tennessee and northern Alabama. This species is not able to withstand the intense competition found in deep-soil prairies, so it can only exist in the shallow soils offered by dolomite prairie. These shallow soils tend to stunt or exclude many of the deep-soil prairie species that occur here. Tennessee milk vetch is found at only one site. **Ecological problems** in this community type are similar to those of Dry-Mesic Prairie but include a greater problem of woody plant encroachment with absence of fire. An additional problem can be created from either drainage or 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 short periods throughout the year. Fens may associate with this vegetation community if there is a dependable groundwater source and peat-forming processes are present. Mesic Prairie conditions and species may be present in this community due to microclimatic and topographic conditions. There are about 15 acres of high-quality, undegraded Wet-Mesic Dolomite prairie at four sites within the LDPRAA. This represents all of the grade A and B that has been identified in Illinois and about 19.2% of the high-quality prairie remaining in the LDPRAA.

Characteristic **grass** species found include: big bluestem grass, blue-joint grass, tufted hair grass, Indian grass, and prairie cord grass. **Sedges** typically may include: *Carex crawei*, *C. sartwelli*, and *C. vulpinoidea*. Typical **forb** species include: northern bedstraw, small fringed gentian, Ohio goldenrod, and Riddell's goldenrod.

Leafy prairie clover, described above, may occur in wet-mesic sites. **Ecological problems** in this community type are essentially the same as those mentioned above for the previous community type.

Wet Dolomite Prairie - Wet Dolomite Prairies are rare communities in which the soil is relatively shallow. These sites are usually saturated, and surface water is often present.

This community type typically is rare even in extensive dolomite areas because depressions usually have deep enough soil to support a sedge meadow at this moisture level. There are five acres of high-quality undegraded Wet Dolomite Prairie that have been identified at one site (Romeoville Prairie) within the LDPRAA. This represents all of the grade A and B wet dolomite prairie in Illinois. An unknown amount of degraded remnants occur in the area, but these tend to occupy sites where there was past flagstone quarrying.

Characteristic **grass** species found include: blue-joint grass, tufted hair grass, prairie cord grass, and Indian grass. **Sedges** found may include: *Carex stricta* and *C. lanuginosa*. Typical **forbs** species include: prairie Indian plantain, golden-seeded spike rush, narrow-leaved loosestrife, Ohio goldenrod, Riddell's goldenrod.

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 LDPRAA. **Ecological problems** in this community type are similar to those in the previously described dolomite prairie communities.

Savanna

Savanna habitats occurred throughout many parts of North America. The Midwest, intermediately located between the eastern forests and grasslands of the great plains, has the environmental conditions and fire history that supported many savanna habitat types (Anderson 1983, Taft 1997a, Anderson and Bowles 1999). 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. Density and percent cover of trees varies and is intermediate between open prairie and closed woodland or forest. In the dissected terrain of major streams, like the Des Plaines River, savannas often occurred associated with a mixture of vegetation types including prairie, woodland, forest, and wetland communities. Midwestern savanna-like habitats have several unifying characteristics including: 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 (Taft 1997a). Oak-dominated systems particularly appear dependent on periodic fire for persistence (Lorimer 1985; Abrams 1992). 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 in North America (e.g., Curtis 1959, White 1978, Nelson 1985, Nuzzo 1986, Anderson and Bowles 1999). Presently in the Midwest former savanna and open-woodland areas can still be recognized locally by the scattered occurrence of large, open-grown oaks now within 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. Typically, the groundcover at pastured sites is floristically degraded and 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. Based on inferred edaphic characteristics in the LDPRAA prior to settlement, two savanna community types probably were present: *Dry-Mesic Savanna* and *Mesic Savanna* (Madany 1981; Table 10). These communities sometimes merge gradually with other community types (e.g., Dry-Mesic Upland Forest, Mesic Prairie).

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. One T&E species found within the LDPRAA from two sites, the savanna blazing star seems to be dependent on Mesic Savanna and Savanna-like habitat of the Tinley and Valparaison morainic systems (Bowles et al. 1988; Table 9). Another T & E species recorded near the LDPRAA and typically found in Mesic Savannas is the pale vetchling.

Fire absence, fragmentation, habitat degradation (in particular, heavy grazing), and exotic species are the primary ecological problems associated with Savanna habitats. Areas of Savanna and former Savanna occur in the LDPRAA where restoration activities are underway (e.g. Packard 1993, Bowles and McBride 1998). Restoration activities include brush cutting, prescribed fire, and exotic species control with much of the effort being volunteer based. Though no Savanna remnants are recognized as Category I natural areas by the Illinois Natural Areas Inventory for the LDPRAA, some degraded remnants have strong restoration potential and others may only be capable of some level of rehabilitation because many species remain missing. The following community descriptions are generalized depictions of the (former) undegraded condition.

Dry-Mesic Savanna - No remnants of Dry-Mesic Savanna are known to exist in an undegraded condition in the LDPRAA. However, this natural community type probably occurred locally on deep, well-drained, fine-textured soils often associated with terminal moraines. These upland sites were exposed to periodic fires. In the absence of fire, these areas rapidly developed into closed woodlands.

The characteristic **canopy tree** of this community type in northeastern Illinois is bur oak. Other trees may include white oak, black oak, and occasionally white ash and shagbark hickory. **Subcanopy** stratum characteristics are dependent on the recent fire history and may include many of the previous species in stages of recruitment together with big-tooth and trembling aspen. **Shrubs** may include lead plant, New Jersey tea, gray dogwood, American hazel, and pasture rose. Savannas share a rich assortment of **groundcover**

species found both in woodlands and prairie depending on fire history. Important **graminoid** species (grasses and sedges) include: big blue stem, little blue stem, Indian grass, poverty oat grass, hairy panic grass, bottlebrush grass, porcupine grass, and the sedges *Carex pensylvanica*, *C. aggregata*, and *C. cephalophora*. Characteristic **forb** species include: nodding wild onion, hog peanut, little pussy toes, Drummond's aster, wild hyacinth, pointed tick trefoil, shooting star, woodland sunflower, veiny pea, yellow star grass, wild quinine, forked chickweed, starry false Solomon's seal, yellow pimpernel, common spiderwort, Venus' looking glass, and Culver's root.

Buffalo clover is a state endangered species extant in the LDPRAA. **Ecological problems** of any remnants would probably include fire absence and a great deal of woody encroachment resulting in loss of groundcover species diversity and cover. Grazing damage may be persistent and exotic species may be abundant. Typical exotics include common burdock, orchard grass, smooth brome, Queen Anne's lace, meadow fescue, Canada bluegrass, and Kentucky bluegrass.

Mesic Savanna - Mesic Savannas typically were associated with prairie groves on level to slightly rolling terrain. Soils were moderately well-drained and usually developed from the same parent material as Dry-Mesic Savanna. Mesic Savannas also may have occurred associated with riparian corridors, and then alluvium or outwash soil parent materials were important. Mesic Savannas are particularly dependent on recurrent fire for maintenance. Without periodic fire, the soil-moisture conditions allow rapid development of woody vegetation cover. Consequentially, due to several factors (e.g., fire absence, habitat loss, and overgrazing) undegraded remnants, though formerly widespread, are among the rarest plant communities in the Midwest and no high quality remnants are known from the LDPRAA. A degraded mesic savanna at Wolf Road Prairie has strong restoration potential (Bowles and McBride 1998).

Similar to the previous community type, the compositional characteristics for Mesic Savannas in the LDPRAA are not completely known, particularly concerning the species-rich groundcover stratum. Again the most characteristic **tree** species of Mesic Savanna is bur oak. White oak and shagbark hickory may be common to occasional at some sites. **Shrubs** are similar to Dry-Mesic Savanna. **Grubs** (resprouted oaks top-killed by fire) may have also been an important shrub component. **Groundcover** species may include greater importance of Mesic Prairie species. Big blue stem and Indian grass are abundant. Many of the groundcover species from Dry-Mesic Savanna are also present in Mesic Savannas. Other **forb** species include spreading dogbane, purple milkweed, prairie milkweed, yellow false foxglove, flowering spurge, wild geranium, false dandelion, rough blazing star, prairie phlox, starry campion, common spiderwort, and early horse gentian. As previously mentioned, savanna blazing star, an Illinois threatened species, is a species that is limited to savanna habitats and is known from the LDPRAA.

Wetland

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands support hydrophytic plants, the substrate is predominantly hydric soil, and the substrate is saturated with or covered by water during a significant portion of the growing season (Suloway and Hubbell 1994). There are approximately 10,633 acres of Wetland in the LDPRAA (GIS database) or about 4.6% of the Assessment Area (Table 2). The Wetland community subclasses in Illinois include Marsh, Swamp, Bog, Fen, Sedge Meadow, Panne, and Seep & Spring (White and Madany 1978). Examples of these subclasses, except for *Bog* and *Panne*, can be found within the Assessment Area. Wetland community types in the LDPRAA, following the natural community classification of White and Madany (1978), include *Floodplain Forests* (about 20.7% of total), *Marsh* (48.9%), *Shrub Swamp* (4.1%), and *Open-Water Wetland* (about 22.5%) including Ponds (Table 10). Lake & Pond and Stream classes are open-water habitats described in the next section.

Wetlands are concentrated along the lower section of the Des Plaines River but can also be found scattered in the northern portions of the Assessment Area in Cook and Du Page Counties. In the eastern two-thirds of DuPage County there are hundreds of swamps, marshes, and kettleholes, indicating a very poorly developed system of natural drainage (Moran 1980). There are a total of 131 acres (1.2% of the wetland total in the LDPRAA) of Wetland (including *Bottomland Forest* and *Wet Prairie*) that are recognized as high-quality and undegraded (Grades A and B). Undegraded Wetland communities in the LDPRAA include *Floodplain Forest*, *Wet Dolomite Prairie*, *Marsh*, *Sedge Meadow*, *Seep*, and *Shrub Swamp*. *Floodplain Forests* were described previously under the *Forest* community class. Typical **ecological problems** for Wetlands include altered hydrology resulting in increased or reduced flooding, ditching or other drainage activities, increased siltation from cultivated uplands, runoff of roadway deicing salts, grazing, and invasion of non-native species.

Marsh - Marshes are palustrine wetlands characterized by having water at or near the surface during most of the growing season, herbaceous vegetation is dominant, and soils are organic or mineral (White and Madany 1978). Two Marsh community types are recognized in Illinois: *Marsh* and *Brackish Marsh*. Only *Marsh* is found in the LDPRAA occupying about 48.8% (5,193 acres; Table 3) of the wetland area. 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 becomes important. 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 grass.

Marsh - Marshes in northeastern Illinois often occur associated with *Sedge Meadow*, *Wet-Mesic to Wet Prairie*, and sometimes *Seeps*. These community types often gradually merge and distinguishing community boundaries can be somewhat arbitrary. Forty-five acres of

high-quality, undegraded Marsh at two sites remain in the LDPRAA. This represents 0.87% of the total Marsh acres in the Assessment Area, 0.47% of the total Wetland acres in the Assessment Area, and about 2% of the total grade A and B marsh remaining in Illinois. There is an additional high-quality site within one mile of the LDPRAA adding an additional six acres to the total.

Characteristic **graminoid** species include the grasses: fowl manna grass, floating manna grass, blue joint grass, common reed grass, rice cut grass, and reed canary grass (probably adventive stock); numerous sedges (e.g., *Carex annectans*, *C. atherodes*, *C. lacustris*, *C. lanuginosa*, *C. sartwellii*, *C. stipata*, *C. tribuloides*, *C. trichocarpa*, *C. vulpinoidea*, *Eleocharis erythropoda*, *E. smallii*); and bulrushes (e.g., *Scirpus acutus*, *S. atrovirens*, *S. cyperinus*, *S. fluviatilis*, and *S. tabernaemontanii*). Common **forb** and other monocot species include sweet flag, common water plantain, Indian hemp, swamp milkweed, nodding beggar's ticks, tall swamp marigold, swamp tickseed, false nettle, marsh bellflower, bulblet-bearing water hemlock, water hemlock, cinnamon willow herb, spotted Joe Pye weed, common boneset, yellow avens, rough avens, saw-toothed sunflower, orange jewelweed, blue flag, path rush, Torrey's rush, common water horehound, tufted loosestrife, winged loosestrife, field mint, meadow parsnip, water smartweed, mild water pepper, yellow water crowfoot, swamp dock, common arrowhead, water parsnip, late goldenrod, bur-reed, woundwort, smooth hedge nettle, wood sage, purple meadow rue, common cattail, and blue vervain. Common **fern** and **fern allies** include common horsetail, scouring rush, and sensitive fern. **Shrubs** include buttonbush, pale dogwood, and red-osier dogwood. Black willow is a common small tree associated with marshes in the LDPRAA.

Threatened or endangered species known from Marsh in the LDPRAA (Table 9) include early dark green bulrush and marsh speedwell. Four other T&E species, beaked sedge, Crawford's sedge, little green sedge, and Richardson's rush occur in marshes near the Assessment Area. Crawford's sedge is a recently discovered species in Illinois (Taft 1992b, 1992c) and is listed as endangered by the IESPB (Illinois Endangered Species Protection Board 1999). This taxon may occur undetected in Marshes within the Assessment Area. **Ecological problems** in Marsh include siltation, runoff of roadway deicing salts, and overabundance of aggressive, disturbance-tolerant native species. Changes in flooding dynamics result in increased frequency and/or duration of flooding, and species intolerant of the new levels will decline and species tolerant of the new levels will increase. Species that increase under these conditions often include reed canary grass, common reed grass, river bulrush, and common cattail. Invasion of exotic species is a serious problem, but compared with upland habitats, relatively few exotic species are present in Wetland communities (Havera et al. 1994). However, a few taxa (e.g., purple loosestrife, glossy buckthorn, bittersweet nightshade, common reed grass, reed canary grass, and narrow-leaved cattail) are serious pests that can threaten the diversity of a Wetland site. Other exotic species present in Marshes within the area include cut-leaved teasel, barnyard grass, yellow iris, Kentucky bluegrass, curly dock, and crack willow.

Swamp - Swamps are dominated by trees, and in Illinois mostly are confined to the southernmost counties. The Swamp community subclass in Illinois includes two community types: *Swamp* and *Shrub Swamp* (White and Madany 1978; Table 9). These wetlands are dominated by woody vegetation and remain inundated throughout much of the year.

Shrub Swamp – This community 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 or Marsh community. Sites with peat development are separately classified as Shrub Bog or Shrub Fen communities. A portion of some Marsh, Sedge Meadow, and Seep complexes in the LDPRAA are partially dominated by shrubs and may qualify for Shrub Swamp natural community designation. The INAI has identified four acres of Shrub Swamp in the LDPRAA that are considered high-quality, undegraded, natural areas. This is about 0.9% of the remaining Shrub Swamp in the LDPRAA, about 0.04% of the remaining Wetland in the LDPRAA, and about 1.3% of the total Grades A and B Shrub Swamp remaining in Illinois.

Typically, species composition includes many taxa from the marsh or Sedge Meadow community types. However, **shrubs** are dominant including: buttonbush, pale dogwood, red-osier dogwood, American black current, pussy willow, sandbar willow, blue-leaved willow, petioled willow, heart-leaved willow, silky willow, shining willow, hardhack and meadow sweet.

No threatened or endangered species are reported from the Shrub Swamp community type within the LDPRAA. However, swollen sedge (*Carex intumescens*) has been reported from a shrubby wetland at Kennicott's Grove, a forest preserve in Cook County. The precise community type is unknown, but this occurrence may be in a shrub swamp near the Assessment Area. **Ecological problems** are similar to the Marsh community type.

Bog - Bogs are acid peatlands (peat [partially decomposed plant matter] accumulates when plant growth exceeds decomposition), and in Illinois they are mostly oligotrophic (poorly fed) wetlands. Today in Illinois, bogs are restricted to the Morainal Section of the Northeast Morainal Natural Division. Four Bog communities are recognized in Illinois: *Forested Bog*, *Tall-Shrub Bog*, *Low-Shrub Bog*, and *Graminoid Bog* (White and Madany 1978). Most Bogs occur northwest of the LDPRAA in the Fox River valley basin, including Antioch Bog which contains the *tall-shrub bog* natural community. There were possibly bogs or bog-like communities in the presettlement landscape because of the occurrence of pockets of Grayslake peat soil type in DuPage county (Willman and Lineback 1970). However, since no Bog communities are known within the LDPRAA today, they will not be described here in detail. Two Lake County, Illinois Bogs that occur north of this Assessment Area have been described in detail (Sheviak and Haney 1973; Taft and Solecki 1990). Bogs typically contain numerous species listed as threatened or endangered in Illinois. At Antioch Bog several rare species, including some listed as threatened or endangered by the IESPB (Herkert 1991), have been reported including: larch (*Larix laricina*), highbush blueberry (*Vaccinium corymbosum*), dwarf birch (*Betula*

pumila), three-seeded bog sedge (*Carex trisperma*), rusty cotton grass (*Eriophorum virginicum*), alder buckthorn (*Rhamnus alnifolia*), inland shadbush (*Amelanchier interior*), red-berried elder (*Sambucus pubens*), and white beak rush (*Rhynchospora alba*). Shreiber Lake Bog also contains a graminoid bog community. Populations of four Illinois threatened and endangered species occur there including: large cranberry (*Vaccinium macrocarpon*), round-leaved sundew (*Drosera rotundifolia*), cordroot sedge (*Carex chordorrhiza*), and white beak rush (*Rhynchospora alba*) (Illinois Department of Natural Resources 1999).

Fen - Fens are peatlands that are constantly recharged with mineral-rich groundwater that has percolated through calcareous gravel in adjacent moraines or ice contact (kames and eskers) features, and have the majority of their peat derived from sedges (Stynoff and Hess 1986, Taft and Solecki 1990). Moran (1981) has described "prairie fens" as areas of firm sapric peat soils constantly saturated with cold, calcareous, artesian groundwater, and supporting a distinctive calciphilous herbaceous flora. Prairie fens are usually dominated by typical prairie grasses and/or sedges and contain a large prairie element in their flora. Fens also support many boreal relict species. Many Fen taxa are common in Seep, Sedge Meadow, and Wet to Wet-Mesic Prairie communities. In northeastern Illinois wetland complexes occasionally occur with characteristics of Fen and the other four natural communities listed above. Separate delineation based on floristic composition at times requires arbitrary distinctions. Some Fens occur within basins largely surrounded by moraines; typically, cool, calcareous, artesian groundwater seeps up through the Fen. Other Fens form on level to slightly sloping areas where calcareous water seeps out of the bases of moraines, kames, or eskers. Spring runs often can be found within Fens. With the proximity to Prairie and other fire dominated community types, it is hypothesized that fire plays an integral role in maintaining structure and diversity in fens (Bowles et al. 1996). Within Illinois, Fens are most common in the upper Fox River basin, and they frequently occur near gravelly moraines or ice-contact features.

Five separate fen community types are recognized in Illinois: *Calcareous Floating Mat*, *Graminoid Fen*, *Low-Shrub Fen*, *Tall-Shrub Fen* (very rare), and *Forested Fen* (White and Madany 1978). The only fen community type that occurs within the LDPRAA is the Graminoid Fen described below. The other Fen types may have occurred prior to European settlement in the Assessment Area. **Ecological problems** associated with Fens include grazing by domestic livestock, lowering of water table caused by ditching and other drainage activities, fire suppression, woody plant encroachment, and exotic species invasion. Moran (1981) gives lists of herbaceous and woody species that increase with disturbances. Exotic species include purple loosestrife and glossy buckthorn.

Graminoid Fen - This natural community type is a minerotrophic peatland dominated by herbaceous vegetation. Typically, peat is formed on a slope at the edge of a moraine; occasionally, the peat forms as a raised island in a marsh or sedge meadow. This island is usually formed by an artesian upwelling of water. In some instances, Mesic Prairie grasses are the dominant species, and in other cases the dominants are sod-forming sedges. Although the peat can be quite elevated, it resists decay due to the high levels of calcium

and magnesium carbonate in the groundwater. There are no high-quality areas of Graminoid Fen that have been identified in the LDPRAA.

Common to occasional species include big bluestem grass, rush aster, marsh marigold, bulbous cress, swamp thistle, buxbaum sedge, Hayden's sedge, bottlebrush sedge, inland sedge, fen-star sedge, spotted Joe-Pye weed, common boneset, small fringed gentian, sweet grass, marsh blazing star, prairie lily, Kalm's lobelia, meadow parsnip, marsh wild timothy, cowbane, grass-of-Parnassus, fen betony, false dragonhead, American black currant, rough-leaf goldenrod, Ohio goldenrod, Riddell's goldenrod, common bog arrow grass, common valerian, and marsh fern.

There are six species recognized by the IESPB as threatened and endangered that can occur in Graminoid Fens in the LDPRAA (Herkert 1991, Table 9). They are slender bog arrow grass, marsh speedwell, grass pink orchid, white lady's slipper, dwarf raspberry, and beaked spike-rush. Numerous rare plant species (arborvitae, bog bedstraw, Queen-of-the-prairie, Richardson's rush, little green sedge, downy willow herb [Table 9]) can be present in Graminoid Fens including several listed as threatened or endangered by the IESPB (1999). If additional Fens are found in the Assessment Area, they should be surveyed by experienced botanists for threatened and endangered species. **Ecological problems** for this community are the same as listed previously for Fen.

Sedge meadow - This community type is a wetland subclass dominated by sedges that occur on mineral or organic (peat or muck) soils (White and Madany 1978). These wetlands are saturated during much of the year, but are usually not inundated for long periods. Sedge Meadows often merge gradually with other Wetland community types (e.g., Wet Prairie, Wet-Mesic Prairie, Marsh, Seep, Graminoid Fen) forming complexes with no clear boundaries. Only one natural community type is recognized in Illinois, the *Sedge Meadow*.

Sedge Meadow - This community type virtually is defined by the hummock sedge (*Carex stricta*) which is usually dominant. Relative age of the wetland community may be indicated by how well the hummocks are formed. Hummock sedge characteristically forms mounds, or hummocks, that are somewhat difficult to walk through. In fact, where sedge meadows occur within pastures, it appears that cattle avoid these wetlands somewhat, presumably due to the difficulty in walking, but also because other more palatable forage is available elsewhere. The INAI has recognized 13 acres of Sedge Meadow at two sites within the LDPRAA. This represents 1.9% of the total grades A and B Sedge Meadow in Illinois and 0.12% of the Wetland remaining in the LDPRAA.

Common plants include the characteristically dominant **sedges**: common tussock sedge, common lake sedge, as well as other species (e.g. *Carex annectans*, *C. atherodes*, *C. buxbaumii*, *C. conjuncta*, *C. cristatella*, *C. granularis*, *C. haydenii*, *C. lacustris*, *C. lanuginosa*, *C. sartwellii*, *C. scoparia*, *C. sterilis*, *C. stricta*, *C. tenera*, and *C. vulpinodea*, *Eleocharis* spp., *Eriophorum angustifolium*). Common **grasses** include: blue-joint grass, fowl manna grass, and prairie cord grass. Characteristic **forbs** include: swamp aster, marsh bellflower, white turtlehead, water hemlock, red rooted spike rush, fen willow herb, grass-

leaved goldenrod, wild madder, closed gentian, spotted Joe-Pye-weed, common boneset, rough avens, blue flag, path rush, Torrey's rush, marsh vetchling, common water horehound, common mountain mint, marsh St. John's wort, great bulrush, soft bulrush, and blue vervain.

Threatened and endangered species reported from Sedge Meadows in the Assessment Area include prairie white-fringed orchid (Table 9). Other T & E species reported from Sedge Meadows occurring outside but near the LDPRAA include little green sedge, beaked sedge, Richardson's rush, and prairie white-fringed orchid which also is listed as threatened by the U.S. Fish and Wildlife Service (Herkert 1991). **Ecological problems** for Sedge Meadows include altered hydrology, past efforts at cultivation or other developments, siltation from cultivated uplands, and exotic species invasion. Exotic species include Kentucky bluegrass, glossy buckthorn, and in wetter areas, purple loosestrife.

Seep and Spring - Seeps are wetland communities characterized by a constant diffuse flow of groundwater, typically from the lower portions of slopes of glacial moraines, ravines, and terraces (White and Madany 1978). Generally, peat formation does not occur in the seep community. The boundary of the community generally is considered to be the zone of saturation from the seepage. The chemistry of the groundwater is influenced by the material it flows through and this in turn influences to some extent floristic composition. In Illinois, five different Seep community types are recognized. Seeps have circumneutral pH and occur where the groundwater 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 groundwater 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. Spring Communities occur where a channel is formed. Seep Communities within the Assessment Area include *Seep* and *Calcareous Seep*. Seeps typically may be considered inclusions within other community types such as Sedge Meadow, Marsh, Forest, Fen, and Wet to Wet-Mesic Prairie. There has only been a Spring Community within the LDPRAA identified by the INAI as high-quality and undegraded (at Romeoville Prairie). The Spring community here is dominated by the algae *Chara* sp. Other dominant forbs here include bog clearweed, nodding bur marigold, slender sedge (*C. leptalea*), and porcupine sedge (*C. hystericina*).

Seep - Seeps probably occur locally in some Mesic Upland and Mesic Floodplain Forest communities bordering the Des Plaines River. Other Seeps may occur within Sedge Meadows or other Wetland communities. Typical **graminoid** and **forb** species in the region include sweet flag, false foxglove, angelica, cowslip, marsh marigold, sedges (*Carex bromoides* [rare], *C. comosa*, *C. hystericina*, *C. suberecta*), white turtlehead, bog willow herb, common horsetail, scouring rush, common boneset, spotted touch-me-not, rice cutgrass, meadow parsnip, swamp wood betony, swamp buttercup, lizard's tail, rough leaf goldenrod, and skunk cabbage. Common **woody plants** include pale dogwood and black ash.

Butternut, an Illinois watch list species, has been reported from seeps outside but near the Assessment Area. **Ecological problems** associated with Seeps include degradation by grazing, alterations to the watershed that influence ground water discharge, and exotic species invasions. Exotic species include creeping Charlie, self heal, and narrow-leaved cattail.

Calcareous Seep - This natural community is restricted in Illinois to the Wisconsinan till plain. Typically, Calcareous Seeps occur at the base of moraines or river valley walls and sometimes they occur in association with Fens. The groundwater in this natural community is strongly calcareous, and tufa deposits (concretions of calcium carbonate) may form. Many of the same plant species that occur in Fens also occur in Calcareous Seeps. No Calcareous Seeps are recognized as high-quality natural areas in the LDPRAA, but they do exist at Black Partridge Woods and at Long Run Seep nature preserves.

Common species include false foxglove, marsh marigold, bulbous cress, sedges (e.g., *Carex hystericina*, *C. sterilis*, *C. subrecta*), white turtlehead, brook nut flatsedge, common horsetail, scouring rush, cotton sedge (*Eriophorum angustifolium*), spotted Joe-Pye weed, common boneset, spotted touch-me-not, rush (*Juncus brachycephalus*), joint rush, rice cut grass, green twayblade, whorled loosestrife, Kalm's lobelia, wiry panic grass, northern bog orchid, grass-of-Parnassus, swamp wood betony, low calamint, rough-leaf goldenrod, Ohio goldenrod, Riddell's goldenrod, and skunk cabbage.

One species listed as endangered in Illinois, slender bog arrow grass (Herkert 1991), typically occurs in Graminoid Fens, but it can occur in calcareous seeps. **Ecological problems** include altered hydrology, particularly reduced recharge zones due to urbanization and other alterations, trampling by humans and animals in this sensitive habitat, and exotic species invasion. A typical non-native species is water cress.

Lake and Pond

Lake and Pond are open-water habitats, and natural Lakes and Ponds in northeastern Illinois are the result of the Wisconsinan glaciation which left many pothole depressions in the Valparaiso Morainic system.

Lake and Pond are the two subclasses of the Lake and Pond community class recognized in Illinois. Only a single natural community type, *Pond*, occurs in the Pond subclass while *Lake* and *Great Lake* are natural communities under the Lake subclass (White and Madany 1978). Little detailed floristic data are available on natural Ponds and Lakes from within the LDPRAA. Common to occasional species of open water habitats, including ponds and lakes, in the region of the Assessment Area (borrowing selectively from descriptions in Swink and Wilhelm [1994]) include: coontail, needle spike rush, red-rooted spike rush, slender waterweed, duckweed, ivy-leaved duckweed, marsh purslane, spiked water milfoil, water milfoil, slender naiad, yellow pond lily, white water lily, water smartweed, leafy pondweed, mermaid-weed, yellow water crowfoot, long-beak buttercup, common arrowhead, common cattail, common bladderwort, eel grass, and horned pondweed.

Ecological problems with Ponds and Lakes include, drainage, degradation from direct and indirect livestock use, leaking septic systems and other sewage inputs, siltation from cultivated uplands, and eutrophication from fertilizer runoff. Non-native plant species such as curly pondweed and European water milfoil can become abundant.

Pond - Natural Ponds include shallow-water wetlands less than 20 acres that are not excavated or impounded. They are usually shallow enough to allow rooted aquatic plants to grow across most of the area. Within the LDPRAA there are 439 acres of natural Ponds; however, no Ponds have been recognized by the INAI as high-quality natural areas. In addition to natural Ponds, there are about 1,948 acres of artificial open water habitats in the Assessment Area. These include impoundments, sewage-treatment lagoons, and excavated ponds. Natural Ponds often occur in association with Marsh and/or Sedge Meadow natural communities. See generalized description for the Pond and Lake natural community class for species composition.

Lake (natural) - Lakes are distinguished from Ponds by several characteristics: Lakes are larger (>20 acres) and deeper than ponds, thermal stratification is more prominent in Lakes compared with Ponds, wave action typically produces locally a semi-barren shore zone, and portions of Lakes generally are too deep to support rooted aquatic plants. Natural Lakes were once present throughout Illinois, but most have been drained or drastically altered. Most natural Lakes that remain in Illinois are in the Northeastern Morainal Division. There are a total of about 394 acres of shallow Lake (lacustrine) habitat in the LDPRAA (Table 3), though no Lakes are considered to be of high ecological quality. See generalized description for the Pond and Lake natural community class for species composition.

There are Lakes outside the Assessment Area boundary that contain three species of pondweeds listed as endangered by the IESPB (grass-leaved pondweed, fern pondweed, and white-stemmed pondweed). **Ecological problems** are addressed briefly in the description for the Pond and Lake community class.

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. No Biologically Significant Stream segments have been identified by the INAI within the LDPRAA. While Streams can be 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 LDPRAA, the most prominent being the Des Plaines River, after which the Assessment Area is named (Figures 2 and 7). Eight separate drainage subbasins are indicated in Figure 2. The plants which most frequently grow along rivers and other streams are listed in Appendix 1 within the Stream 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 these **forbs**: water hemp, tall water hemp, nodding beggar ticks, common beggar ticks, panicked aster, round-fruited hedge hyssop, American bulrush, winged monkey flower, sessile-flowered yellow cress, dotted smartweed, common arrowhead, water willow, 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.

The Illinois endangered heart-leaved plantain (*Plantago cordata*, known in DuPage County) is generally restricted to margins of clear Streams. **Ecological problems** in Streams and Rivers receive wide publicity and include channelization, siltation from cultivated land, pollution from industrial and sewage inputs, degradation from direct and indirect livestock use, and fertilizer and pesticide runoff from agricultural land.

Primary

This community class includes natural communities where soil is thin or absent and bedrock is near the surface. Three subclasses are recognized: Cliff, Glade, and Lake Shore (White and Madany 1978). There are no *Glades* in northeastern Illinois, nor does the Assessment Area include shore of Lake Michigan. *Cliffs* occur locally within the Assessment Area primarily along the bluffs of the Des Plaines River. Other Cliff communities near the LDPRAA occur along the DuPage River, Rock Run Creek, and Kankakee River. The INAI has identified two acres of high-quality, undegraded Cliff community in the LDPRAA. It is unknown how much primary community once existed or remains in Illinois.

Cliff - This natural community subclass includes vertical exposures of resistant bedrock as well as unconsolidated associated materials. The communities are distinguished based upon the type of rock present. Only the *Dolomite Cliff* community is known within the Assessment Area (Figure 2).

Dolomite Cliff - 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 lower Des Plaines River. Two acres of high-quality Dolomite Cliff community exist at one location in the LDPRAA (Sagawau Canyon). Other examples of high-quality Dolomite Cliff are found nearby at Mooseheart Ravine in Kane County.

Plant species occurring in this community tend to be adapted to drought, high pH, and must be able to root in crevices of the rock. Characteristic plants include the **ferns** bulblet fern and 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.

Only a few threatened and endangered species may be associated with Cliff communities in northeastern Illinois. Bearded wheat grass and slender sandwort prefer dry dolomite outcrops while inland shadbush may be found on sand or dolomite stream bluffs.

Threatened and endangered species occurring outside the Assessment Area include buffalo berry which can be found on calcareous bluffs and running pine which is characteristic of talus slopes and ledges of St. Peter's sandstone. 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 erosion often caused by rock climbing may degrade the community and damage species populations as well.

Cultural

This class describes communities formed by anthropogenic activities and disturbances and includes cropland, pastureland, successional fields, developed land (e.g., urban), tree plantations, artificial lakes and ponds, and prairie reconstructions (White and Madany 1978). A noteworthy wetland reconstruction effort associated with the upper Des Plaines River north of the Assessment Area will be described briefly in this section. Cultural, mostly urban land, is the major community class in the LDPRAA comprising about 66.1% of the total land area (Table 2, Figure 4). No threatened or endangered species are known from cultural habitats in the LDPRAA. Cultural areas impose some of the most challenging **ecological problems** for natural habitats in the LDPRAA by isolating natural habitats, interrupting landscape-level processes, and providing a habitat for weedy native and non-native plants (see discussion below). Exceptions are the prairie reconstruction, termed prairie restoration by the INAI (White and Madany 1978), and wetland reconstruction efforts. These are the only community types mentioned below since they are the only examples in the Cultural community class with an effort to create natural communities.

Prairie Restoration - Typically, prairie reconstructions are plantings of prairie species on grassland soils where the original natural community has been destroyed. Prairie species are planted, sometimes in an effort to produce a warm-season grassland and sometimes with the goal of attempting to recreate the original prairie community. Prairie reconstructions often are species poor and strongly dominated by only a few taxa. The total area of prairie reconstruction within the LDPRAA is unknown. None have developed into communities that mimic undegraded tallgrass prairie in species richness or structure.

Wetland Restoration - A large and ambitious wetland reconstruction effort was begun along the upper Des Plaines River near Wadsworth in Lake County in 1985 (Hey 1994, Hey et al.

1989, Hey et al. 1994, Brueske and Barrett 1994, US EPA 1993). This undertaking has been coordinated by Wetland Research, Inc. of Chicago. In summary, four wetlands were reconstructed near the Des Plaines River with the primary goal of improving river water quality. Water is pumped out of the river and into these wetlands under an experimental regime to determine the efficacy of reconstructed wetland vegetation in improving stream water quality. Turbidity in the river was a major water-quality problem and the wetlands were effective at removing most of the sediment during summer months; winter efficiency was lower than during the summer months (US EPA 1993). Phosphorus and nitrates used in agricultural lands leach and runoff into the stream during periods of peak application and the wetlands were efficient at removing most of these nutrients, particularly during the summer months (US EPA 1993). Though some of the functional aspects of wetlands appear to be operational in the short term, structural aspects, including compositional characteristics, appear to take much longer. Reconstructed wetlands, like reconstructed prairies, appear to take a long time (>5 years and probably >50 years) to develop into systems that structurally and compositionally resemble natural communities. However, severely fragmented landscapes limit immigration potential of native species from outside refugia (Taft 1996a, Taft et al. 1997, Schwartz 1997) and species-poor reconstructions in these landscapes may never resemble the diversity or structural characteristics of undegraded natural areas.

Summary and Recommendations

Trends in the Lower Des Plaines River Assessment Area among all natural communities combined indicate that habitat loss and degradation are less than state trends (0.26% of the LDPRAA remains in a high-quality, undegraded condition compared to 0.07% statewide). This is particularly true for forest and wetland communities. However, for prairie and savanna communities, habitat loss and degradation appear to be similar or for prairies only slightly less-severe compared to statewide trends. Nonetheless, in spite of these slight differences, the trends are not encouraging. About 99.8% of the land cover in the LDPRAA have been degraded and altered to some extent by human activities, and the rapid pace of development may continue to jeopardize the remaining high-quality sites. Considering habitat quality, about 0.81% of the original forest area in the LDPRAA is high-quality natural area while statewide the figure is slightly lower at 0.08%. While the total cover of forest for the LDPRAA is estimated to be greater now than prior to European settlement, only about 0.95% of the forest cover remaining is in a high quality condition and recognized as natural area. This estimate is higher than statewide trends (0.28%). Additional survey efforts in the LDPRAA may identify noteworthy and/or restorable remnants of natural communities and new populations of threatened or endangered species.

Despite the availability of a considerable amount of descriptive information regarding natural communities in the LDPRAA, there remain many knowledge gaps such as the long-term abundance patterns of species, ecological trends among remnants, and the dependent factors among each community type for maintaining or maximizing species richness. This is particularly true for savannas, a formerly abundant community type in the area (e.g.,

Moran 1978, 1980), now reduced to a few, isolated and degraded remnants. Further, since remnants of any community type tend to have floristic differences (no two natural areas are the same), and very few undegraded remnants remain of each indigenous community type, there is an incomplete knowledge of even floristic characteristics for all community types historically present in the Assessment Area.

Throughout the natural community description for the LDPRAA there are consistent references to a set related **ecological problems** that threaten the long-term maintenance of biodiversity in the LDPRAA. These include habitat fragmentation, habitat degradation, exotic species invasion, siltation, and, for several community types, fire absence. The following five steps are recommended as an approach for gaining further insights into the natural communities in the LDPRAA and developing a plan for the long-term maintenance of biodiversity.

1. Inventory

The Illinois Natural Areas Inventory (INAI) provides data on the distribution and abundance of statewide-significant natural communities (White 1978). However, many natural communities occur in Illinois and in the LDPRAA that, though they do not meet the qualitative standards chosen for the INAI for undegraded and statewide-significant natural areas, contain regionally noteworthy and exceptional natural features. 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. Restorable remnants among all community classes (e.g., forest, prairie, savanna, wetland) need to be identified. For example, since so few areas of high-quality savanna, upland forest, northern flatwoods, prairie, or wetland communities are known from the LDPRAA, identification of the degraded remnants with restoration potential 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 numerous parameters of community characteristics, is a promising technique for distinguishing remnants of native vegetation that have restoration potential (Swink and Wilhelm 1994, Taft et al. 1997).

2. 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 for establishing large preserve complexes or macrosites. Trends in total area of each community class among qualitative units would serve as an aid in measuring success in restoration efforts (see below).

3. Protection

The natural communities with the greatest integrity need to be protected from further anthropogenic degradation (e.g., damaging levels of grazing, off-road vehicle impacts, siltation). Inventory and mapping in the LDPRAA will aid in the prioritization of protection efforts. Highly isolated remnants pose distinct conservation and protection challenges compared with clusters of restorable natural communities. Staff of the Illinois

Nature Preserves Commission (524 S. Second St., Springfield, IL 62701) are familiar with the various protection options and incentives for private landowners.

4. Identification and prioritization of ecological problems

As previously indicated, a host of related **ecological problems** consistently are present among remnant natural communities in the LDPRAA (e.g., 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). High levels of fragmentation often result in a loss of species richness because species immigration, needed to compensate for local extirpation (and emigration) of species, is seriously challenged. However, "solutions" to restoring biological connectivity and ecosystem-level processes are extraordinarily complex and costly if the goal is to recreate corridors for all species among regional habitats. If functional dispersal corridors can not be established for most species, maintaining biodiversity in the highly fragmented landscape of the LDPRAA may require distinct management actions among several remnants of each community type in order to simulate the landscape-scale heterogeneity needed to accomplish this goal. Unfortunately, where habitat loss is pronounced, that option seldom is available.

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) and reintroducing fire in many cases, although restoration to predisturbance condition in severe cases may require intensive vegetation management. It is difficult to find a woodland in Illinois that does not bear indications of past livestock grazing. Furthermore, in some areas of Illinois, intense deer browsing is negatively impacting many native plant communities. The effects of overgrazing can be persistent. Certain species (e.g., many ferns, orchids, trilliums, blue cohosh, bellflower, bloodroot, several grass and sedge species) appear to be sensitive to grazing disturbance and often are absent while certain grazing increasers (e.g., unpalatable species, thorn-bearing species, and plants with bristly fruits) are dominant. For instance, a typical situation in degraded Illinois woodlands is a groundcover and shrub flora dominated by common snakeroot, white snakeroot, buckbrush, Missouri gooseberry, blackberries (*Rubus* spp.), Virginia creeper, and exotics such as garlic mustard. Usually, confounding influences such as grazing, increased shade, and siltation, or other soil disturbances are involved.

Exotic species invasion can be considered a species-level, a community-level, and a landscape-level problem. Some community-level management activities address more than one ecological problem. For example, garlic mustard abundance possibly can be reversed with appropriately timed applications of fire (Nuzzo 1991, Schwartz and Heim 1996). Other serious exotic pests such as purple loosestrife, more common in the northeastern Illinois counties, require direct treatment or biological control (Thompson et al. 1987; Malecki et al. 1993). Recommended control measures for several of the most threatening and abundant exotic species are summarized in Table 11 (modified from Solecki 1997).

Fire is an ecological force that historically influenced many aspects of natural communities in the LDPRAA. Many community types require fire for maintenance of community characteristics and diversity. Fire absence has resulted in changes in forest structure, composition, and levels of species diversity. Invasion of mesophytic species such as sugar maple into oak-hickory forests is a statewide phenomenon related to fire absence also occurring in portions of the LDPRAA. 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 extraordinarily more common and occur at higher density than prior to settlement. 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 still can 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. Infrequent application of prescribed fire may be inadequate to reverse these trends. Rather, a long-term program of repeated applications of prescribed fire is often necessary before compositional stability is achieved in fire-dependent communities. 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. Consideration needs to be given to the whole natural community. Spatially heterogenous burns appear most effective at maintaining viable populations of fire-dependent and fire-sensitive species.

5. Application of appropriate vegetation management and monitoring

Once the ecological problems for a natural community are identified and prioritized according to restoration effort and gain, a program of vegetation management needs to be implemented. Record keeping is vital to tracking activities and levels of success in implementing each treatment plan. Floristic Quality Assessment (Swink and Wilhelm 1994, Taft et al. 1997) methods may provide a framework useful in measuring progress of each restoration activity.

Table 11. List of invasive exotic species known or suspected to occur in the Lower Des Plaines River Assessment Area, and recommended eradication methods.

Common Name <i>Scientific Name</i>	Cut & Apply Stump-Treatmt Herbicide ¹	Foliar Herbicide Application	Prescribed Fire	Cut &/or Hand Pull (get root)	Dig Root	Biological Control	Cover w/ Black Plastic
asparagus <i>Asparagus officinale</i>	X				X		
barberry, Japanese <i>Berberis thunbergii</i>	X	X	X		X		
beggars' lice <i>Lappula echinata</i>		X					
bluegrass, Canada <i>Poa compressa</i>			X				

Table 11. Continued.

Common Name <i>Scientific Name</i>	Cut & Apply Stump-Treatmt Herbicide ¹	Foliar Herbicide Application	Prescribed Fire	Cut &/or Hand Pull (get root)	Dig Root	Biological Control	Cover w/ Black Plastic
bluegrass, Kentucky <i>Poa pratensis</i>			X				
bouncing bet <i>Saponaria officinalis</i>		X					
buckthorn, common <i>Rhamnus cathartica</i>	X	X		X			
buckthorn, glossy <i>Rhamnus frangula</i>	X	X		X			
brome grass, smooth <i>Bromus inermis</i>		X					
clover, white sweet <i>Melilotus alba</i>			X	X			
clover, yellow sweet <i>Melilotus officinalis</i>			X	X			
cypress spurge* <i>Euphorbia cyparissias</i> *		X		X*	X*		
dock <i>Rumex spp.</i>		X		X			
elm, Siberian <i>Ulmus pumila</i>	X						
fescue, meadow <i>Festuca pratensis</i>		X	X		X		
foxtail <i>Setaria spp.</i>		X	X				
garlic, field <i>Allium vineale</i>		X					
grass, cheat <i>Bromus tectorum</i>		X					
grass, quack <i>Agropyron repens</i>		X	X				
grass, reed canary <i>Phalaris arundinacea</i>		X					
honeysuckle, Japanese <i>Lonicera japonica</i>		X					
honeysuckle, amur <i>Lonicera maackii</i>	X	X					
honeysuckle, tartarian <i>Lonicera tatarica</i>	X	X		X			
motherwort <i>Leonurus cardiaca</i>		X		X	X		
moneywort <i>Lysimachia nummularia</i>		X					

Table 11. Continued.

Common Name <i>Scientific Name</i>	Cut & Apply Stump-Treatmt Herbicide ¹	Foliar Herbicide Application	Prescribed Fire	Cut &/or Hand Pull (get root)	Dig Root	Biological Control	Cover w/ Black Plastic
mulberry, white <i>Morus alba</i>	X						
mullein <i>Verbascum thapsus</i>		X	X		X		
mustards <i>Brassica spp.</i>		X		X			
orange day lily <i>Hemerocallis fulva</i>		X			X		X
Osage orange <i>Maclura pomifera</i>	X						
parsnip* <i>Pastinaca sativa*</i>		X		X*	X*		
poplar, white <i>Populus alba</i>	X		X				
Queen-Anne's-lace* <i>Daucus carota*</i>		X					
rose, multiflora <i>Rosa multiflora</i>	X	X	X				
smartweed; knotweed <i>Polygonum spp.</i>		X					
thistle, bull <i>Cirsium vulgare</i>		X					
thistle, Canada <i>Cirsium arvense</i>		X					
tree-of-heaven <i>Ailanthus altissima</i>	X			X			
willow, white <i>Salix alba</i>	X						
yarrow, common <i>Achillea millefolium</i>		X		X			

¹ The recommended herbicide, typically, is Round-up (glyphosate) except for black locust (Solecki 1997).

² Asterisk (*) indicates plant can cause skin rashes. Direct skin contact should be avoided.

Birds

Information in this section is derived from standard references of Illinois, including the Illinois Natural Heritage Database (Illinois Department of Natural Resources 1999), The Illinois Breeding Bird Atlas (Illinois Department of Natural Resources, in prep), and the results of extensive field work by personnel from the Illinois Natural History Survey (much of it ongoing and not yet published). In addition, records from the published literature found in the journal of the Illinois Ornithological Society, *The Meadowlark* and its predecessor *Illinois Birds and Birding* (published by the Illinois Audubon Society) have been used. The extensive species list for this relatively small area of Illinois would not have been possible if it were not for the rich ornithological history of several generations of ornithologists and very capable amateur ornithologists that have published their sightings in the various scientific journals and manuscripts of their time. Much of the "documented" evidence, especially breeding evidence, comes from the published materials of R. Kennicott (1854), E.W. Nelson (1876), F. Woodruff (1907), G. Eifrig (1913, 1919), B.T. Gault (1922), H. Coale (1923), E. Ford (1956), S. Mlodinow (1984) and H.D.Bohlen (1989). Researchers in the LDPRAA who provided the results of their recent research efforts in the area included Dr. Daniel Ludwig with the Du Page Co. Forest Preserve District, Charles Paine with the Max McGraw Wildlife Foundation, and Dr. Jeffrey Brawn with the Illinois Natural History Survey. Many of the more recent records, both published and unpublished, are the result of the dedicated army of local observers such as C. Alberico, A. Anderson, K. Bartel, H. Cohen, D. De Courcey, P. Dring, B. and K. Fisher, U. Geiser, R. Herbst, J. Milosevich, W. Serafin, D. Stotz, C. Thayer, C. Westcott, and K. Wysocki.

The Lower Des Plaines River Assessment Area (LDPRAA) is notable primarily for its rich potential for wetland bird communities, as well as a relatively large area of forested lands, especially in the Palos Preserves of Cook Co. and the nearby Waterfall Glen Forest Preserve in Du Page County. At least 263 of the 299 species that regularly occur in the state (exclusive of vagrants) can be found in the area (Table 12). Of these 263 species, 150 breed or formerly bred there (Table 12). Of these, 61 are either locally extinct, or are rare during the breeding season (species with a "Ⓞ" in Table 12), which suggest that some habitats may be in short supply in the LDPRAA due to the large amount of urban and suburbanized land area. Some globally extinct species (Passenger Pigeon - *Ectopistes migratorius* and Carolina Parakeet - *Conuropsis carolinensis*) formerly occurred in the basin as did several formerly "common breeding species" (see Nelson 1876) such as the locally extirpated Sharp-tailed Grouse, Greater Prairie-Chicken, Ruffed Grouse, Wild Turkey, Yellow Rail, Long-billed Curlew, Whooping Crane, Sandhill Crane and Wilson's Phalarope. A species now apparently extirpated throughout the state, the Bachman's Sparrow formerly bred in the LDPRAA at LaGrange and at River Forest (Eifrig 1919, Bohlen 1989). Conversely, several introduced and naturalized species have become firmly

established including the Rock Dove, European Starling, House Finch and House Sparrow, while a few others including the Mute Swan, Monk Parakeet and Eurasian Collared Dove have bred or been noted in the area, and will likely have populations that continue to grow.

Outside of the above mentioned areas, most forest patches are small and narrow and are unlikely to have successful breeding populations of most species (Brawn and Robinson 1996), which suggests that restoration of grassland, savanna, and shrubland bird communities may be more appropriate for some areas. For this reason, wetland habitats should be the primary focus of conservation efforts in the region, especially those with adjacent upland grassland or forest habitats to buffer them from surrounding agricultural and residential areas. We know little, however, about the effects of fragmentation on wetland habitats. The use by migratory birds of the forested corridor along the Des Plaines River, and to a lesser extent, Salt Creek, may be intense.

Compared to many other urbanized areas of Illinois, the bird species that live in the LDPRAA are still relatively ecologically diverse. However, although some species are able to live in a variety of habitats, many species occupy only one or a few habitats, and oftentimes are confined to very small populations within a very restricted area inside this Assessment Area (Table 12). The following sections describe the bird communities typically found in the major habitat types of the LDPRAA, as well as the habitat-specific environmental problems and management solutions for bird communities in each habitat.

Table 12. Bird species that regularly occur in the Lower Des Plaines River 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 <i>Gavia immer</i>			L
Pied-billed Grebe - ST <i>Podilymbus podiceps</i>	L W		L W
Horned Grebe <i>Podiceps auritus</i>			L
Eared Grebe <i>Podiceps nigricollis</i>	L		
Double-crested Cormorant <i>Phalacrocorax auritus</i>	L W [®]		L
American Bittern - SE <i>Botaurus lentiginosus</i>	W [®]		W
Least Bittern - ST <i>Ixobrychus exilis</i>	W [®]		W
Great Blue Heron <i>Ardea herodias</i>	L W Fs F	L W	L W

Table 12. Continued.

Species ^{1,2}	Breeding ^{3,6,7}	Winter ^{4,6}	Migrant ^{5,6}
Great Egret <i>Ardea albus</i>	W [®]		LW
Snowy Egret - SE <i>Egretta thula</i>			W
Little Blue Heron - SE <i>Egretta caerulea</i>			LW
Cattle Egret <i>Bubulcus ibis</i>			CGW
Green Heron <i>Butorides virescens</i>	LWFs		LWFs
Black-crowned Night-Heron - SE <i>Nycticorax nycticorax</i>	FsW [®]		FsW
Yellow-crowned Night-Heron - SE <i>Nyctanassa violacea</i>	FsW [®]		Fs
Turkey Vulture <i>Cathartes aura</i>	FGCFsSav [®]		FGCSFsSav
Greater White-fronted Goose <i>Anser albifrons</i>		LW	LW
Snow Goose <i>Chen caerulescens</i>		LC	LWC
Canada Goose <i>Branta canadensis</i>	LWC	LWCR	LWCR
Mute Swan <i>Cygnus olor</i>	LW [®]	LW	
Trumpeter Swan <i>Cygnus buccinator</i>	LW		
Tundra Swan <i>Cygnus columbianus</i>			LW
Wood Duck <i>Aix sponsa</i>	FsW		FsWL
Gadwall <i>Anas strepera</i>			WL
American Wigeon <i>Anas americana</i>			WL
American Black Duck <i>Anas rubripes</i>	W [®]		WLFsC
Mallard <i>Anas platyrhynchos</i>	WCLFsG	WCLFs	WCLFs
Blue-winged Teal <i>Anas discors</i>	WG		WL
Northern Shoveler <i>Anas clypeata</i>	W [®]		WL
Northern Pintail <i>Anas acuta</i>	W [®]		WCL
Green-winged Teal <i>Anas crecca</i>	W [®]		WL

Table 12. Continued.

Species ^{1,2}	Breeding ^{3,6,7}	Winter ^{4,6}	Migrant ^{5,6}
Canvasback <i>Aythya valisineria</i>			L W
Redhead <i>Aythya americana</i>	W [®]		L W
Ring-necked Duck <i>Aythya collaris</i>	W [®]		L W
Greater Scaup <i>Aythya marila</i>			L W
Lesser Scaup <i>Aythya affinis</i>			L W
Surf Scoter <i>Melanitta perspicillata</i>			L
White-winged Scoter <i>Melanitta fusca</i>		L	L
Oldsquaw <i>Clangula hyemalis</i>			L
Bufflehead <i>Bucephala albeola</i>		L	L W
Common Goldeneye <i>Bucephala clangula</i>		L	L
Hooded Merganser <i>Lophodytes cucullatus</i>	Fs [®]		L Fs W
Common Merganser <i>Mergus merganser</i>		L	L
Red-breasted Merganser <i>Mergus serrator</i>	W [®]		L W
Ruddy Duck <i>Oxyura jamaicensis</i>	W [®]		L W
Osprey - SE <i>Pandion haliaetus</i>	Fs L [®]		L
Bald Eagle - ST, FT <i>Haliaeetus leucocephalus</i>		L	L
Northern Harrier - SE <i>Circus cyaneus</i>	G W [®]	G C W	G C W
Sharp-shinned Hawk <i>Accipiter striatus</i>	F [®]	F S R Fs Sav	F S R Fs Sav
Cooper's Hawk <i>Accipiter cooperii</i>	F S Sav	F S R Sav	F S R Sav
Northern Goshawk <i>Accipiter gentilis</i>		F S	F S W L
Red-shouldered Hawk - ST <i>Buteo lineatus</i>	Fs [®]	Fs	Fs
Broad-winged Hawk <i>Buteo platypterus</i>	F [®]		F
Swainson's Hawk - SE <i>Buteo swainsoni</i>	F G Sav		

Table 12. Continued.

Species ^{1,2}	Breeding ^{3,6,7}	Winter ^{4,6}	Migrant ^{5,6}
Red-tailed Hawk <i>Buteo jamaicensis</i>	FCGRS	FCGRS	FCGRS
Rough-legged Hawk <i>Buteo lagopus</i>		CG	
Golden Eagle <i>Aquila chrysaetos</i>			FSG
American Kestrel <i>Falco sparverius</i>	RCGSav	RCGSav	RCGSav
Merlin <i>Falco columbarius</i>			All
Peregrine Falcon - SE <i>Falco peregrinus</i>			All
Ring-necked Pheasant* <i>Phasianus colchicus</i>	CGS	CGS	CGS
King Rail - SE <i>Rallus elegans</i>	GW*		GW
Virginia Rail <i>Rallus limicola</i>	W*		WG
Sora <i>Porzana carolina</i>	W*		WG
Common Moorhen - ST <i>Gallinula chloropus</i>	W*		W
American Coot <i>Fulica americana</i>	W*	L	WL
Sandhill Crane - ST <i>Grus canadensis</i>			WGC
Black-bellied Plover <i>Pluvialis squatarola</i>			LW
American Golden-Plover <i>Pluvialis dominica</i>			WLCCG
Semipalmated Plover <i>Charadrius semipalmatus</i>			W
Killdeer <i>Charadrius vociferus</i>	WRGC		WRGC
Greater Yellowlegs <i>Tringa melanoleuca</i>			W
Lesser Yellowlegs <i>Tringa flavipes</i>			W
Solitary Sandpiper <i>Tringa solitaria</i>			W
Willet <i>Catoptrophorus semipalmatus</i>			W
Spotted Sandpiper <i>Actitis macularia</i>	L*		W
Upland Sandpiper - SE <i>Bartramia longicauda</i>	G*		G

Table 12. Continued.

Species ^{1,2}	Breeding ^{3,6,7}	Winter ^{4,6}	Migrant ^{5,6}
Hudsonian Godwit <i>Limosa haemastica</i>			W
Ruddy Turnstone <i>Arenaria interpres</i>			W
Sanderling <i>Calidris alba</i>			W
Semipalmated Sandpiper <i>Calidris pusilla</i>			W
Western Sandpiper <i>Calidris mauri</i>			W
Least Sandpiper <i>Calidris minutilla</i>			W
White-rumped Sandpiper <i>Calidris fuscicollis</i>			W
Baird's Sandpiper <i>Calidris bairdii</i>			W G
Pectoral Sandpiper <i>Calidris melanotos</i>			C W G
Dunlin <i>Calidris alpina</i>			W
Stilt Sandpiper <i>Calidris himantopus</i>			W
Buff-breasted Sandpiper <i>Tryngites subruficollis</i>			W G
Short-billed Dowitcher <i>Limnodromus griseus</i>			W
Long-billed Dowitcher <i>Limnodromus scolopaceus</i>			W
Common Snipe <i>Gallinago gallinago</i>			W G
American Woodcock <i>Scolopax minor</i>	F Fs S		F Fs S
Wilson's Phalarope - SE <i>Phalaropus tricolor</i>			L W
Red-necked Phalarope <i>Phalaropus lobatus</i>			L W
Franklin's Gull <i>Larus pipixcan</i>			L W C
Bonaparte's Gull <i>Larus philadelphia</i>			L W C
Ring-billed Gull <i>Larus delawarensis</i>		L W C	L W C
Herring Gull <i>Larus argentatus</i>		L	W L C
Glaucous Gull <i>Larus hyperboreus</i>		L	

Table 12. Continued.

Species ^{1,2}	Breeding ^{3,6,7}	Winter ^{4,6}	Migrant ^{5,6}
Caspian Tern <i>Sterna caspia</i>			L
Common Tern - SE <i>Sterna hirundo</i>			L
Forster's Tern - SE <i>Sterna forsteri</i>			LW
Black Tern - SE <i>Chlidonias niger</i>	W*		LW
Rock Dove* <i>Columba livia</i>	RC	RC	RC
Eurasian Collared-Dove <i>Streptopelia decaocto</i>	R*	R	R
Mourning Dove <i>Zenaida macroura</i>	RCS	RCS	RCS
Monk Parakeet* <i>Myiopsitta monachus</i>	R*	R	R
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i>	S*		FS Sav
Yellow-billed Cuckoo <i>Coccyzus americanus</i>	FS Fs Sav		FS Fs Sav
Eastern Screech-Owl <i>Otus asio</i>	RS Sav	RS Sav	RS Sav
Great Horned Owl <i>Bubo virginianus</i>	FCR Fs Sav	FCR Fs Sav	FCR Fs Sav
Barred Owl <i>Strix varia</i>	FFs*	FFs	FFs
Long-eared Owl <i>Asio otus</i>	FS*	FS	FS
Northern Saw-whet Owl <i>Aegolius acadicus</i>	FS*	FS	FS
Common Nighthawk <i>Chordeiles minor</i>	RSav		RGC
Whip-poor-will <i>Caprimulgus vociferus</i>	FSav*		FSav
Chimney Swift <i>Chaetura pelagica</i>	RFS Fs Sav		All
Ruby-throated Hummingbird <i>Archilochus colubris</i>	FSR Fs Sav		FSR Fs Sav
Belted Kingfisher <i>Ceryle alcyon</i>	LW	LW	LW
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	Fs RC	FFs Sav	FFs CR Sav
Red-bellied Woodpecker <i>Melanerpes carolinus</i>	FFs SR Sav	FFs SR Sav	FFs SR Sav
Yellow-bellied Sapsucker <i>Sphyrapicus varius</i>	FFs*	FFs R Sav	FFs R Sav

Table 12. Continued.

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

Table 12. Continued.

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

Table 12. Continued.

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

Table 12. Continued.

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

Table 12. Continued.

Species ^{1,2}	Breeding ^{3,6,7}	Winter ^{4,6}	Migrant ^{5,6}
Summer Tanager <i>Piranga rubra</i>	F Sav [®]		F R Sav
Scarlet Tanager <i>Piranga olivacea</i>	F Fs Sav		F Fs R Sav
Eastern Towhee <i>Pipilo erythrophthalmus</i>	S F	S F	S F Fs R
American Tree Sparrow <i>Spizella arborea</i>		S G C R W Sav	S G C R W Sav
Chipping Sparrow <i>Spizella passerina</i>	R F Sav		R F G S Sav
Clay-colored Sparrow <i>Spizella pallida</i>			S
Field Sparrow <i>Spizella pusilla</i>	S G C Sav	S G W Sav	S G C W Sav
Vesper Sparrow <i>Pooecetes gramineus</i>	C G [®]		C G
Lark Sparrow <i>Chondestes grammacus</i>	S C G [®]		S C G
Savannah Sparrow <i>Passerculus sandwichensis</i>	G	G	G C W
Grasshopper Sparrow <i>Ammodramus savannarum</i>	G		G
Henslow's Sparrow - SE <i>Ammodramus henslowii</i>	G [®]		G
Le Conte's Sparrow <i>Ammodramus leconteii</i>			G W
Nelson's Sharp-tailed Sparrow <i>Ammodramus nelsoni</i>			W
Fox Sparrow <i>Passerella iliaca</i>		S Fs F	S Fs F R Sav
Song Sparrow <i>Melospiza melodia</i>	R S W C G	R S W C G	R S W C G
Lincoln's Sparrow <i>Melospiza lincolnii</i>			S W Fs R
Swamp Sparrow <i>Melospiza georgiana</i>	W	W Fs S G	S W Fs G
White-throated Sparrow <i>Zonotrichia albicollis</i>		R S F Fs Sav	R S F Fs Sav
Harris's Sparrow <i>Zonotrichia querula</i>		S R G	S R G
White-crowned Sparrow <i>Zonotrichia leucophrys</i>		S R G	S R G
Dark-eyed Junco <i>Junco hyemalis</i>		R S F Fs G C Sav	R S F Fs G C Sav
Lapland Longspur <i>Calcarius lapponicus</i>		C G	C G

Table 12. Continued.

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

Table 12. Continued.

Species ^{1,2}	Breeding ^{3,6,7}	Winter ^{4,6}	Migrant ^{5,6}
Evening Grosbeak <i>Coccothraustes vespertinus</i>		R F Fs	R F Fs
House Sparrow* <i>Passer domesticus</i>	R C	R C	R C

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

² * designates 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 (a) 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

Forested (both upland and bottomland) habitats comprise more than 19% (almost 45,000 acres) of the land cover in the LDPRAA. Much of the remaining forest habitat is found along the Des Plaines river and its main tributaries, especially Salt Creek (Figure 5). The large Ned Brown and Paul Douglas Forest Preserves in northwestern Cook County also contain some fairly large areas of young and old forest habitat. The large Palos area forest preserves in Cook County alone, cover more than 14,000 acres of mainly forested area. There is also a very narrow corridor of forest stretching across the lower width of the area along the Chicago Sanitary and Ship Canal, parallel to the Des Plaines River.

Regularly Occurring Species

Typical Species - Typical species of forest habitats in the LDPRAA include: Cooper's Hawk (rare but increasing), Yellow-billed Cuckoo (erratic), Great Horned Owl, Red-headed Woodpecker, Red-bellied Woodpecker, Downy Woodpecker, Hairy Woodpecker, Northern Flicker, Eastern Wood-Pewee, Great Crested Flycatcher, Blue Jay, American Crow, Black-capped Chickadee, Tufted Titmouse, White-breasted Nuthatch, Carolina Wren (rare; population fluctuates depending upon winter weather), House Wren, Wood

Thrush, American Robin, Yellow-throated Vireo, Red-eyed Vireo, American Redstart, Ovenbird, Scarlet Tanager, Northern Cardinal, Rose-breasted Grosbeak, Indigo Bunting, and Brown-headed Cowbird. Rarer forest species that also nest within the LDPRAA include Broad-winged Hawk, **Red-shouldered Hawk (ST)**, Whip-poor-will, Acadian Flycatcher, Least Flycatcher, Blue-gray Gnatcatcher, Veery, Cerulean Warbler, Prothonotary Warbler (rare; mostly a southern species), Hooded Warbler (mostly a southern species noted annually in the Palos area), Kentucky Warbler (also a southern species nesting occasionally in the Palos area), Louisiana Waterthrush, Summer Tanager (rare; mainly in Palos area), and Baltimore Oriole (mostly in more open forests).

Threatened and Endangered Species - Only a few state threatened (ST) and endangered (SE) species occur in forests in the area. These include the **Yellow-crowned Night Heron (SE)**, **Red-shouldered Hawk (ST)** and **Brown Creeper (ST)**, all occurring in forested wetlands (see below).

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

There are relatively few stands of pine in this area. Pines are not native to the LDPRAA, however pine plantations have unusual bird communities. In addition to more generalized forest species, pine plantations in central and other northern Illinois locations, occasionally attract nesting Northern Saw-whet Owls and Long-eared Owls (both also found in winter), Solitary Vireos, Pine Siskins, Yellow-bellied Sapsuckers, Golden-crowned Kinglets, Red-breasted Nuthatches, Yellow-throated Warblers, and Black-throated Green Warblers. Chipping Sparrows are often the most abundant species nesting in pine plantations. In winter, pines also attract winter finches (e.g., crossbills, Pine Siskin), Pine Grosbeaks (very rare), Yellow-bellied Sapsuckers, 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 LDPRAA 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 and isolation 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 LDPRAA 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), as a 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. Many of the forested areas in the Des Plaines River valley were historically more of a savanna type woodland (see Savanna Bird Communities). The north-south orientation of the wooded Des Plaines floodplain may lead to intensive use by migrating forest songbirds, and many of the remaining small, woodlots would best be managed for migrant stopover habitat.

Wetland

Although there had been considerably more wetland in the LDPRAA, wetland habitats still represent one of the more significant avian habitats in the Basin, and comprise more than 7,500 acres (3.3% of the LDPRAA) of non-forested wetlands. This area includes the numerous marshes, sloughs, ponds and lakes throughout the Palos area including McGinnis, Tampier, Sansone, Saganashkee, Long John, and Buttonbush Sloughs, to name a few. Other notable wetland sites in Cook County include marshes and sloughs in the large Paul Douglas Forest Preserve and Ned Brown Forest Preserves including Busse Woods as well as a few other areas near Schaumburg identified in the Northeastern Illinois Wetland Survey (Heidorn et al. 1991). Campbell Slough near Addison in Du Page Co. is also noteworthy.

Historically, the once avian rich area from Tampier Slough eastward to Lake Michigan (to include the vast Calumet marshes), was a fairly contiguous stretch of wetlands, much of which has now been drained, filled, degraded, or otherwise converted to some other habitat of an anthropogenic nature. One particularly large and diverse wetland, long since drained, was where the present Stevenson Expressway runs parallel to the Des Plaines River between U.S. 45 and Il. Rt. 171. A specimen of the Eskimo Curlew (*Numenius borealis*), now thought to be extinct or nearly so, was collected in this large wetland, called Mud

Lake, near the town of Summit in 1872 (Ford 1956). Many of the relatively common to rare breeding species which once nested in this area, will only rarely (if ever again) be found nesting in the small, remnant areas that are left.

Regularly Occurring Species

Typical Species - Typical wetland species occurring in the LDPRAA include the **Pied-billed Grebe (ST)**, Great Blue Heron, Great Egret, Green Heron, Canada Goose, Wood Duck, Mallard, Blue-winged Teal (uncommon), Killdeer, American Woodcock, Belted Kingfisher, Red-headed Woodpecker (forested), Northern Flicker (forested), Acadian Flycatcher (forested), Willow Flycatcher (shrubby), Purple Martin, Tree Swallow, Bank 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), Cerulean Warbler (forested), American Redstart (forested), Common Yellowthroat, Song Sparrow, Swamp Sparrow, Red-winged Blackbird, Common Grackle, and Baltimore Oriole. Rarer species might include the Blue-winged teal, Hooded Merganser (forested) and Spotted Sandpiper.

Threatened and Endangered Species - Numerous State Threatened (ST) and Endangered (SE) species occur or have occurred in the wetland habitats of the LDPRAA. There are records of breeding **Pied-billed Grebes (ST)**, **Double-crested Cormorants (ST)**, **American Bitterns (SE)**, **Least Bitterns (SE)**, **Black-crowned Night Herons (SE)**, **Yellow-crowned Night Herons (SE)**, **Northern Harriers (SE)**, **Red-shouldered Hawks (SE)**, **King Rails (ST)**, **Common Moorhens (ST)**, **Black Terns (SE)**, and **Yellow-headed Blackbirds (ST)**. Other T&E species which nested historically very nearby in the Calumet marshes, and almost certainly bred (and could possibly still occasionally breed) in the LDPRAA include **Black Rail (SE)**, **Wilson's Phalarope (SE)** and **Short-eared Owl (SE)**. Notable sites for these species include the above mentioned areas as well as numerous other small marshes, sloughs, ponds and lakes. Protection of remaining wetlands, especially marshes, is an extremely high priority for this area.

Exotic Species - The only non-native wetland species in the LDPRAA is the Mute Swan, which is still relatively rare in the region. This species should not be encouraged to breed as the aggressive nature of the nesting adults can be detrimental to the success of most native waterfowl species.

Population Dynamics and Management

Currently, the main problem for birds inhabiting wetlands is the continued loss of habitat and suburban encroachment. Several wetland bird species were just "upgraded" from threatened to endangered species status (IESPB 1999) due to the continued decline of these species due to the above mentioned reasons or because recent research has revealed that some species were not as numerous as once thought. Some forested wetland species likely suffer from the same problems with fragmentation that affect forest species (cowbird

parasitism and nest predation). We know little, however, about the effects of fragmentation on other wetland habitats. In fact, there is only one published study of the population dynamics and nesting success of wetland birds in the region (see Paine 1997). Potentially, wetland species are more resistant to fragmentation, which may make this habitat a good target for conservation efforts in this landscape. 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

Oak savanna habitats were once widespread in the Midwest, but due to habitat destruction and the absence of fire they are now very rare in the LDPRAA (see Chapter on Natural Vegetation Communities), but are actively being restored in several areas, especially in the Palos area and several smaller areas in Du Page County. Some good examples of both restored and unrestored savanna habitat within the LDPRAA include Swallow Cliff, Cap Sauer's Holdings Nature Preserve, and McClaughry Springs, all Cook County forest preserves in the Palos area, as well as Waterfall Glen Forest Preserve in Du Page County. Disturbance, usually in the form of fire, is the key for restoring the savanna and savanna-like habitats necessary for savanna bird species. The savanna bird community has several affinities with both grassland and forest bird communities. For a typical summary of species to be found in this habitat, as well as those found within the boundaries of the LDPRAA see Ludwig and Reklau (1999) and Brawn (1998).

Regularly Occurring Species

Typical Species - Savannas share many species with forest habitats. Perhaps the most typical species of savannas would be: Cooper's Hawk, Mourning Dove, Yellow-billed Cuckoo, Whip-poor-will, Red-headed Woodpecker, Great Crested Flycatcher, Eastern Wood-Pewee, Blue Jay, House Wren, American Robin, Eastern Bluebird, Yellow-throated Vireo, Baltimore Oriole, Rose-breasted Grosbeak, and Chipping Sparrow. Other forest species remain common in savannas, including the Great Horned Owl, Ruby-throated Hummingbird, Northern Flicker, Red-bellied, Downy, and Hairy Woodpeckers, Black-capped Chickadee, White-breasted Nuthatch, House Wren, Brown-headed Cowbird, Scarlet Tanager, and Northern Cardinal. Species with shrubland affinities such as Black-billed Cuckoo (uncommon; erratic), Gray Catbird, Brown Thrasher, Indigo Bunting, American Goldfinch and Field Sparrow, are commonly found in more open savannas with a more shrubby understory. The open, park-like structure of some savannas also attracts some species that are more characteristic of grassland habitats, such as the Red-tailed Hawk, Common Nighthawk, Eastern Kingbird, Tree Swallow and even Eastern Meadowlark. For many of these species, Illinois contains a significance 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. A few **Swainson's Hawks (SE)** have nested and still nest in savanna-type habitat in nearby parts of Du Page and Kane Co.'s and could still re-establish a small nesting population in the LDPRAA.

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 (Brawn 1998). 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 was just completed in the local Palos Preserves (Brawn 1998).

Savannas also appear to be a 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. One species still found in the LDPRAA, which is declining precipitously nationwide, including in the Illinois area is the Red-headed Woodpecker (see Robbins et al. 1986). The Red-headed Woodpecker has become the "poster-child" for declining savanna and savanna-like habitats in the east. Some of the reasons for this as well as the (estimated) drastic decline in numbers of this species in Illinois since the turn of the century, when there theoretically was much more savanna-type habitat still remaining in Illinois, is summarized by Graber and Graber (1963). For a review of avian communities in savanna habitat and the current knowledge and research needs in this habitat, see Brawn (1994) and Brawn (1998).

Prairie/Grassland

Much of the land area in the LDPRAA that was not historically wetland was tallgrass prairie or a combination of the two (see Eifrig 1913, Hanson 1977). Native prairie habitat is now rare in the LDPRAA (see Chapter on Natural Vegetation Communities), although the small Lockport and Romeoville Prairies give a good example of what much of the original prairie areas must have been like. However, many bird species that historically lived in prairies are also able to live in grassland habitat such as hay and other cool-season grass fields, and sometimes pastures. These habitats are also relatively uncommon in the LDPRAA. Some of the larger areas of grassland habitat with typical grassland associated species can be found in the large Ned Brown and Paul Douglas Forest Preserves of

northwestern Cook County. There are less than 10,000 acres of "grassland" in the basin (4.3% of the land area). Nonetheless, although patches of available grassland habitat in the LDPRAA are small, they have considerable potential for restoration and contain many typical prairie grassland species. What little pastureland that is left in the area is mostly heavily grazed and is little used by grassland birds. They are also favored sites for foraging Brown-headed Cowbirds.

Regularly Occurring Species

Typical Species - In these habitats, typical species include a subset of those found on larger grasslands throughout the state: Red-tailed Hawk, American Kestrel, Ring-necked Pheasant, Eastern Kingbird, Willow Flycatcher (shrubs), Horned Lark (recently burned), Barn Swallow, Brown Thrasher (shrubs), Sedge Wren, Common Yellowthroat, Eastern Meadowlark, Red-winged Blackbird, Dickcissel (rare), Savannah Sparrow, Song Sparrow, Grasshopper Sparrow, Vesper Sparrow, Field Sparrow, Bobolink, and American Goldfinch. See Table 12 for a more complete list of grassland species found in the LDPRAA.

Threatened and Endangered Species - Currently, the **Henslow's Sparrow (SE)** is the only endangered grassland species known to breed in the area. **Upland Sandpipers (SE)** have bred historically, and there are still small breeding populations as close as the Orland Hills Forest Preserve and at the Bartel Grasslands near Vollmer and Central Avenues. **Northern Harriers (SE)** and **Short-eared Owls (SE)** have nested in the LDPRAA and were noted as "common summer resident" and "uncommon summer resident", respectively, relatively recently (see Ford 1956), and pairs probably still occasionally nest. The **Loggerhead Shrike (ST)**, a former "fairly common summer resident" in the area (Ford 1956) has essentially been extirpated from the LDPRAA as a breeding species as no birds were recorded on the Cook County Breeding Bird Survey since at least 1985 (A. Anderson, pers. comm.). See Graber et al. (1973) for a summary of this species decline throughout its range in Illinois. Before the area was settled (~1834), a species now extirpated from the area and all of Illinois, the Long-billed Curlew (*Numenius americanus*) was once "quite common" in the prairie areas of the LDPRAA (see Hanson 1977).

Exotic Species - Two introduced species are found in the grasslands of the LDPRAA. The Ring-necked Pheasant (mostly absent from much of this area), which is native to Asia, was first released in Illinois in about 1890 (Bohlen 1989) and they continue to be released. European Starlings feed in grasslands following grazing, mowing, or burning.

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). Currently, prairie remnants and other grassland habitats are probably too small to sustain regular breeding populations and successful nesting of most prairie species. For example, the **Short-eared Owl (SE)** is highly area-sensitive and will require larger grasslands than exist

currently to maintain a regular breeding population. **Henslow's Sparrows (SE)** are also area-sensitive and require taller, ranker grass that has not recently been burned (Herkert 1994). **King Rails (SE)** and **Northern Harriers (SE)** would also be good candidates for reestablishment in restored grasslands. **Upland Sandpipers (SE)** nested historically and still do in nearby areas, but they require mowing, grazing, or burning to keep the grass short. Upland Sandpipers are also area-sensitive and usually require larger grassland areas than are currently available. Other rare or locally extirpated species that would be likely to increase rapidly (or otherwise return to grasslands where they formerly occurred) if restoration were to occur include Sedge Wren, **Loggerhead Shrike (ST)**, Bobolink, and Lark Sparrow. Because of the short supply of available grassland, prairie restoration and enhancement will be needed to attract grassland birds.

Removal of woody vegetation may also be beneficial. 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-breasted Chat) 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.

Migrant birds use grasslands as stopover habitat, especially Smith's and Lapland Longspurs, several sparrows including LeConte's, various rails, bitterns, American Golden Plovers, Pectoral Sandpipers and Buff-breasted Sandpipers.

Lakes, Ponds, and Impoundments

There are several natural lakes or ponds in the LDPRAA (see Chapter on Aquatic Biota), as well as a number of impoundments. These bodies of water take up almost 2% (more than 4,000 acres) of the land area of the LDPRAA (Table 2, Figure 7). However, many have been drastically altered from their historic condition and do not contain many representative species from earlier historic times. A good example of this is McGinnis Slough, although it still attracts a fair number and variety of shorebirds, ducks and waders. Many other unique areas have been either filled or drained in the last century, drastically affecting both the numbers of migrant waterfowl and the diversity of species which used to breed in these areas.

Regularly Occurring Species

Typical Species - Spotted Sandpipers may occasionally breed around lakes, ponds, and impoundments. Canada Geese, Mallards, and Killdeer breed if there are open, grassy areas nearby. Common Yellowthroats, Common Grackles, Red-winged Blackbirds, and Song Sparrows nest along ponds, especially those with gradual shorelines and some emergent

vegetation (e.g., *Typha*) along the edge. Belted Kingfishers, Chimney Swifts, Eastern Phoebes, Eastern Kingbirds, Barn Swallows, Northern Rough-winged Swallows, Bank Swallows, Cliff Swallows, Purple Martins, and Tree Swallows forage over the open-water habitats as long as nest sites are available. Green Herons, Willow Flycatchers, Warbling Vireos, Yellow Warblers, and occasionally Baltimore Orioles often nest along ponds lined with dense, woody vegetation. Great Blue Herons, **Black-crowned Night Herons (SE)** and Great Egrets will often forage around the edges of lakes and ponds, especially those with some emergent vegetation, even in the more urban areas of the LDPRAA.

Threatened and Endangered Species - The only threatened or endangered species known to breed in this habitat in the LDPRAA is the **Osprey (SE)**. A pair nested at Bergman Slough in 1998 (after having been present since 1996), and represented only the second nest record in Illinois this century and the first in more than 45 years (see Thayer 1999).

Exotic Species - The Mute Swan is the only non-native species that would be likely to occur in the area. Some states consider this species a pest or nuisance species due to its negative affects on other waterfowl (Ciaranca et al 1997).

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 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 (e.g. *Typha*). 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 both Double-crested Cormorants and Ospreys (SE) in the LDPRAA and other nearby areas.

Creeks and Rivers

The Des Plaines River has been highly altered by human activities, but still likely has some associated river species. Although humanmade, the Chicago Sanitary and Ship Canal also provides a corridor of trees and other habitat for both migrant and some breeding species to utilize. There are a number of Du Page and Cook County Forest Preserves to be found along the smaller Salt Creek, which provide lots of breeding opportunities and an almost unbroken migratory corridor for numerous species.

Regularly Occurring Species

Typical Species - Among the species found along creeks and rivers are the following: Double-crested Cormorant, Canada Goose, Mallard, Wood Duck (forested), Cooper's Hawk (forested corridors), Great Blue Heron, Great Egret, Green Heron (forested), Killdeer, American Woodcock, Great Horned Owl (forested), Barred Owl (forested; rare), Belted Kingfisher, Willow Flycatcher (more open, shrubby areas), Eastern Kingbird, Eastern Phoebe (especially near bridges), Barn Swallow, Northern Rough-winged Swallow, 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).

Threatened and Endangered Species - Threatened and Endangered species which can be found in this habitat include both **Black-crowned (SE)** and **Yellow-crowned Night Herons (SE)** and both may occasionally nest in the isolated areas along the Des Plaines River. **Red-shouldered Hawks (ST)** and **Brown Creepers (ST)** are also occasionally found in wooded, riverine areas throughout the LDPRAA.

Populations 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

Very little of the LDPRAA is in cropland. Only a little more than 5% (11,562 acres) of the land area is in cropland, making many open field and grassland species relatively uncommon to rare as compared to the rest of the state (Table 2, Figure 8)

Regularly Occurring Species

Typical Species - Cropland bird communities in the LDPRAA have the same bird species that are common statewide in this structurally simple habitat: Mallard, Red-tailed Hawk, American Kestrel, Ring-necked Pheasant, Killdeer, Rock Dove, Mourning Dove, Great Horned Owl, Eastern Phoebe (farmsteads), Barn Swallow, American Crow, Eastern Bluebird (where nest boxes are provided), Common Grackle, Brown-headed Cowbird, Red-winged Blackbird, Eastern Meadowlark, Savannah Sparrow (grassy strips) and Field Sparrow.

Some species characteristic of recently burned and heavily grazed, dry grasslands have adapted to croplands, including the Horned Lark, and Vesper Sparrow.

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

Intensively farmed areas offer little in the way of stopover habitat except around farmsteads and wet fields in the spring for shorebirds.

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 Eastern Meadowlarks, Horned Larks as well as Henslow's, Grasshopper, Vesper and Savannah Sparrows.

Cultural Habitats: Successional Fields

Successional habitats, such as abandoned fields and pastures, are relatively uncommon in the LDPRAA. 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 tree-fall gaps. Such habitats usually have dense, protective cover and are often rich in fruit producing plants, and therefore offer rich habitat for breeding and migrating 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 - Ring-necked Pheasant, American Woodcock (wet areas), Mourning Dove, Yellow and Black-Billed Cuckoos, Ruby-throated Hummingbird, Northern Flicker, Downy Woodpecker, Eastern Kingbird, Willow Flycatcher (wet thickets), Blue Jay, Black-capped Chickadee, House Wren, Carolina Wren, Gray Catbird, Brown Thrasher, American Robin, Eastern Bluebird, Cedar Waxwing, White-eyed Vireo (rare this far north), Blue-winged Warbler (uncommon this far north), Yellow Warbler, Common Yellowthroat, Yellow-breasted Chat (uncommon this far north), Red-winged Blackbird, Northern Cardinal, Rose-breasted Grosbeak (older thickets), Indigo Bunting, House Finch, American Goldfinch, Eastern Towhee, 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). The Northern Bobwhite, a common resident in successional field habitat over much of the state, was formerly considered abundant in the area (Woodruff 1907), but had already become rare less than ten years later (see Eifrig 1913), and now is virtually absent from the region.

Interestingly, both rare hybrid forms of the Blue-winged Warbler x Golden-winged Warbler cross have occurred within the LDPRAA. The "Brewster's Warbler" has occurred several times, the last being the summer of 1998 (C. Thayer, Meadowlark 8:37), and the much rarer "Lawrence's" during the summers of 1997 and 1998 (Bohlen 1989), all in the Palos area forest preserves. This implies that at least one sex of a pair of this paternity has been a Golden-winged Warbler, making that species at least a rare breeder in the region.

Threatened and Endangered Species - No threatened or endangered species are known to depend on successional habitats in the LDPRAA.

Exotic Species - Most species found in successional habitats are native, although Ring-necked Pheasants use early successional fields, and House Finches breed in shrubbery. The Gray Partridge was considered a "fairly common resident" in the area as recently as the late 1950's (Ford 1956), but may have been gone by 1970 (Farris 1970). There were no breeding records for the Gray Partridge in the LDPRAA for the period 1986-1991 during the Illinois Breeding Bird Atlas Project (Kleen in litt.), and they are apparently now gone from most, if not all of the area (W. Serafin, pers. comm.).

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 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 LDPRAA. Shrubland species may be excellent target species for lands managed to promote game species.

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, Prairie (rare), Golden-winged Warbler, Orange-crowned Warbler, Chestnut-sided Warbler, Mourning Warbler, Connecticut Warbler, Wilson's Warbler, Canada Warbler, Harris's Sparrow, 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 the overwhelming majority of the LDPRAA, covering more than 150,000 acres or 66.1% of the land area. These areas, scattered with lawns, parks, and other manicured vegetation, offer suitable breeding habitat for relatively few bird species.

Regularly Occurring Species

Typical Species - Red-tailed Hawk (in more sparsely inhabited areas), American Kestrel (especially farmsteads), Killdeer, Rock Dove, Mourning 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, White-breasted Nuthatch, House Wren, Carolina Wren, 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. This species, once fairly common in the LDPRAA, has virtually been extirpated from the area.

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. Monk Parakeets are rare nesters in some residential and urban areas in and/or near the LDPRAA, with a small colony present as close as Bensenville (Hyman and Pruett-Jones 1995). Eurasian Collared-Doves and Ringed Turtle-Doves have been found in the area and will probably continue to increase (Bohlen 1997). Both the Monk Parakeet and Eurasian Collared-Dove were recently added to the state checklist due to the presence of a stable, if not increasing population of the parakeet and due to recent nesting and rapidly increasing reports of the dove (Illinois Ornithological Records Committee 1999).

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.

Many of the areas manicured parks and park-like areas can still be a valuable rest and "refueling" area for tired migrants and provide important stopover habitat, especially if areas could be enhanced with plantings of shrubs and other seed and berry producing plants. As most of this large area will never be an important area for breeding species, this stopover habitat can be important for rest, cover and food for numerous migrant species.

Management Recommendations

The LDPRAA contains several rich wetland bird communities and is a potentially important migration corridor, especially for neotropical forest and forest interior species. Wetland conservation should clearly be one of the highest priorities in the LDPRAA because of remaining populations of many state threatened and endangered species. Grassland restoration, especially around existing wetlands, would provide habitat for *declining grassland birds, 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 LDPRAA 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 coupled with judicious consideration of the needs of migrant birds (some shrubby areas and oak trees) might be the best management strategy. Needless to say, continued protection of the large, intact parcels of remaining forest tracts, especially in the forest preserves in the Palos area of Cook Co., are also a high priority. As further lands become available both in that area, and along the Salt Creek in Du Page Co., these lands should be purchased to provide unbroken tracts and travel corridors for those forest interior and area sensitive species that still breed in the area.

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 CRP fields, shrub-lined drainage ditches, and unmowed roadsides.

Mammals

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 1999) was checked for recent records (as of June 1999) of threatened and endangered species. Taxonomy follows Wilson and Reeder (1993).

Mammal species known or likely to occur in the Lower Des Plaines River Assessment Area (LDPRAA) are listed in Table 13. The 45 species in this table represent 76% 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 LDPRAA 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). The only record of an endangered or threatened mammal in the LDPRAA is a sighting of the river otter at the Waterfall Glen Forest Preserve, DuPage County, in 1988 (Illinois Department of Natural Resources 1999). Given the apparent recent increase in numbers and distribution of the (formerly state threatened) bobcat (*Lynx rufus*) in Illinois (Woolf 1996), it is possible that a bobcat could be reported somewhere among the county forest preserves in the southern parts of the LDPRAA soon. The population status of many mammal species in the LDPRAA is unknown; in these cases, designations in Table 13 are projections based on their status in other parts of Illinois.

More than half (66.1%) of the LDPRAA consists of urban and developed areas (Table 2). Croplands, concentrated near the southern border of the LDPRAA, occupy an additional 5.1% of the area (Table 2, Figure 8). 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 urban and suburban 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 hayfields, pastures, and fencerows in agricultural areas and other maintained areas such as roadsides, cemeteries, parks, 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 18.3% of the LDPRAA and are extremely fragmented, but substantial forest preserves are located in the southern part of the LDPRAA along the Calumet-Sag Channel and Chicago Sanitary and Ship Canal. These areas, and forests along the lower Salt Creek, may provide habitat for species of mammals associated primarily with forest that may not be common elsewhere in the

LDPRAA. Only 4.3% of the LDPRAA is grassland (Table 2), again concentrated in the southern parts of the LDPRAA (Figure 9), offering few opportunities for conservation of mammal species associated with grasslands. The mammalian fauna of most of the LDPRAA is therefore likely to consist of common species that can adapt to human-dominated, suburban landscapes.

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 and dogs (*Canis familiaris*) to transmit diseases to wild mammals or humans (Coleman and Temple 1996).

Table 13. List of mammal species known or likely to occur in the Lower Des Plaines River Assessment Area.¹

Common name ²	Order <i>Scientific name</i>	Habitat ³	Population status ^{4,5}
Marsupials	Didelphimorphia		
Virginia opossum	<i>Didelphis virginiana</i>	F, W, G	C
Insectivores	Insectivora		
masked shrew	<i>Sorex cinereus</i>	G, F, W	C
northern short-tailed shrew	<i>Blarina brevicauda</i>	F, G, W	C
pygmy shrew	<i>Sorex hoyi</i>	F, G	R?
least shrew	<i>Cryptotis parva</i>	G	U?
eastern mole	<i>Scalopus aquaticus</i>	F, G	C
Bats	Chiroptera		
little brown bat	<i>Myotis lucifugus</i>	F, caves, buildings	C
northern long-eared bat	<i>Myotis septentrionalis</i>	F, caves, buildings	U?
silver-haired bat	<i>Lasionycteris noctivagans</i>	F, caves (hibernation)	C/R+
eastern pipistrelle	<i>Pipistrellus subflavus</i>	F, caves	U?
big brown bat	<i>Eptesicus fuscus</i>	F, caves, buildings	C
red bat	<i>Lasiurus borealis</i>	F	C
hoary bat	<i>Lasiurus cinereus</i>	F	U
evening bat	<i>Nycticeius humeralis</i>	F, buildings	U?
Rabbits	Lagomorpha		
eastern cottontail	<i>Sylvilagus floridanus</i>	G, F (edges)	C

Table 13. Continued.

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

¹ Compiled from range maps and known records reported in Hoffmeister (1989) and Illinois Department of Natural Resources (1999).

² Bold type indicates an Illinois threatened (ST) species by the Illinois Endangered Species Protection Board (1999).

* = introduced species.

³ Habitats: W = wetland, G = grassland, F = forest.

⁴ Population status: C = common, U = uncommon, R = rare, ? = status uncertain, *C during migration, but R or absent during summer

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 LDPRAA 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. Pygmy shrews inhabit forested areas or grassland adjacent to forest. 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 human-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 LDPRAA are listed in Table 13.

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). There are no confirmed records of gray fox for the LDPRAA and gray foxes are unlikely to inhabit suburban and developed areas, but Hoffmeister (1989) reports a record near St. Charles in Kane County. The large forest tracts in the southern LDPRAA may support gray foxes, but this possibility should be confirmed. The bobcat has also recently increased in numbers in Illinois (Wolf 1996) and may eventually immigrate into these areas. Unfortunately, the areas surrounding these forest tracts are primarily urban and developed land, which reduces the likelihood of movements among them by mammals that specialize in forested habitats, and the tracts are generally too small to support isolated populations of larger species of forest mammals. 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. Gray squirrels, however, also live in city parks and residential areas. Nixon et al. (1978) considered gray squirrels scarce in most of the LDPRAA, but common in several urban areas, particularly those near Chicago such as Oak Park and Berwyn. Fox squirrels occur in most towns away from the rivers, and the agricultural regions of the LDPRAA. 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 associated with forests that are known or likely to occur in the LDPRAA 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). LDPRAA 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 LDPRAA are not available. Surveys should be conducted to determine the status of the gray fox in the LDPRAA. The INHD (Illinois Department of Natural Resources 1999) contains no records of the bobcat (formerly a state threatened species) in the LDPRAA, 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 LDPRAA. Until recently only two specimens of the pygmy shrew (*Sorex hoyi*) had been collected in Illinois, one near Palatine in Cook County in the LDPRAA (Hoffmeister 1989).d At least four specimens have been collected in Cook and McHenry counties during the 1990's (Mierzwa 1991, Sliwiski 1994, INHS Mammal Collection). The status of this species in the LDPRAA should be determined. Because the specimen collected in Palatine was captured in a garage, the possible occurrence of pygmy shrews in suburban habitats also should be investigated. There are no records for the eastern pipistrelle and few records for the northern long-eared bat, hoary bat, and evening bat in the LDPRAA (Hoffmeister 1989, INHS Bat Survey Database). Information on the distribution and abundance of these bats would be of interest, as well as data on whether they summer in the LDPRAA or only occur there during migration. Bat surveys in the LDPRAA 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). The woodland vole has been reported from forest tracts near the LDPRAA (e.g., Elk Grove Village, Cook County, and Downer's Grove, DuPage County; Hoffmeister 1989), but the current status of this species in regions with small, isolated forest remnants is also unknown. Because forest habitat in the LDPRAA is fragmented, it would be valuable to assess the ability of forest species to maintain viable populations and to disperse between forested tracts in a suburban or urban landscape. The distribution of flying squirrels, chipmunks, and woodland voles, in particular, should be determined. A growing concern as well is the effect of overabundant species such as raccoons or white-tailed deer on the fauna and flora of urban/suburban nature preserves.

Prairie/Grassland

Typical Species

Mammal species occurring in the LDPRAA 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 LDPRAA that use grasslands are listed in Table 13.

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 LDPRAA 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 LDPRAA. Franklin's ground squirrel is known historically from locations in the southern LDPRAA (Hoffmeister 1989), 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 LDPRAA should be studied further. There are no published records of the southern bog lemming for the northeastern part of Illinois, and the presence of this species in the LDPRAA should be confirmed. 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 LDPRAA, but its population status in the LDPRAA should be determined more precisely. It is probable that badgers and Franklin's ground squirrels only occur in the southernmost part of the LDPRAA where grassland and agricultural land in this area is concentrated. 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 LDPRAA should be evaluated. The persistence of grassland small mammal populations in small preserves surrounded by suburban and developed land and the ability of small mammals to travel between such habitat islands should be investigated.

Wetland

Typical Species

Mammal species in the LDPRAA 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 LDPRAA 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 13.

Threatened and Endangered Species

There is only one record for the state threatened river otter in the LDPRAA prior to 1999 (Hoffmeister 1989, Illinois Department of Natural Resources 1999). Otters were sighted at Waterfall Glen Forest Preserve in DuPage County in 1988 (Illinois Department of Natural Resources 1999). The current status of this species in the LDPRAA is unknown.

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 LDPRAA.

Information Gaps

Aquatic habitat in the LDPRAA should be monitored regularly for river otters, particularly in the southern LDPRAA along the Chicago Sanitary and Ship Canal where wetlands in the LDPRAA are concentrated. The continued presence of river otters at Waterfall Glen should be investigated. The presence of beavers is considered favorable for otters, but the impact of beaver populations on the physical structure of riparian systems in the LDPRAA should be evaluated. Prior to European settlement much of Will, Cook, and DuPage counties consisted of wetlands (Suloway and Hubbell 1994), but only 3.3% of the LDPRAA 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 could enhance the suitability of the LDPRAA as habitat for a variety of forest-dwelling species, including the bobcat and gray fox. Urban development around most existing forest tracts in the LDPRAA will probably limit their ability to support large, forest-associated mammals, but efforts to establish and retain wildlife movement corridors among these tracts could increase their value as habitat for these species. 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 LDPRAA 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.

Preservation of native prairie remnants and other types of grassland habitats would provide habitat for the badger and red fox in the southern LDPRAA. If they prove to be rare in the LDPRAA, *Franklin's ground squirrels* could be introduced into suitable grasslands on county property. Vegetation along abandoned railroad rights-of-way in the LDPRAA should be preserved or restored to provide habitat and dispersal or travel corridors for mammals. Because many of the remaining natural areas in the LDPRAA are surrounded by urban and developed lands, designing and maintaining wildlife movement corridors among existing preserves should be a priority.

Amphibians and Reptiles

Information in this section has been compiled from range maps in Smith (1961), the Natural Heritage Database (Illinois Department of Natural Resources 1999), 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 Lower Des Plaines River Assessment Area (LDPRAA) but Dancik (1974) reported on the turtle fauna of a portion of the Des Plaines River (see section on Creeks and Rivers). The LDPRAA contains portions of three of Smith's (1961) eleven Herpetofaunal Divisions for the state: Grand Prairie, Woodlands of the Grand Prairie, and Northeastern Mesic Woodlands.

Amphibian and reptile species that are known or likely to occur in the LDPRAA are listed in Table 14. The 16 amphibian species and 22 reptile species in Table 14 represent 39% of the amphibian species and 37% of the reptile species of the State. Three threatened or endangered species are known to exist in the LDPRAA: the state endangered Spotted Turtle (*Clemmys guttata*), the state threatened Blanding's Turtle (*Emydoidea blandingii*), and the state threatened Kirtland's Snake (*Clonophis kirtlandii*). One other state endangered species, the eastern Massasauga (*Sistrurus catenatus*), has been extirpated from the LDPRAA.

There have been reports of exotic reptile species in the Des Plaines River (see section on Creeks and Rivers).

When referring to the habitat designations in Table 14, 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 14 might suggest. For example, the Spotted Turtle is listed as occurring in wetlands, but it is only found in wet dolomite prairies with good water quality.

Habitat Requirements and Current Status of the Listed Species in LDPRAA

Spotted Turtle - This semi-aquatic turtle is most frequently found in bogs, sedge meadows, and wet meadows but it may also occur in association with small woodland streams. In Illinois, spotted turtles are known from sedge meadows intermixed with dolomite prairie, fen, and marsh.

The historic Illinois range probably encompassed the entire Chicago metropolitan area, but today this turtle is only known from three populations along the Des Plaines River. All three populations (Lockport Prairie, Romeoville Prairie, and Trygg Asphalt Plant) are within the boundaries of the LDPRAA.

Blanding's Turtle - Prairie marshes and floodplain sloughs of larger rivers are the primary habitat of this semi-aquatic turtle. They are most commonly found in shallow (10-20 cm) open water areas of cattail marshes, sloughs, ponds, and flooded ditches, although they have been reported from small streams in southeast Minnesota. 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.

There are several known locations for this species in the LDPRAA. Most of these populations have been studied by Dan Ludwig, Mike Redmer, and others associated with the Forest Preserve District of DuPage County.

Kirtland's Water Snake - This semi-aquatic snake prefers wet prairies with abundant cover, especially prairies that are seasonally flooded and adjacent to upland habitats. *Clonophis* utilize crayfish burrows as shelter although they have been taken in vacant lots in some urban areas where crayfish burrows have been completely destroyed. In these situations they rely on boards and other surface debris for cover.

The most recent verified record is from Argonne National Laboratory in DuPage County in 1989.

Table 14. Amphibian and reptile species known or likely to occur in the Lower Des Plaines River 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	<i>Ambystoma laterale</i>	F,W,L	C
spotted salamander	<i>Ambystoma maculatum</i>	F,W,L	C
central newt	<i>Notophthalmus viridescens</i>	F,W,L	R
tiger salamander	<i>Ambystoma tigrinum</i>	W,P,L	C
redback salamander	<i>Plethodon cinereus</i>	F	U
mudpuppy	<i>Necturus maculosus</i>	R,L	.
American toad	<i>Bufo americanus</i>	U	C
cricket frog	<i>Acris crepitans</i>	W,L,R	C
spring peeper	<i>Pseudacris crucifer</i>	F,W,L	C
western chorus frog	<i>Pseudacris triseriata</i>	U	C
Cope's gray treefrog	<i>Hyla chrysoscelis</i>	F,W	C
eastern gray treefrog	<i>Hyla versicolor</i>	F,W	C

Table 14. Continued.

Common Name ^{1,2}	Scientific Name	Habitat ³	Abundance ⁴
bullfrog	<i>Rana catesbeiana</i>	U	C
green frog	<i>Rana clamitans</i>	F,W,R	C
pickerel frog	<i>Rana palustris</i>	F,W,R	R
northern leopard frog	<i>Rana pipiens</i>	U	C
Reptiles			
snapping turtle	<i>Chelydra serpentina</i>	W,L,R	C
musk turtle	<i>Sternotherus odoratus</i>	L	R
Spotted turtle - SE	<i>Clemmys guttata</i>	W	R
Blanding's turtle - ST	<i>Emydoidea blandingii</i>	W	U
painted turtle	<i>Chrysemys picta</i>	W,L,R	C
slider	<i>Trachemys scripta</i>	W,L,R	U ⁴
map turtle	<i>Graptemys geographica</i>	L,R	U
false map turtle	<i>Graptemys pseudogeographica</i>	L,R	U
spiny softshell turtle	<i>Apalone spinifera</i>	W,L,R	C
eastern hognose snake	<i>Heterodon platirhinos</i>	F,P	C
racer	<i>Coluber constrictor</i>	U	C
smooth green snake	<i>Opheodrys vernalis</i>	F,W,P	U
fox snake	<i>Elaphe vulpina</i>	F,P,C	C
milk snake	<i>Lampropeltis triangulum</i>	F,W,P	U
plains garter snake	<i>Thamnophis radix</i>	U	C
common garter snake	<i>Thamnophis sirtalis</i>	U	C
brown snake	<i>Storeria dekayi</i>	U	C
red-bellied snake	<i>Storeria occipitomaculata</i>	F,W	U
Graham's crayfish snake	<i>Regina grahamii</i>	W,P,L	U
queen snake	<i>Regina septemvittata</i>	R	R
Kirtland's snake - ST	<i>Clonophis kirtlandii</i>	F,W,P,L	R
northern water snake	<i>Nerodia sipedon</i>	U	C

¹ Nomenclature follows Collins (1990) unless noted.

² Bold type indicates an Illinois endangered (SE) or 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 LDPRAA that are typical of forested habitats include the Spotted Salamander and the Gray Treefrog. As outlined above, some amphibians also require aquatic habitats for breeding. The Gray Treefrog and Spotted Salamander breed in forested wetlands and upland forested ponds. Among the reptiles of the LDPRAA, the Brown Snake is typical of forested areas.

Enhancement and Restoration Potential

Maintaining small, temporary, fishless ponds in forests of the LDPRAA would benefit almost all of the reptiles and amphibians of the LDPRAA 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 LDPRAA and the state. The Central Newt and both Gray Treefrogs breed in this habitat. Kirtland's Snake and the Massasauga, both state listed species, would both benefit from restoration or creation of woodland ponds.

Wetland

Typical Species

Amphibian species of the LDPRAA 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 LDPRAA, the Painted Turtle and Common Garter Snake are typical of wetlands. All three listed species rely on wetland habitats.

Enhancement and Restoration Potential

Wetlands are central to the continued existence of all three listed species in the LDPRAA: Spotted Turtle, Blanding's Turtle, and Kirtland's Snake. Maintaining even small, temporary wetlands in the LDPRAA 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.

Prairie/Grassland

Typical Species

Of the amphibian species listed in Table 14, the Tiger Salamander and Western Chorus Frog are typical of prairie habitats in the LDPRAA. 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 LDPRAA. 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 LDPRAA 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, old field, and agricultural edge. All three listed species rely on prairie habitats.

Enhancement and Restoration Potential

Restoring native prairie, especially wet prairie, in the LDPRAA would benefit a variety of amphibians and reptiles especially the Tiger Salamander, and all three listed species.

Lakes, Ponds, and Impoundments

Typical Species

Of the amphibian species listed in Table 14, the Bullfrog is typical of lakes, ponds, and impoundments in the LDPRAA. Both of these species have developed strategies for co-existing with fish and are usually more widely distributed than most amphibians. Among the reptiles of the LDPRAA 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 LDPRAA would benefit a variety of amphibians and reptiles including the listed species.

Creeks and Rivers

Typical Species

The Cricket Frog and Green Frog are typical of creeks and small rivers in the LDPRAA. The Bullfrog is common in the Des Plaines River. Among the reptiles of the LDPRAA, the Northern Water Snake is typical of creeks and small rivers while the Snapping Turtle is typical of Des Plaines River.

Enhancement and Restoration Potential

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

Exotic Species

Dancik (1972) reported 12 species or subspecies of exotic turtles in a five mile stretch of the Des Plaines River (from the 22nd Street bridge in North Riverside to the Interstate 55 crossing in Forest View) in a three year study (1971 through 1973). Only one of these, the Yellow-bellied Slider (*Trachemys scripta scripta*) was reported as reproducing. Dancik also reported finding two Spectacled Caimans (*Caiman crocodilus*) during this survey, indicating that most of the exotic reptiles found in the Des Plaines are probably discarded pets. Although the stretch of river studied by Dancik is outside of the LDPRAA, his conclusions undoubtedly apply to the entire river.

Cultural Habitats

Typical Species

Of the amphibian species listed in Table 14, the American Toad, Western Chorus Frog, and Bullfrog are typical of cultural habitats in the LDPRAA. 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 LDPRAA, the Plains Garter Snake, Common Garter Snake, Brown Snake, and Northern Water Snake are typical of cultural habitats in the LDPRAA.

Enhancement and Restoration Potential

The American Toad, Western Chorus Frog, and Bullfrog do well in patches of cattail marsh less than 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 grasses around these habitats.

Overall Habitat Quality

Overall, opportunities for amphibians and reptiles in the LDPRAA are poor. Compared to pre-settlement, the present landscape of the LDPRAA lacks a significant amount of wet prairie and the riparian zone along the Des Plaines River has been destroyed or degraded.

Current Management Concerns for Partnership

The most critical management concerns for the LDPRAA Partnership are restoration of the riparian zone along the Des Plaines River and improvement of water quality. Intact riparian zones may act as dispersal corridors for many amphibians and reptiles, thus reducing the effects of habitat fragmentation.

Aquatic Biota

Introduction

The Lower Des Plaines River Assessment Area (LDPRAA) is located in northeastern Illinois. Major waterways in the Assessment Area include the lower Des Plaines River, Salt Creek, the Chicago Sanitary and Ship Canal, and the Calumet-Sag Channel. Three counties are included - Cook, DuPage, and Will. The majority of the Assessment Area is in the Northeastern Morainal Natural Division (Morainal & Chicago Lake sections) but also encompasses a small portion of the Grand Prairie Division (Schwegman 1973).

Much of the watershed is part of the Greater Chicago Metropolitan Region and has been extensively developed for urban and industrial use. Pollution has degraded the water quality and aquatic habitat. Overenrichment of the water from treated and untreated sewage is a major problem. Septic conditions, algal blooms, and small fish populations have reduced the attractiveness for water-oriented recreation (Vidal 1969).

Statewide Comparison of Aquatic Biota

The Lower Des Plaines River Assessment Area supports a low diversity of aquatic species including 49 species of fishes, 31 species of mussels, and 10 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.

This area also appears to support, at best, a moderate diversity of aquatic macroinvertebrate species.

Common Species

Forty-nine species of fishes are known from the Lower Des Plaines River Assessment Area (Tables 15 and 16). Common fishes throughout the drainage are the bluntnose minnow, common carp, black bullhead, green sunfish and johnny darter. The headwaters are dominated by creek chubs; the larger creeks by bluntnose minnows, striped shiners, sand shiners, central stonerollers, white suckers, black bullheads, bluegills, largemouth bass and johnny darters (Smith 1979).

Thirty-one species of native freshwater mussels have been reported from this Assessment Area (Tables 17 and 18). However, the streams in the region have been severely degraded

and very few mussels remain. Of the 31 known mussel species, only 1 (white heelsplitter) has been collected alive in the past 20 years. Information on the mussels of the rivers included in this area is available in Baker (1898, 1906) and Cummings and Mayer (1997). Historically the common species included the fat mucket, Wabash pigtoe, plain pocketbook, white heelsplitter, and cylindrical papershell (Cummings and Mayer 1997; INHS Mollusk Collection data).

Ten species of crayfishes, isopods, and amphipods are found in the Lower Des Plaines River Assessment Area (Tables 19 and 20). The most common crayfishes are the introduced rusty crayfish, which is found over rocky substrates in fast current, the clearwater crayfish, also found over rocky substrates in fast current, and the virile crayfish found in rocky substrates in moderate current. 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, unpublished), Ephemeroptera (mayflies) (Burks 1953), Plecoptera (stoneflies) (Frison 1935), Trichoptera (caddisflies) (Ross 1944), Hemiptera (true bugs) (Lauck 1959, Taylor 1996), Diptera (Malloch 1915a, b), and Annelida (segmented worms) (Wetzel 1992).

In general, the aquatic macroinvertebrate populations of the Lower Des Plaines River Assessment Area appear to be, at best, as diverse as those of many other watersheds in Illinois, although the diversity of aquatic fauna in the Des Plaines River proper, and in the Chicago Sanitary and Ship Canal and Calumet Sag Canal, have been reduced to tolerant organisms because of the heavy industrial and domestic effluents in those rivers. Unfortunately, available information to date is limited to those few surveys that focused primarily on the Des Plaines River proper. A list of aquatic macroinvertebrate taxa known or thought likely to occur within the Lower Des Plaines River Assessment Area is presented in Table 21; this information is based upon records from the Des Plaines River, a few direct tributaries, and from records from other aquatic habitats within the counties located in the Lower Des Plaines River Assessment Area. Most of these species are considered relatively common in the state of Illinois.

Although many of the species listed in Table 21 are known to occur in both standing and running water, the paucity of accessible historical records and limited recent information for taxa known to occur within the Lower Des Plaines River Assessment Area make it difficult to associate most 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 15. Freshwater fishes recorded from the Lower Des Plaines River Assessment Area¹.

FAMILY Scientific Name ^{2,3,4}	Common Name	Headwaters	Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
AMIIDAE						
<i>Amia calva</i>	bowfin				X	X
CLUPEIDAE						
<i>Dorosoma cepedianum</i>	gizzard shad			X	X	X
CYPRINIDAE						
<i>Campostoma anomalum</i> #	central stoneroller	X	X	X		
<i>Carassius auratus</i> *	goldfish		X	X	X	X
<i>Cyprinella spiloptera</i>	spotfin shiner		X	X	X	
<i>Cyprinus carpio</i> *#	common carp			X	X	X
<i>Luxilus chrysocephalus</i> #	striped shiner	X	X	X	X	
<i>Lythrurus umbratilis</i>	redfin shiner		X	X	X	
<i>Nocomis biguttatus</i>	hornyhead chub		X	X		
<i>Notemigonus crysoleucas</i>	golden shiner			X	X	X
<i>Notropis atherinoides</i>	emerald shiner				X	
<i>Notropis dorsalis</i>	bigmouth shiner		X	X	X	
<i>Notropis heterolepis</i> - SE	blacknose shiner		X	X		
<i>Notropis ludibundus</i> #	sand shiner		X	X	X	
<i>Pimephales notatus</i> #	bluntnose minnow	X	X	X	X	
<i>Pimephales promelas</i>	fathead minnow		X	X		
<i>Semotilus atromaculatus</i>	creek chub	X	X			
CATOSTOMIDAE						
<i>Carpionodes cyprinus</i>	quillback		X	X	X	
<i>Catostomus commersoni</i> #	white sucker		X	X	X	
<i>Erimyzon oblongus</i>	creek chubsucker	X	X	X		
<i>Moxostoma anisurum</i>	silver redhorse			X	X	
<i>Moxostoma valenciennesi</i> -SE	greater redhorse				X	
ICTALURIDAE						
<i>Ameiurus melas</i> #	black bullhead		X	X	X	X
<i>Ameiurus natalis</i>	yellow bullhead		X	X	X	X
<i>Ictalurus punctatus</i>	channel catfish			X	X	X
<i>Noturus gyrinus</i>	tadpole madtom		X	X		
ESOCIDAE						
<i>Esox americanus</i>	grass pickerel	X	X	X		X
<i>Esox lucius</i>	northern pike			X	X	X
UMBRIDAE						
<i>Umbra limi</i>	central mudminnow		X			X
SALMONIDAE						
<i>Oncorhynchus mykiss</i>	rainbow trout		X	X		
APHREDODERIDAE						
<i>Aphredoderus sayanus</i>	pirate perch		X			
FUNDULIDAE						
<i>Fundulus notatus</i>	blackstripe topminnow			X	X	X
POECILIIDAE						
<i>Gambusia affinis</i>	mosquitofish	X	X			X

Table 15. Continued.

FAMILY <i>Scientific Name</i> ^{2,3,4}	Common Name	Headwaters	Creeks	Small	Med. &	Standing
				Rivers	Lg. Rivers	Water
GASTEROSTEIDAE						
<i>Gasterosteus aculeatus*</i>	threespine stickleback		X	X	X	X
COTTIDAE						
<i>Cottus bairdi</i>	mottled sculpin	X	X			
MORONIDAE						
<i>Morone mississippiensis</i>	yellow bass		X	X	X	X
CENTRARCHIDAE						
<i>Ambloplites rupestris</i>	rock bass		X	X	X	
<i>Lepomis cyanellus#</i>	green sunfish		X	X	X	X
<i>Lepomis gibbosus</i>	pumpkinseed		X	X	X	X
<i>Lepomis humilis</i>	orangespotted sunfish			X	X	X
<i>Lepomis macrochirus#</i>	bluegill		X	X	X	X
<i>Micropterus dolomieu</i>	smallmouth bass		X	X	X	X
<i>Micropterus salmoides#</i>	largemouth bass		X	X	X	X
<i>Pomoxis annularis</i>	white crappie		X	X	X	X
<i>Pomoxis nigromaculatus</i>	black crappie		X	X	X	X
PERCIDAE						
<i>Etheostoma flabellare</i>	fantail darter	X	X	X		
<i>Etheostoma nigrum#</i>	johnny darter	X	X	X	X	
<i>Percina maculata</i>	blackside darter	X	X	X	X	
SCIAENIDAE						
<i>Aplodinotus grunniens</i>	freshwater drum			X	X	

¹ Data from the Illinois Natural History Survey Fish Collection.

² Bold type indicates a State Endangered Species (SE).

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

⁴ Total number of species = 49 (47 native, 2 introduced).

Table 16. Freshwater fishes recored from the Lower Des Plaines River Assessment Area, by habitat¹.

FAMILY <i>Scientific Name</i> ^{2,3,4}	Common Name	Streams			Standing Water	
		Riffles	Runs	Pools	Littoral	Open Water
AMIIDAE						
<i>Amia calva</i>	bowfin			X	X	
CLUPEIDAE						
<i>Dorosoma cepedianum</i>	gizzard shad		X			X
CYPRINIDAE						
<i>Campostoma anomalum#</i>	central stoneroller	X	X			
<i>Carassius auratus*</i>	goldfish			X	X	
<i>Cyprinella spiloptera</i>	spotfin shiner		X	X		
<i>Cyprinus carpio*#</i>	common carp			X	X	

Table 16. Continued.

FAMILY <i>Scientific Name</i> ^{2,3,4}	Common Name	Streams			Standing Water	
		Riffles	Runs	Pools	Littoral	Open Water
<i>Luxilus chrysocephalus</i> #	striped shiner		X	X		
<i>Lythrurus umbratilis</i>	redfin shiner		X	X		
<i>Nocomis biguttatus</i>	hornyhead chub		X	X		
<i>Notemigonus crysoleucas</i>	golden shiner			X	X	X
<i>Notropis atherinoides</i>	emerald shiner			X		
<i>Notropis dorsalis</i>	bigmouth shiner		X	X		
<i>Notropis heterolepis</i> - SE	blacknose shiner			X		
<i>Notropis ludibundus</i> #	sand shiner		X	X		
<i>Pimephales notatus</i> #	bluntnose minnow		X	X		
<i>Pimephales promelas</i>	fathead minnow			X		
<i>Semotilus atromaculatus</i> #	creek chub			X		
CATOSTOMIDAE						
<i>Carpiodes cyprinus</i>	quillback		X	X		
<i>Catostomus commersoni</i> #	white sucker		X	X		
<i>Erimyzon oblongus</i>	creek chubsucker		X	X		
<i>Moxostoma anisurum</i>	silver redhorse		X	X		
<i>Moxostoma valenciennesi</i> -SE	greater redhorse		X	X		
ICTALURIDAE						
<i>Ameiurus melas</i> #	black bullhead			X	X	
<i>Ameiurus natalis</i>	yellow bullhead			X	X	
<i>Ictalurus punctatus</i>	channel catfish		X	X	X	
<i>Noturus gyrinus</i>	tadpole madtom		X	X		
ESOCIDAE						
<i>Esox americanus</i>	grass pickerel			X	X	
<i>Esox lucius</i>	northern pike			X	X	
UMBRIDAE						
<i>Umbra limi</i>	central mudminnow			X	X	
SALMONIDAE						
<i>Oncorhynchus mykiss</i>	rainbow trout		X	X		
APHREDODERIDAE						
<i>Aphredoderus sayanus</i>	pirate perch			X		
FUNDULIDAE						
<i>Fundulus notatus</i>	blackstripe topminnow			X		
POECILIIDAE						
<i>Gambusia affinis</i>	mosquitofish			X	X	
GASTEROSTEIDAE						
<i>Gasterosteus aculeatus</i> *	threespine stickleback			X	X	
COTTIDAE						
<i>Cottus bairdi</i>	mottled sculpin	X				
MORONIDAE						
<i>Morone mississippiensis</i>	yellow bass			X	X	
CENTRARCHIDAE						
<i>Ambloplites rupestris</i>	rock bass			X		
<i>Lepomis cyanellus</i> #	green sunfish			X		X

Table 16. Continued.

FAMILY <i>Scientific Name</i> ^{2,3,4}	Common Name	Streams			Standing Water	
		Riffles	Runs	Pools	Littoral	Open Water
<i>Lepomis gibbosus</i>	pumpkinseed			X		
<i>Lepomis humilis</i>	orangespotted sunfish			X		
<i>Lepomis macrochirus</i> #	bluegill			X	X	
<i>Micropterus dolomieu</i>	smallmouth bass			X	X	X
<i>Micropterus salmoides</i> #	largemouth bass			X	X	X
<i>Pomoxis annularis</i>	white crappie			X	X	X
<i>Pomoxis nigromaculatus</i>	black crappie			X	X	X
PERCIDAE						
<i>Etheostoma flabellare</i>	fantail darter	X				
<i>Etheostoma nigrum</i> #	johnny darter		X	X		
<i>Percina maculata</i>	blackside darter			X		
SCIAENIDAE						
<i>Aplodinotus grunniens</i>	freshwater drum			X		

¹Data from the Illinois Natural History Survey Fish Collection.

²Bold type indicates a State Endangered Species (SE).

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

⁴Total number of species = 49 (47 native, 2 introduced).

Table 17. Freshwater mussels recorded from the Lower Des Plaines River Assessment Area¹.

ORDER	Subfamily <i>Scientific Name</i> ^{2,3,4}	Common Name	Headwaters/ Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
MARGARITIFERIDAE						
	Cumberlandinae					
	<i>Cumberlandia monodonta</i> -SE	spectaclecase			X	
UNIONIDAE						
	Anodontinae					
	<i>Alasmidonta marginata</i>	elktoe		X	X	
	<i>Alasmidonta viridis</i> - ST	slippershell mussel	X	X		
	<i>Anodontoides ferussacianus</i>	cylindrical papershell	X	X		X
	<i>Lasmigona complanata</i> #	white heelsplitter	X	X	X	X
	<i>Lasmigona compressa</i>	creek heelsplitter	X	X		
	<i>Lasmigona costata</i>	flutedshell		X	X	
	<i>Pyganodon grandis</i>	giant floater	X	X	X	X
	<i>Simpsonaias ambigua</i> - SE	salamander mussel		X	X	
	<i>Strophitus undulatus</i>	squawfoot		X	X	X
	<i>Utterbackia imbecillis</i>	paper pondshell		X	X	X
	Ambleminae					
	<i>Amblema plicata</i>	threeridge		X	X	

Table 17. Continued.

ORDER		Common Name	Headwaters/ Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
Subfamily	Scientific Name ^{2,3,4}					
	<i>Cyclonaias tuberculata</i> - ST	purple wartyback			X	
	<i>Elliptio crassidens</i> - ST	elephantear			X	
	<i>Elliptio dilatata</i> - ST	spike		X	X	
	<i>Fusconaia flava</i>	Wabash pigtoe		X	X	
	<i>Plethobasus cyphus</i> - SE	sheepnose			X	
	<i>Pleurobema sintoxia</i>	round pigtoe		X	X	
	<i>Quadrula metanevra</i>	monkeyface			X	
	<i>Quadrula pustulosa</i>	pimpleback		X	X	
	<i>Quadrula quadrula</i>	mapleleaf		X	X	
	<i>Tritogonia verrucosa</i>	pistolgrip		X	X	
Lampsilinae						
	<i>Actinonaias ligamentina</i>	mucket		X	X	
	<i>Lampsilis cardium</i>	plain pocketbook		X	X	
	<i>Lampsilis siliquoidea</i>	fatmucket		X	X	X
	<i>Leptodea fragilis</i>	fragile papershell		X	X	
	<i>Ligumia recta</i> - ST	black sandshell			X	
	<i>Potamilus alatus</i>	pink heelsplitter		X	X	
	<i>Toxolasma parvus</i>	lilliput	X	X	X	X
	<i>Venustaconcha ellipsiformis</i>	ellipse		X	X	
	<i>Villosa iris</i> - SE	rainbow		X	X	
DREISSENIDAE						
	<i>Dreissena polymorpha</i> *	zebra mussel			X	
CORBICULIDAE						
	<i>Corbicula fluminea</i> *	Asian clam	X	X	X	X

¹Data from the Illinois Natural History Survey Mollusk Collection.

²Bold type indicates a State Endangered Species (SE); State Threatened Species (ST).

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

⁴Total number of species = 33 (31 native, 2 introduced).

Table 18. Freshwater mussels recorded from the Lower Des Plaines River Assessment Area, by habitat.¹

FAMILY		Common Name	Streams			Standing Water
Subfamily	Scientific Name ^{2,3,4}		Riffles	Runs	Pools	Littoral Zone
MARGARITIFERIDAE						
Cumberlandinae						
	<i>Cumberlandia monodonta</i> -SE	spectaclecase		X	X	
UNIONIDAE						
Anodontinae						
	<i>Alasmidonta marginata</i>	elktoe	X	X		
	<i>Alasmidonta viridis</i> - ST	slippershell mussel	X	X		

Table 18. Continued.

FAMILY	Subfamily	Common	Streams			Standing Water	
			Scientific Name ^{2,3,4}	Name	Riffles	Runs	Pools
		<i>Anodontoides ferussacianus</i>	cylindrical papershell		X	X	X
		<i>Lasmigona complanata</i> #	white heelsplitter		X	X	X
		<i>Lasmigona compressa</i>	creek heelsplitter	X	X		
		<i>Lasmigona costata</i>	flutedshell	X	X		
		<i>Pyganodon grandis</i>	giant floater		X	X	X
		<i>Simpsonaias ambigua</i> - SE	salamander mussel	X	X		
		<i>Strophitus undulatus</i>	squawfoot		X	X	X
		<i>Utterbackia imbecillis</i>	paper pondshell		X	X	X
	Ambleminae						
		<i>Amblema plicata</i>	threeridge	X	X	X	
		<i>Cyclonaias tuberculata</i> - ST	purple wartyback	X	X		
		<i>Elliptio crassidens</i> - ST	elephantear		X	X	
		<i>Elliptio dilatata</i> - ST	spike	X	X		
		<i>Fusconaia flava</i>	Wabash pigtoe	X	X		
		<i>Plethobasus cyphus</i> - SE	sheepnose	X	X		
		<i>Pleurobema sintoxia</i>	round pigtoe	X	X		
		<i>Quadrula metanevra</i>	monkeyface	X	X		
		<i>Quadrula pustulosa</i>	pimpleback	X	X		
		<i>Quadrula quadrula</i>	mapleleaf	X	X	X	
		<i>Tritogonia verrucosa</i>	pistolgrip	X	X		
	Lampsilinae						
		<i>Actinonaias ligamentina</i>	mucket	X	X		
		<i>Lampsilis cardium</i>	plain pocketbook	X	X	X	
		<i>Lampsilis siliquoidea</i>	fatmucket	X	X	X	X
		<i>Leptodea fragilis</i>	fragile papershell	X	X	X	
		<i>Ligumia recta</i> - ST	black sandshell	X	X		
		<i>Potamilus alatus</i>	pink heelsplitter	X	X	X	
		<i>Toxolasma parvus</i>	lilliput	X	X	X	X
		<i>Venustaconcha ellipsiformis</i>	ellipse	X	X		
		<i>Villosa iris</i> SE	rainbow	X	X		
	DREISSENIDAE						
		<i>Dreissena polymorpha</i> *	zebra mussel		X	X	
	CORBICULIDAE						
		<i>Corbicula fluminea</i> *	Asian clam	X	X	X	X

¹Data from the Illinois Natural History Survey Mollusk Collection.

²Bold type indicates a State Endangered Species (SE); State Threatened Species (ST).

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

⁴Total number of species = 33 (31 native, 2 introduced).

Table 19. Freshwater crustaceans recorded from the Lower Des Plaines River Assessment Area .¹

ORDER	Family	Caves & Springs	Headwaters	Creeks	Small Rivers	Med. & Lg. Rivers	Standing Water
	<i>Scientific Name</i> ^{2,3,4}						
ISOPODA (Isopods)							
	Asellidae						
	<i>Caecidotea intermedia</i> #	X	X	X	X	X	
AMPHIPODA (Amphipods)							
	Hyalellidae						
	<i>Hyaella azteca</i> #		X	X	X	X	X
DECAPODA (Crayfishes & shrimps)							
	Cambaridae						
	<i>Procambarus acutus</i> White River crawfish			X	X	X	X
	<i>Procambarus gracilis</i> prairie crayfish				burrower		
	<i>Orconectes immunis</i> calico crayfish	X	X	X	X		X
	<i>Orconectes propinquus</i> # clearwater crayfish			X	X	X	
	<i>Orconectes rusticus</i> *# rusty crayfish		X	X	X	X	
	<i>Orconectes virilis</i> # virile crayfish		X	X	X		X
	<i>Fallicambarus fodiens</i> burrowing crayfish				burrower		
	<i>Cambarus diogenes</i> devil crawfish				burrower		

¹Data from the Illinois Natural History Survey Crustacean Collection.

²* = non-native species; # = common species.

³Total number of species = 10 (9 native, 1 introduced).

Table 20. Freshwater crustaceans recorded from the Lower Des Plaines River Assessment Area, by habitat¹.

ORDER	Family	Caves & Springs	Streams			Standing Water	
	<i>Scientific Name</i> ^{2,3}		Riffles	Runs	Pools	Littoral	Open Water
ARGULOIDA (Fish lice)							
	Argulidae						
	<i>Argulus</i> sp.			X	X		X
ISOPODA (Isopods)							
	Asellidae						
	<i>Caecidotea intermedia</i> #	X	X		X		
AMPHIPODA (Amphipods)							
	Hyalellidae						
	<i>Hyaella azteca</i> #		X	X	X	X	
DECAPODA (Crayfishes & shrimps)							
	Cambaridae						
	<i>Procambarus acutus</i> White River crawfish				X	X	
	<i>Procambarus gracilis</i> prairie crayfish				burrower		
	<i>Orconectes immunis</i> calico crayfish				X	X	

Table 21. Continued.

ORDER Family <i>Scientific Name</i> ^{2,3}	Caves & Springs	Streams			Standing Water	
		Riffles	Runs	Pools	Littoral	Open Water
<i>Orconectes propinquus</i> #	clearwater crayfish	X				
<i>Orconectes rusticus</i> * #	rusty crayfish	X			X	
<i>Orconectes virilis</i> #	virile crayfish	X	X		X	
<i>Fallicambarus fodiens</i>	burrowing crayfish					burrower
<i>Cambarus diogenes</i>	devil crawfish					burrower

¹Data from the Illinois Natural History Survey Crustacean Collection.

²* = non-native species; # = common species.

³Total number of species = 10 (9 native, 1 introduced).

Table 22. Aquatic macroinvertebrates, exclusive of the Crustacea and unionid Mollusca, recorded for the Lower Des Plaines River Assessment Area.¹

Phylum CNIDARIA - Coelenterates	<i>Chaetogaster diaphanus</i>
Class HYDROZOA - Hydrozoans	<i>Bratislavia unidentata</i>
Anthomedusae	<i>Dero digitata</i>
Hydridae	<i>Dero furcata</i>
<i>Hydra</i> sp.	<i>Dero nivea</i>
	<i>Haemonais waldvogeli</i>
Phylum TURBELLARIA - Flatworms	<i>Nais barbata</i>
Tricladida	<i>Nais communis</i>
Planariidae	<i>Nais pardalis</i>
<i>Dugesia</i> sp.	<i>Nais variabilis</i>
	<i>Ophidonais serpentina</i>
Phylum NEMATODA - Nematode Worms	<i>Paranais frici</i>
species indeterminate	<i>Pristina leidy</i>
	<i>Pristinella osborni</i>
Phylum ANNELIDA - Segmented Worms	<i>Slavina appendiculata</i>
Class BRANCHIOBELLAE - Crayfish	<i>Stylaria lacustris</i>
Worms	Tubificidae
Branchiobdellida	<i>Aulodrilus pigueti</i>
Cambarincolidae	<i>Branchiura sowerbyi</i>
<i>Cambarincola</i> sp.	<i>Ilyodrilus templetoni</i>
Class OLIGOCHAETA - Oligochaete Worms	<i>Limnodrilus cervix</i>
Lumbriculida	<i>Limnodrilus claparedianus</i>
Lumbriculidae	<i>Limnodrilus hoffmeisteri</i>
species indeterminate	<i>Limnodrilus maumeensis</i>
Tubificida	<i>Quistadrilus multisetosus</i>
Enchytraeidae	<i>Rhyacodrilus falciformis</i>
species indeterminate	<i>Tubifex tubifex</i>
Naididae	Lumbricidae
<i>Amphichaeta leydigi</i>	species indeterminate

Table 22. Continued.

Class HIRUDINEA - Leeches

Rhynchobdellida

Glossiphoniidae

Helobdella triserialis

Helobdella stagnalis

Placobdella multilineata

Placobdella parasitica

Gnathobdellida

Hirudinidae

Haemopsis marmorata

Pharyngobdellida

Erpobdellidae

Erpobdella punctata

Phylum ARTHROPODA - Arthropods

Class ARACHNIDA

Hydrachnida - Aquatic Mites

species indeterminate

Class INSECTA - Insects

Order Ephemeroptera - Mayflies

Baetidae

Baetis sp.

Labiobaetis frondalis

Ephemeridae

Ephemera simulans

Pentagenia vittigera

Heptageniidae

Stenonema femoratum

Siphonuridae

Siphonurus alternatus

Order Odonata - Damselflies and

Dragonflies

Zygoptera - Damselflies

Calopterygidae

Calopteryx maculata

Hetaerina americana

Coenagrionidae

Anomalagrion hastatum

Enallagma basidens

Enallagma carunculatum

Enallagma civile

Enallagma ebrium

Enallagma hageni

Enallagma signatum

Enallagma vesperum

Nehalennia irene

Lestidae

Lestes disjunctus

Lestes dryas

Lestes rectangularis

Lestes unguiculatus

Lestes vigilax

Anisoptera - Dragonflies

Aeshnidae

Aeshna clepsydra

Anax junius

Corduliidae

Epitheca spinigera

Somatochlora linearis

Gomphidae

Gomphus graslinellus

Libellulidae

Celithemis elisa

Celithemis eponina

Ladona julia

Leucorrhinia intacta

Libellula luctuosa

Libellula pulchella

Pachydiplax longipennis

Perithemis tenera

Sympetrum costiferum

Sympetrum internum

Sympetrum obtrusum

Sympetrum rubicundulum

Sympetrum vicinum

Order Plecoptera - Stoneflies

Capniidae

Allocapnia vivipara

Perlidae

Acroneuria frisoni

Perlesta placida complex

Taeniopterygidae

Taeniopteryx burksi

Order Heteroptera - True Bugs

Belostomatidae

Belostoma flumineum

Lethocerus americanus

Lethocerus griseus

Corixidae

Hesperocorixa obliqua

Hesperocorixa vulgaris

Palmacorixa buenoi

Sigara alternata

Sigara grossolineata

Sigara hubbelli

Trichocorixa calva

Table 22. Continued.

Trichocorixa sexcincta
Gerridae
Aquarius remigis
Gerris argenticollis
Gerris buenoi
Gerris comatus
Gerris marginatus
Limnoporos dissortis
Rheumatobates palosi
Trepobates knighti
Trepobates subnitidus
Hebridae
Hebrus tuckahoanus
Merragata hebroides
Mesoveliidae
Mesovelia mulsanti
Nepidae
Nepa apiculata
Ranatra fusca
Ranatra kirkaldyi
Ranatra nigra
Notonectidae
Buenoa margaratacea
Notonecta irrorata
Notonecta raleighi
Notonecta undulata
Pleidae
Neoplea striola
Veliidae
Microvelia americana
Microvelia buenoi
Order Megaloptera - Dobsonflies and Alderflies
Corydalidae
species indeterminate
Sialidae
species indeterminate
Order Coleoptera - Beetles
Dytiscidae
Coptotomus lenticus
Coptotomus longulus
Graphoderes librus
Hydaticus piceus
Laccophilus maculosus
Laccophilus proximus
Elmidae
Stenelmis crenata

Gyrinidae
Dineutes sp.
Gyrinus sp.
Haliplidae
Haliplus blanchardi
Haliplus borealis
Haliplus conexus
Haliplus cribrarius
Haliplus immaculicollis
Haliplus longulus
Haliplus subquittatus
Haliplus triopsis
Peltodytes edentulus
Peltodytes pedunculatus
Peltodytes sexmaculatus
Hydrophilidae
Anacaena limbata
Hydrochara obtusata
Hydrochus granulatus
Hydrochus rufipes
Hydrochus pseudosquamifer
Hydrochus squamifer
Hydrophilus triangularis
Paracymus despectus
Paracymus subcupreus
Tropisternus blatchleyi modestus
Tripisternus glaber
Tripisternus lateralis nimbatus
Tripisternus mixtus
Tropisternus natator
Order Trichoptera - Caddisflies
Brachycentridae
Brachycentrus lateralis
Hydropsychidae
Cheumatopsyche sp.
Hydropsyche sp.
Potamyia flava
Leptoceridae
Ceraclea diluta
Ceraclea nepha
Ceraclea tarsipunctata
Ceraclea transversa
Leptocerus americanus
Mystacides sepulchralis
Oecetis cinerascens
Oecetis inconspicua
Triaenodes abus
Triaenodes marginatus

Table 22. Continued.

Limnephilidae	<i>Aedes trivittatus</i>
<i>Anabolia consocia</i>	<i>Aedes vexans</i>
Polycentropodidae	<i>Psorophora ciliata</i>
<i>Neureclipsis bimaculata</i>	<i>Psorophora confinnis</i>
Order Diptera - Flies	<i>Psorophora horrida</i>
Chironomidae	Simuliidae
<i>Chironomus</i> sp.	species indeterminate
<i>Cricotopus bicinctus</i>	Tabanidae
<i>Cricotopus sylvestris</i>	<i>Chrysops callidus</i>
<i>Dicrotendipes nervosus</i>	<i>Chrysops cincticornis</i>
<i>Glyptotendipes barbipes</i>	<i>Chrysops indus</i>
<i>Nanocladius</i> sp.	<i>Chrysops niger</i>
<i>Orthocladius</i> sp.	<i>Chrysops pikei</i>
<i>Parachironomus</i> sp.	<i>Chrysops sequax</i>
<i>Parachironomus</i> nr. <i>directus</i>	<i>Chrysops univittatus</i>
<i>Parachironomus</i> nr. <i>monochromus</i>	<i>Chrysops vittatus</i>
<i>Parakiefferiella</i> sp.	<i>Hybomitra lasiophthalma</i>
<i>Polypedilum</i> nr. <i>scalaenum</i>	<i>Tabanus atrotus</i>
<i>Procladius</i> sp.	<i>Tabanus limbotinevris</i>
Culicidae	<i>Tabanus lineola</i>
<i>Anopheles barberi</i>	<i>Tabanus quinquevittatus</i>
<i>Anopheles punctipennis</i>	<i>Tabanus reinwardtii</i>
<i>Anopheles quadrimaculatus</i>	<i>Tabanus similis</i>
<i>Mansonia perterbans</i>	<i>Tabanus trimaculatus</i>
<i>Orthopodomyia signifera</i>	Tipulidae
<i>Culiseta ornata</i>	species indeterminate
<i>Culex apicalis</i>	Phylum MOLLUSCA - Mollusks (not
<i>Culex pipiens</i>	including Unionidae)
<i>Culex restuans</i>	Gastropoda - Snails
<i>Culex salivarius</i>	Ancylidae
<i>Culex tarsalis</i>	<i>Ferrissia</i> sp.
<i>Aedes canadensis</i>	Physidae
<i>Aedes dorsalis</i>	<i>Physa</i> sp.
<i>Aedes fitchii</i>	Pelecypoda - Bivalve Mollusks
<i>Aedes sticticus</i>	Sphaeriidae
<i>Aedes triserialis</i>	species indeterminate

¹ This list was compiled by M.J. Wetzel, D.W. Webb, and S.J. Taylor, Illinois Natural History Survey Center for Biodiversity.

Threatened and Endangered Species

The only state-listed fishes known from the Lower Des Plaines River Assessment Area are the state endangered blacknose shiner and the state endangered greater redhorse. Both species were collected in Salt Creek near Maywood (York Township) in DuPage County, on July 27, 1901. Neither species has been observed in the Assessment Area since 1901, and it is doubtful that either still exists in the area.

The blacknose shiner was once widespread in Illinois but recent records (since 1980) are available only for the Fox River drainage where the species lives in clear water near vegetation over sand. The greater redhorse, which requires large creeks and rivers with clean rocky substrates, now is found in Illinois only in the Fox, Vermilion, and Illinois rivers, and in Aux Sable Creek.

Five state threatened mussels (black sandshell, elephantear, purple wartyback, slippershell, spike) and four state endangered mussels (spectaclecase, salamander mussel, sheepnose, rainbow) have historically been reported from this Assessment Area. All are presumed extirpated from the Assessment Area as none have been found alive in well over 50 years. 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; the INHS Mollusk Collection database).

Mussels:

Black sandshell: One historical record from the Des Plaines River at Joliet (late 1800s). Most likely extirpated from the region.

Elephantear: A single record from the Des Plaines River at Summit, Cook County, Illinois (no date given, probably late 1800's) is known. Most likely extirpated from the region.

Purple wartyback: One historical record from the Des Plaines River at Joliet (late 1800s). Most likely extirpated from the region.

Slippershell: The slippershell was widespread and common in small streams throughout central and northeastern Illinois. Historical records in this Assessment Area include the Des Plaines River near Summit (around 1920), Joliet (pre-1927) and Salt Creek near Hinsdale (early 1900s) and a subfossil shell collected from La Grange Park (1997). No live individuals have been seen since the early 1900s and this species is likely extirpated from the area.

Spike: This mussel was historically widespread and common in small to medium-sized streams throughout Illinois. Historical records of the spike in this Assessment Area include the Des Plaines River near Joliet (1800s) and Salt Creek (1897). No live individuals have been seen since the 1800s and this species is considered extirpated from this region.

Spectaclecase: There are two historical records for the spectaclecase in the Des Plaines River at Joliet. As with the preceding species, no live individuals have been seen since the early 1900s and this species is almost certainly extirpated from the area.

Salamander mussel: One historical record from the Des Plaines River at Joliet (pre-1921). Most likely extirpated from the region.

Sheepnose: One historical record from the Des Plaines River at Joliet (pre-1921). Most likely extirpated from the region.

Rainbow: The rainbow has been extirpated from all of its former range in Illinois except the Vermilion River drainage in east-central Illinois (Cummings & Mayer, 1997). Historical records in this Assessment Area include the Des Plaines River near Joliet (1800s) and Salt Creek (pre-1921). No live individuals have been collected in over 80 years and it is considered extirpated from the area.

Ten species of crustaceans are known from this region (Tables 19 and 20). None is considered threatened or endangered.

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 Lower Des Plaines River Assessment Area.

The goldfish is ecologically similar to the common carp but is much less common. It is found mainly in shallow, muddy pools and backwaters of sluggish rivers, ponds, and lakes. It is most common in warm turbid or vegetated water, and is more tolerant than most fishes of some forms of pollution. The goldfish is native to Eurasia and has been reproducing in Illinois waters since at least 1876.

The threespine stickleback is a recent invader of Illinois, having been first collected in Lake Michigan in 1988 (Johnston 1991, Laird and Page 1996). Its native range in North America encompassed the Great Lakes-St. Lawrence River drainage only as far west as Lake Ontario. Threespine sticklebacks are found in shallow, sluggish waters of lakes, ponds, large lowland rivers and estuaries.

The Asian clam is found throughout this Assessment Area. Effects of the Asian clam on native species and communities are difficult to measure, but some studies have suggested that it competes with native mussels for food (Leff et al. 1990).

In 1994, the exotic Chinese mystery snail was collected from the Des Plaines River near Lemont. This exotic has been reported from many states in North America (Burch 1989). This species has been found in scattered localities in northern Illinois (particularly northeastern Illinois). Its effect on our native biota has not been investigated.

In Northeastern Illinois, the zebra mussel has been found in the Chicago Sanitary & Ship Canal, Illinois River and Lake Michigan. The zebra mussel is having negative impacts on many Illinois species, particularly the native mussels that are restricted to large rivers and lakes (Tucker and Atwood 1995, Nalepa et al. 1998, Schneider et al. 1998).

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 Lower Des Plaines River Assessment Area (Table 21), at least three are known to have been introduced:

The aquatic oligochaete worm, *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

Several recently completed studies and one currently in progress, conducted by INHS personnel and underwritten by the Illinois Department of Transportation, have identified unique aquatic and semiaquatic habitats associated with the Des Plaines River bluff and wetland area north of Lemont. One such stream, Black Partridge Creek, flowing through Black Partridge Woods Nature Preserve, supports an persistent population of the mottled sculpin, *Cottus bairdi*; although this fish is not currently listed as endangered or threatened at either the federal or state levels, it nonetheless is rare in its state distribution. Other uncommon or rare aquatic macroinvertebrates also are thought likely to occur in Black Partridge Creek, as well as in several small bluff seepage areas adjacent to this stream. Fraction Run, a small direct tributary of the Des Plaines River south of Lockport, supports a population of an extremely rare aquatic worm, *Rhyacodrilus falciformis* (Annelida,

Oligochaeta, Tubificidae). Originally described from the Swiss Alps in 1901, *R. falciformis* has subsequently been documented in Lac Léman, France, the Pieniny Mountains in southern Poland, and recently in Sweden. In North America, this species has been recorded from Airport Creek, a small tributary on the Saanich Peninsula, Vancouver Island, British Columbia; the Hudson River in New York, and from Cascade Cave on Vancouver Island. The collection of *Rhyacodrilus falciformis* from Fraction Run in Will County, Illinois, represents only the fourth known North American locality for this species (Wetzel 1992). Extensive collecting in springs, caves, and streams receiving groundwater - in Illinois and elsewhere in North America - has not yielded this species.

Information Gaps

The Lower Des Plaines River 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, and possibly uncover populations of rare species.

Long-term population monitoring of selected species and communities is needed throughout the state to provide information on trends in biological resources and on the success of various management strategies.

Long-term population monitoring of selected species and communities is needed throughout the state to provide information on trends in biological resources and on the success of various management strategies. Mark-recapture studies also are badly needed to understand normal movements of fishes and other aquatic organisms and, hence, to provide baseline data for interpreting the impacts of environmental alterations and management strategies.

Although there have been some historical as well as recent faunal studies conducted on the aquatic macroinvertebrates occurring in Illinois [e.g., Coleoptera (beetles) (Wooldridge 1967), Ephemeroptera (mayflies) (Burks 1953, DeWalt and Webb 1998), Plecoptera (stoneflies) (Frison 1935, DeWalt and Webb (1998), Trichoptera (caddisflies) (Ross 1944, DeWalt and Webb 1998), Hemiptera (true bugs) (Lauck 1959, Taylor 1996), Diptera (flies) (Malloch 1915 a, b; Ross 1947; Ross and Horsfall 1965; Pechuman et al. 1983), and Annelida (segmented worms) (Wetzel 1992)], the major groups of aquatic macroinvertebrates known to occur in the Lower Des Plaines River Assessment Area (Table 21) have not been as well studied as fishes, mussels, and crustaceans.

There are extensive historical and recent collections of aquatic macroinvertebrates in the permanent INHS Collections; much of this information, however, is not easily retrievable because either specimens have not yet been identified or the identified material has not yet been incorporated into a searchable database.

Once specimens have been identified and incorporated into a database, comparisons between historical material and that obtained more recently could be made to evaluate changes in distribution and abundance. Moreover, long-term monitoring of selected 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 Mill Creek, Long Run, Fraction Run as "Full Support" (water quality meets the needs of all designated uses protected by applicable water quality standards). Salt Creek, Spring Brook, the upper 4.7 stream miles of Addison Creek, and the portion of the Des Plaines River occurring in the Assessment Area were rated as "Partial Support/Minor Impairment" (water quality has been impaired, but only to a minor degree). The lower 6.7 stream miles of Addison Creek were rated 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). Fiddymet Creek, Calumet-Sag Channel, and much of the Chicago Sanitary and Ship Canal were rated as "Non-support" (water quality has been severely impaired and is not capable of supporting the designated use to any degree).

The Biological Stream Characterization (Bertrand et al. 1996) rated Salt Creek upstream of Interstate 290, Spring Brook, and Sawmill Creek as "Class C Streams" (Moderate Aquatic Resource). Salt Creek from Interstate 290 to its mouth and Flag Creek were rated as a "Class D Streams" (Limited Aquatic Resource). The Des Plaines River, Chicago Sanitary and Ship Canal, and Calumet-Sag Channel within the Assessment Area were also rated as a "Class D Streams." Addison Creek was rated as a "Class E Stream" (Restricted Aquatic Resource), the lowest rating. No streams in the Assessment Area were given "Class A" (Unique Aquatic Resource) or "Class B" (Highly Valued Aquatic Resource) ratings.

Smith (1971) rated the Des Plaines River system (including Salt Creek and other direct tributaries and canals of the Illinois River) as "Poor." Domestic and industrial pollution and extensive modification of streams and habitats are major problems within the basin.

Biologically Significant Streams

No streams in the Lower Des Plaines River Assessment Area were recognized as biologically significant by Page et al. (1992). No recent records of threatened or endangered fishes, mussels, or crustaceans are known from the Assessment Area. No mussel surveys have been conducted in any of the streams of this region; therefore, no assessment of stream quality based on mussel diversity can be made.

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 tilled. 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/m² in 1986 to 0/m² 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 the restoration of the Lower Des Plaines River should focus on the principal causes of degradation: poor water quality, ecosystem fragmentation, and degraded habitat.

Water quality in the Des Plaines River is impacted by numerous waste water treatment plants located on the main-stem and tributaries (i.e. Salt Creek). While major improvements in water quality have been attained over the past ten years (largely due to implementation of the Deep Tunnel Project), more improvement is needed. Nutrient levels of effluents must be regulated and reduced. Nutrient reduction can be facilitated by discharging effluent water into treatment lagoons and/or wetlands (or other innovative methods) prior to release into the Des Plaines River or its tributaries.

Water quality is also impacted by a significant volume of storm water that is discharged directly into the river and streams of this watershed. All storm water should enter primary detention basins (and secondary basins, when possible) prior to being discharged into streams.

The negative impacts of dams on aquatic habitat, water quality, and freshwater, riverine fish populations is well known (Baumann 1976, Odeh 1999, Pescitelli and Rung 1999, Pescitelli and Rung 2000). A report by American Rivers, Friends of the Earth, and Trout Unlimited (1999) documents the benefits of dam removal nationwide. A free-flowing, reconnected, healthier stream can be quickly achieved by removing or modifying all non-essential dams.

Currently the Des Plaines River and several of its tributaries exhibit a paucity of native aquatic and riparian vegetation. Reintroductions of native aquatic plants in the Des Plaines River and Salt Creek at several trial locations during 1997, has been moderately successful (Rung and Pescitelli 2000). These efforts should be expanded to cover larger areas of the watershed, and include the riparian zone. Reestablishment of native aquatic and riparian vegetation provides improved aquatic habitat, nutrient uptake, reduced water temperatures, and streambed and shoreline stabilization.

The preservation, or restoration and enhancement, of tributary streams is critical to the continued improvement of the Lower Des Plaines River. Protection of streams such as Manhattan Creek and Jackson Creek will ensure they will continue to serve as spawning, nursery and refuge areas for many aquatic species. Salt Creek, a major tributary, would

benefit from the same restoration and enhancement techniques that will benefit the Lower Des Plaines River. The watersheds of most tributary streams are under threat from development.

Upland areas in the Des Plaines River watershed are highly urbanized. Wetland areas should be reestablished where it is feasible. Converting turf grass campuses, or portions of campuses, to native plants will restore some of the uplands' ability to reduce and clean storm water runoff, and it will enhance groundwater levels.

A 1997 survey (IDNR unpublished data) documented the substantial improvement in the fish communities throughout the Des Plaines River, compared to a earlier survey at the same sampling locations (Bertrand 1984). This recovery reflects improved water quality and indicates the potential for the Des Plaines River system. The pending removal of the Hofmann, Armitage, and Fairbanks Road Dams has high potential to substantially improve biodiversity throughout a 20 mile reach of river. Discussions of other dam removals have been initiated. Removal of migration barriers in one of the most cost effective restoration tools and should remain a high priority for the Des Plaines River.

Exotic species populations, such as common carp are problematic in the Des Plaines River. However, the removal of the Woolen Mills Dam on the Milwaukee River resulted in a substantial decline in the carp population (Kanehl et al. 1997). It is possible that the population of this exotic species may experience a decline in the Des Plaines River following removal of dams. Other exotic species, such as round goby, white perch, and zebra mussel, represent a potential threat to the Des Plaines River ecosystem.

The moderation and improvement of effluent discharges, removal of non-essential dams, protection or enhancement of tributary streams, and the restoration of native aquatic, riparian, wetland and upland plant communities could facilitate a substantial recovery for the Lower Des Plaines River.

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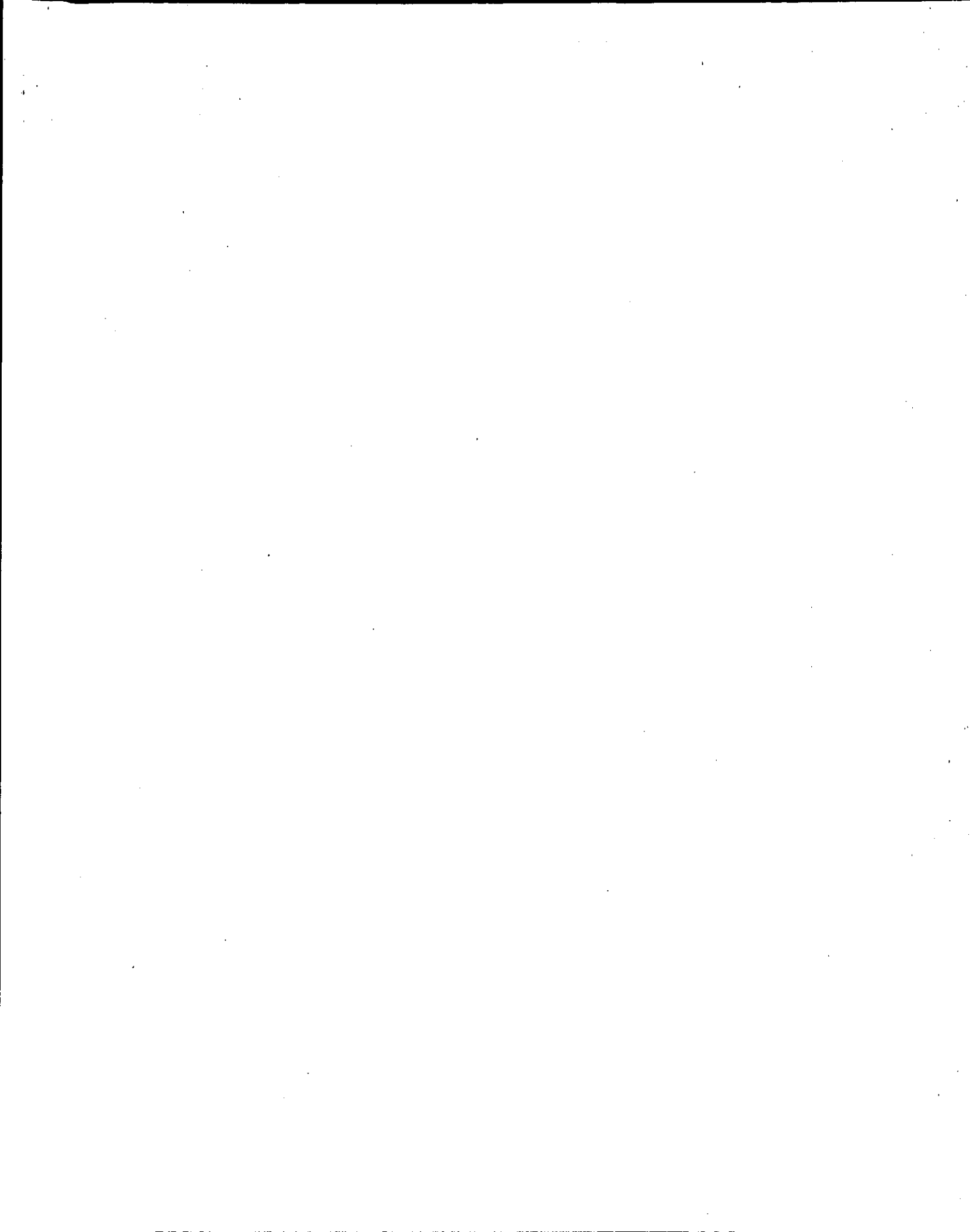
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Appendix 1. Continued.

Class ¹	Sub-Class	Forest						Prairie						Sav	Wetland				L&P	Strm	Pri	Cu		
		Upland		Floodplain		Flatwoods	Prairie		Gravel		Dolomite		Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff			
Natural Community ^{2,3}		dm	m	wm	m	wm	w	dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm				dc
Common name ^{4,5}	Scientific Name ^{4,5}																							
aspen, quaking	<i>Populus tremuloides</i>				x		x		x								x							
aster, arrow-leaved	<i>Aster sagittifolius</i>	x	x																					
aster, big-leaved	<i>Aster macrophyllus</i>	X	x																					
aster, Drummond's	<i>Aster drummondii</i>	x	x																					x
aster, false	<i>Boltonia asteroides</i>					x	x											x		x				
aster, flat top	<i>Aster umbellatus</i>																		x	x				
aster, hairy	<i>Aster pilosus</i>								x								x							x
aster, heath	<i>Aster ericoides</i>							x	x			x	x	x	x		x							x
aster, New England	<i>Aster novae-angliae</i>							x	x					x						x				x
aster, Ontario	<i>Aster ontarionis</i>				x	x	x																	
aster, panicked	<i>Aster simplex</i>				x	X	X											x	x		x			
aster, Short's	<i>Aster shortii</i>	x	x		x																			x
aster, side-flowering	<i>Aster lateriflorus</i>				x	x	x																	x
aster, sky-blue	<i>Aster azureus</i>							x	x			x		x			x							
aster, smooth	<i>Aster laevis</i>							x	x			x	x				x							
aster, swamp	<i>Aster puniceus</i>					x	x											x	x	x	x	x		
aster, willow	<i>Aster praealtus</i>								x	x								x		x	x			
Aunt Lucy	<i>Ellisia nyctelea</i>				x	x	x																	x
avens, rough	<i>Geum laciniatum</i>				x	x				x	x							x		x				
avens, spring	<i>Geum verum</i>		x		x	x	x																	x
avens, white	<i>Geum canadense</i>	X	x	x	X	x	x	x												x				x
baneberry, red	<i>Actaea rubra</i>		x	x																				
baneberry, white	<i>Actaea pachypoda</i>	x	x																					
barberry, Japanese*	<i>Berberis thunbergii*</i>	x	x		x																			x
basswood	<i>Tilia americana</i>	x	X		x																			
beak rush, hair	<i>Rhynchospora capillacea</i>																		x		x			
beard tongue, foxglove	<i>Penstemon digitalis</i>	x			x			x	x	x				x	x		x							
beard tongue, hairy	<i>Penstemon hirsutus</i>											x	x	x	x									
beard tongue, pale	<i>Penstemon pallidus</i>	x						x	x			x	x	x	x		x							
beard tongue, smooth	<i>Penstemon calycosus</i>	x							x															x
bedstraw, northern	<i>Galium boreale</i>								x	x										x				
bedstraw, rough	<i>Galium asprellum</i>										x							x	x	x	x			
bedstraw, shining	<i>Galium concinnum</i>	x	x		x																			
bedstraw, sweet scented	<i>Galium triflorum</i>		x		x																x			
bedstray, stiff	<i>Galium tinctorium</i>										x							x	x	x				

Appendix 1. Continued.

Common name ^{4,5}	Scientific Name ^{4,5}	Class ¹		Forest			Prairie					Sav	Wetland			L&P	Strm	Pri	Cu						
		Sub-Class	Upland		Floodplain		Flatwoods	Prairie			Gravel		Dolomite		Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring		Cliff			
			dm	m	wm	m	wm	w	dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm			dc	
dandelion, false	<i>Krigia biflora</i>	x						x						x											
day lily, orange*	<i>Hemerocallis fulva*</i>				x			x																	x
dewberry, common	<i>Rubus flagellaris</i>	x	x		x		x	x	x					x											x
ditch stonecrop	<i>Penthorum sedoides</i>				x	x															x				
dock, bitter*	<i>Rumex obtusifolius*</i>				x	x																			x
dock, curly*	<i>Rumex crispus*</i>																								x
dock, pale	<i>Rumex altissimus</i>				x	x					x														x
dock, swamp	<i>Rumex verticillatus</i>						x														x	x			
dock, great water	<i>Rumex orbiculatus</i>																				x				
odder, knotweed	<i>Cuscuta polygonorum</i>				x	x	x														x	x			
odder, rope	<i>Cuscuta glomerata</i>				x	x	x	x	x																
dogbane	<i>Apocynum cannabinum</i>							x	x	x				x	x										x
dogwood, alternate-leaved	<i>Cornus alternifolia</i>		x		x																				x
dogwood, gray	<i>Cornus racemosa</i>	x	x		x			x	x	x				x							x				
dogwood, pale	<i>Cornus obliqua</i>				x		x			x											x	x	x		x
dogwood, red-osier	<i>Cornus stolonifera</i>				x	x				x	x										x	x	x		
dragonhead, false	<i>Physostegia virginiana</i>							x	x			x	x	x	x										
dropseed, prairie	<i>Sporobolus heterolepis</i>							x	x				x	x	x	x									
dropseed, rough*	<i>Sporobolus asper*</i>							x	x				x	x	x	x									x
duckweed, forked	<i>Lemna trisulca</i>																				x	x			
duckweed, great	<i>Spirodela polyrhiza</i>																								x
duckweed, small	<i>Lemna minor</i>																								x
Dutchman's breeches	<i>Dicentra cucullaria</i>	x	x		x																				
elder, common	<i>Sambucus canadensis</i>		x		x	x	x														x	x			x
elm, American	<i>Ulmus americana</i>		x	X	x	x		x																	
elm, Siberian*	<i>Ulmus pumila*</i>							x																	x
elm, slippery	<i>Ulmus rubra</i>	x	x	x	x	x																			
enchanter's nightshade	<i>Circaea lutetiana</i>	x	x		x																				
evening primrose, common	<i>Oenothera biennis</i>							x	x					x											x
evening primrose, showy*	<i>Oenothera speciosa*</i>																								x
false buckwheat, climbing	<i>Polygonum scandens</i>				x	x	x																		x
false foxglove, purple	<i>Agalinis paupercula</i>										x										x	x	x		x
false foxglove, purple	<i>Agalinis purpurea</i>										x										x	x	x		x
false foxglove, slender	<i>Agalinis besseyana</i>										x										x	x	x		
false mermaid	<i>Floerkea proserpinacoides</i>		x	x	x	x																			x

Appendix 1. Continued.

Class ¹	Sub-Class	Forest						Prairie					Sav	Wetland				L&P	Strm	Pri	Cu			
		Upland			Floodplain			Prairie	Gravel		Dolomite			Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff		
Natural Community ^{2,3}		dm	m	wm	m	wm	w		dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm			dc
Common name ^{4,5}	Scientific Name ^{4,5}																							
false Solomon's seal	<i>Smilacina racemosa</i>	x	x		x																			
false Solomon's seal, starry	<i>Smilacina stellata</i>	x	x		x				x	x										x		x		
false toadflax	<i>Comandra umbellata</i>							x	x	x		x		x										
fern, bracken	<i>Pteridium aquilinum</i>	x							x															
fern, broad beech	<i>Phegopteris hexagonoptera</i>		x																					
fern, bulblet	<i>Cystopteris protrusa</i>		x																					x
fern, florist's wood	<i>Dryopteris intermedia</i>		x	x																				
fern, lady	<i>Athyrium angustum</i>		x	x	x																			
fern, maidenhair	<i>Adiantum pedatum</i>		x																					
fern, marsh	<i>Thelypteris palustris</i>																	x	x	x	x			x
fern, northern grape - SE	<i>Botrychium multifidum</i> -SE		x																					
fern, purple cliff brake	<i>Pellaea glabella</i>																							x
fern, sensitive	<i>Onoclea sensibilis</i>				x	x	x			x	x							x	x	x	x	x		
fern, spinulose shield	<i>Dryopteris carthusiana</i>	x	x																					
fern, walking	<i>Asplenium rhizophyllum</i>																							x
fescue, meadow*	<i>Festuca pratensis</i> *				x				x															x
fescue, tall*	<i>Festuca arundinacea</i> *																							x
figwort, early	<i>Scrophularia lanceolata</i>	x	x																	x				
figwort, late	<i>Scrophularia marilandica</i>	x	x		x															x				
fire pink	<i>Silene virginica</i>	x	x																					
fireweed	<i>Erechtites hieracifolia</i>																							x
flatsedge, brook nut	<i>Cyperus rivularis</i>						x											x		x		x		
flatsedge, brownish shoreline	<i>Cyperus ferruginescens</i>						x															x		x
flax, common*	<i>Linum usitatissimum</i> *																							x
flax, grooved yellow	<i>Linum sulcatum</i>							x				x												
fleabane, annual	<i>Erigeron annuus</i>	x							x			x								x				x
fleabane, daisy	<i>Erigeron strigosus</i>								x			x		x										x
fleabane, marsh	<i>Erigeron philadelphicus</i>				x					x	x									x	x			x
flower-of-an-hour*	<i>Hibiscus trionum</i> *																							x
fog fruit	<i>Phyla lanceolata</i>					x	x											x		x		x		
forget-me-not, common*	<i>Myosotis scorpioides</i> *				x	x	x												x					x
foxglove, earleaf - ST	<i>Tomanthera auriculata</i> - ST								x	x										x				
foxglove, slender false	<i>Agalinis tenuifolia</i>													x						x				

Appendix 1. Continued.

Class ¹	Sub-Class	Forest						Prairie						Sav	Wetland					L&P	Strm	Pri	Cu		
		Upland			Floodplain			Prairie				Gravel		Dolomite		Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff	
		dm	m	w	m	w	w	dm	m	w	w	dm	m	dm	m	w		ss	gf	sm				dc	
Common name ^{4,5}	Scientific Name ^{4,5}																								
grape-fern, rattlesnake	<i>Botrychium virginianum</i>																								
grass, alkali*	<i>Puccinellia distans</i> *																								
grass, American slough	<i>Beckmannia syzigachne</i> - SE																								
grass, annual blue*	<i>Poa annua</i> *																								
grass, barnyard	<i>Echinochloa muricata</i>																								
grass, barnyard*	<i>Echinochloa crus-galli</i> *																								
grass, bearded wheat - SE	<i>Agropyron trachycaulum</i> var. <i>unilaterale</i> [<i>Elymus trachycaulus</i>] - SE																								
grass, blue-joint	<i>Calamagrostis canadensis</i>																								
grass, bog-reed	<i>Calamagrostis inexpansa</i>																								
grass, bottle brush	<i>Elymus hystrix</i>																								
grass, broad-leaved panic	<i>Dichanthelium latifolium</i>																								
grass, Canada blue*	<i>Poa compressa</i> *																								
grass, common reed	<i>Phragmites australis</i>																								
grass, downy brome*	<i>Bromus tectorum</i> *																								
grass, ear-leaved brome	<i>Bromus purgans</i>																								
grass, English rye*	<i>Lolium perenne</i> *																								
grass, floating manna	<i>Glyceria septentrionalis</i>																								
grass, fowl manna	<i>Glyceria striata</i>																								
grass, Indian	<i>Sorghastrum nutans</i>																								
grass, Kentucky blue*	<i>Poa pratensis</i> *																								
grass, knee	<i>Panicum dichotomiflorum</i>																								
grass, little bluestem	<i>Schizachyrium scoparium</i>																								
grass, marsh blue	<i>Poa palustris</i>																								
grass, old witch	<i>Panicum capillare</i>																								
grass, old-field panic	<i>Dichanthelium acuminatum</i>																								
grass, orchard*	<i>Dactylis glomerata</i> *																								
grass, plains three-awn	<i>Aristida oligantha</i>																								
grass, porcupine	<i>Stipa spartea</i>																								
grass, poverty oat	<i>Danthonia spicata</i>																								
grass, prairie brome	<i>Bromus kalmii</i>																								
grass, prairie cord	<i>Spartina pectinata</i>																								
grass, prairie panic	<i>Dichanthelium leibergii</i>																								
grass, prairie wedge	<i>Sphenopholis obtusata</i>																								
grass, purpletop	<i>Tridens flavus</i>																								

Appendix 1. Continued.

Class ¹	Forest						Prairie						Sav	Wetland					L&P	Strm	Pri	Cu				
	Sub-Class		Upland		Floodplain		Flatwoods	Prairie			Gravel		Dolomite			Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff		
Natural Community ^{2,3}		dm	m	wm	m	wm	w	dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm			dc			
Common name ^{4,5}		Scientific Name ^{4,5}																								
grass, quack*	<i>Agropyron repens*</i>																									
grass, redtop*	<i>Agrostis alba*</i>																									
grass, reed canary*	<i>Phalaris arundinacea*</i>																									
grass, rice cut	<i>Leersia oryzoides</i>																									
grass, sandbar love	<i>Eragrostis frankii</i>																									
grass, Scribner's panic	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>																									
grass, sheathed rush	<i>Sporobolus vaginiflorus</i>																									
grass, side oats grama	<i>Bouteloua curtipendula</i>																									
grass, smooth brome*	<i>Bromus inermis*</i>																									
grass, squirrel-tail*	<i>Hordeum jubatum*</i>																									
grass, sweet	<i>Hierochloa odorata</i>																									
grass, switch	<i>Panicum virgatum</i>																									
grass, thin	<i>Agrostis perennans</i>																									
grass, tickle	<i>Agrostis hyemalis</i>																									
grass, tufted hair	<i>Deschampsia cespitosa</i>																									
grass, white	<i>Leersia virginica</i>																									
grass, wiry panic	<i>Panicum flexile</i>																									
grass, woodland	<i>Poa sylvestris</i>																									
grass-of-parnassus	<i>Parnassia glauca</i>																									
green briar, bristly	<i>Smilax hispida</i>																									
green dragon	<i>Arisaema dracontium</i>																									
ground cherry, clammy	<i>Physalis heterophylla</i>																									
ground cherry, hairy*	<i>Physalis pubescens*</i>																									
ground cherry, lance-leaved	<i>Physalis virginiana</i>																									
ground cherry, tall	<i>Physalis subglabrata</i>																									
ground nut	<i>Apios americana</i>																									
hackberry	<i>Celtis occidentalis</i>																									
hairy wild licorice	<i>Galium circaezans</i>																									
harbinger of spring	<i>Erigenia bulbosa</i>																									
hardhack	<i>Spiraea tomentosa</i>																									
hawkweed, long-bearded	<i>Hieracium longipilum</i>																									
hawthorn, cockspur	<i>Crataegus crus-galli</i>																									
hawthorn, dotted	<i>Crataegus punctata</i>																									
hawthorn, downy	<i>Crataegus mollis</i>																									

Appendix 1. Continued.

Class ¹	Forest						Prairie					Sav	Wetland				L&P	Strm	Pri	Cu						
	Sub-Class		Upland		Floodplain		Flatwoods	Prairie				Gravel		Dolomite		Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff		
Natural Community ^{2,3}	dm	m	wm	m	wm	w	dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm			dc				
Common name ^{4,5}	Scientific Name ^{4,5}																									
Indian plantain, prairie	<i>Cacalia plantaginea</i>																									
Indian tobacco	<i>Lobelia inflata</i>																									
ironweed, common	<i>Vernonia fasciculata</i>																									
ironweed, Missouri	<i>Vernonia missurica</i>																									
ironweed, smooth tall	<i>Vernonia gigantea</i>																									
ironwood	<i>Ostrya virginiana</i>																									
Jack-in-the-pulpit	<i>Arisaema triphyllum</i>																									
Jacob's ladder	<i>Polemonium reptans</i>																									
Japanese hedge parsley*	<i>Torilis japonica*</i>																									
Jerusalem artichoke	<i>Helianthus tuberosus</i>																									
jewel weed, orange	<i>Impatiens capensis</i>																									
jewel weed, yellow	<i>Impatiens pallida</i>																									
Joe Pye weed, purple	<i>Eupatorium purpureum</i>																									
Joe Pye weed, spotted	<i>Eupatorium maculatum</i>																									
Juneberry	<i>Amelanchier arborea</i>																									
Kentucky coffeetree	<i>Gymnocladus dioica</i>																									
knotweed, bushy	<i>Polygonum ramossissimum</i>																									
knotweed, Japanese*	<i>Polygonum cuspidatum*</i>																									
knotweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>																									
knotweed, sidewalk*	<i>Polygonum arenastrum*</i>																									
knotweed, water	<i>Polygonum amphibium</i> var. <i>stipulaceum</i>																									
knotweed, water pepper	<i>Polygonum hydropiper</i>																									
knotweed, woodland	<i>Polygonum virginianum</i>																									
lady's thumb*	<i>Polygonum persicaria*</i>																									
lamb's quarters*	<i>Chenopodium album*</i>																									
leadplant	<i>Amorpha canescens</i>																									
lettuce, prickly*	<i>Lactuca serriola*</i>																									
lettuce, wild	<i>Lactuca canadensis</i>																									
lily, prairie	<i>Lilium philadelphicum</i> var. <i>andinum+</i>																									
lily, turk's cap	<i>Lilium michiganense</i>																									
lily-of-the-valley*	<i>Convallaria majalis*</i>																									
lion's foot	<i>Prenanthes alba</i>																									
lion's tail*	<i>Leonurus marrubiastrum*</i>																									
lobelia, great blue	<i>Lobelia siphilitica</i>																									
lobelia, Kalm's	<i>Lobelia kalmii</i>																									

Appendix 1. Continued.

Class ¹	Sub-Class	Forest						Prairie						Sav	Wetland				L&P	Strm	Pri	Cu		
		Upland			Floodplain			Prairie			Gravel			Dolomite	Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff	
		dm	m	wm	m	wm	w	dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm			dc	
Common name ^{4,5}	Scientific Name ^{4,5}																							
milkweed, whorled	<i>Asclepias verticillata</i>																							
milkwort, field	<i>Polygala sanguinea</i>																							
mint, wild	<i>Mentha arvensis</i> var. <i>villosa</i>																							
mint, wild*	<i>Mentha arvensis</i> *																							
mistflower*	<i>Eupatorium coelestinum</i> *																							
moneywort*	<i>Lysimachia nummularia</i> *																							
monkey flower	<i>Mimulus ringens</i>																							
monkey flower, winged	<i>Mimulus alatus</i>																							
moonseed	<i>Menispermum canadense</i>																							
morning glory, ivy-leaved*	<i>Ipomoea hederacea</i> *																							
motherwort*	<i>Leonurus cardiaca</i> *																							
mountain mint, common	<i>Pycnanthemum virginianum</i>																							
mountain mint, hairy	<i>Pycnanthemum pilosum</i>																							
mountain mint, slender	<i>Pycnanthemum tenuifolium</i>																							
mulberry, red	<i>Morus rubra</i>																							
mulberry, white*	<i>Morus alba</i> *																							
mullein, common*	<i>Verbascum thapsus</i> *																							
mullein, moth*	<i>Verbascum blattaria</i> *																							
mustard field*	<i>Brassica rapa</i> *																							
mustard, black*	<i>Brassica nigra</i> *																							
mustard, hedge*	<i>Sisymbrium officinale</i> *																							
mustard, tower	<i>Arabis glabra</i>																							
mustard, tumble*	<i>Sisymbrium altissimum</i> *																							
nannyberry	<i>Viburnum lentago</i>																							
nettle, false	<i>Boehmeria cylindrica</i>																							
nettle, tall	<i>Urtica dioica</i>																							
nettle, wood	<i>Laportea canadensis</i>																							
New Jersey tea	<i>Ceanothus americanus</i>																							
nightshade, bittersweet*	<i>Solanum dulcamara</i> *																							
ninebark	<i>Physocarpus opulifolius</i>																							
oak, black	<i>Quercus velutina</i>																							
oak, bur	<i>Quercus macrocarpa</i>																							
oak, northern pin	<i>Quercus ellipsoidalis</i>																							
oak, pin	<i>Quercus palustris</i>																							
oak, red	<i>Quercus rubra</i>																							

Appendix 1. Continued.

Common name ^{4,5}	Scientific Name ^{4,5}	Class ¹		Forest			Prairie			Sav	Wetland				L&P	Strm	Pri	Cu
		Sub-Class	Upland	Floodplain	Flatwoods	Prairie	Gravel	Dolomite	Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Sprng			Cliff	
oak, shingle	<i>Quercus imbricaria</i>		x	x	x	x												
oak, swamp white	<i>Quercus bicolor</i>				x	x	x											
oak, white	<i>Quercus alba</i>	X	X			x												
orach, common*	<i>Atriplex patula*</i>									X								x
orchid, grass pink-SE	<i>Calopogon tuberosus- SE</i>																	
orchid, great plains ladies' tresses	<i>Spiranthes magnicamporum</i>								x									
orchid, helleborine*	<i>Epipactis helleborine*</i>	x	x															x
orchid, lesser twayblade	<i>Liparis loeselii</i>																	
orchid, nodding ladies' tresses	<i>Spiranthes cernua</i>								x									
orchid, northern bog	<i>Platanthera hyperborea var. huronensis</i>																	
orchid, prairie white-fringed - SE, FT	<i>Platanthera leucophaea - SE, FT</i>								x	x								
orchid, purple-fringed - SE	<i>Platanthera psycodes - SE</i>																	
orchid, twayblade	<i>Liparis lilifolia</i>	x	x															
orchid, white lady's slipper - ST	<i>Cypripedium candidum - ST</i>																	
Osage orange*	<i>Maclura pomifera*</i>			x		x	x											x
ox-eye daisy*	<i>Luecanthemum vulgare*</i>								x	x								x
parsley, thicket	<i>Perideridia americana</i>	x				x												
parsnip, cow	<i>Heracleum maximum</i>					x	x											x
parsnip, heart-leaved meadow	<i>Zizia aptera</i>								x									
parsnip, meadow	<i>Thaspium trifoliatum</i>	x	x			x												
parsnip, tall water	<i>Sium suave</i>																	
parsnip, wild*	<i>Pastinaca sativa*</i>									x								x
paw paw	<i>Asimina triloba</i>		x	x	x	x												
pea, partridge	<i>Cassia fasciculata</i>								x	x								x
pea, veiny	<i>Lathyrus venosus</i>								x									
pellitory	<i>Parietaria pensylvanica</i>		x			x	x											x
pennyroyal, American	<i>Hedeoma pulegioides</i>	x																
pennyroyal, false	<i>Trichostema brachiatum</i>																	

Appendix 1. Continued.

Class ¹	Sub-Class	Forest						Prairie						Sav	Wetland				L&P	Strm	Pri	Cu						
		Upland			Floodplain			Flatwoods	Prairie				Gravel		Dolomite		Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff			
Natural Community ^{2,3}		dm	m	wm	m	wm	w		dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm				dc			
Common name ^{4,5}	Scientific Name ^{4,5}																											
pennyroyal, rough	<i>Hedeoma hispida</i>							x																		x		
peppergrass, common	<i>Lepidium virginicum</i>																											x
petunia, wild	<i>Ruellia humilis</i>							x	x			x	x	x	x													x
phlox, garden*	<i>Phlox paniculata*</i>				x																							x
phlox, marsh	<i>Phlox glaberrima</i> var. <i>interior</i>								x	x									x	x								
phlox, prairie	<i>Phlox pilosa</i>							x	x	x			x															
phlox, woodland	<i>Phlox divaricata</i>		x		x	x																						
pimpernel, false	<i>Lindernia dubia</i>						x												x						x	x		
pineapple-weed*	<i>Matricaria matricarioides*</i>																											x
plaintain, lance-leaved*	<i>Plantago lanceolata*</i>																											x
plantain, common*	<i>Plantago major*</i>																											x
plantain, heart-leaved - SE	<i>Plantago cordata+</i> - SE																									x		
plantain, red-stalked	<i>Plantago rugelii</i>				x																							x
plum, wild	<i>Prunus americana</i>	x																										x
poison ivy	<i>Toxicodendron radicans</i>	x	x	x	x	x	x	x				x	x	x	x													x
pondweed, beginner's*	<i>Potamogeton crispus*</i>																								x	x		x
pondweed, leafy	<i>Potamogeton foliosus</i>																		x					x	x			
pondweed, sago	<i>Potamogeton pectinaus</i>																		x					x	x			
pondweed, small	<i>Potamogeton pusillus</i>																		x					x				
poplar, Lombardy*	<i>Populus nigra</i> var. <i>italica*</i>																											x
poplar, white*	<i>Populus alba*</i>																											x
prairie clover, purple	<i>Dalea purpurea</i>							x	x			x	x	x	x													
prairie clover, white	<i>Dalea candida</i>							x	x			x	x															
prairie dock	<i>Silphium terebinthinaceum</i>							x	x	x																		
prairie-clover, leafy - SE. FE	<i>Dalea foliosa</i> - SE, FE														x													
puccoon, broad-leaved	<i>Lithospermum latifolium</i>	x	x																									
puccoon, hairy	<i>Lithospermum carolinense</i>							x																				x
puccoon, hoary	<i>Lithospermum canescens</i>							x	x			x																x
puccoon, yellow	<i>Lithospermum incisum</i>							x				x	x	x	x													
purslane, marsh	<i>Ludwigia palustris</i> var. <i>americana</i>						x																			x		
pussy toes	<i>Antennaria plantaginifolia</i>	x																										x
pussy toes, little	<i>Antennaria neglecta</i>	x						x				x																x
ragweed, common	<i>Ambrosia artemisiifolia</i>	x						x	x																			x

Appendix 1. Continued.

Class ¹	Sub-Class	Forest						Prairie						Sav	Wetland					L&P	Strm	Pri	Cu			
		Upland			Floodplain			Prairie			Gravel			Dolomite	Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff			
Natural Community ^{2,3}		dm	m	wm	m	wm	w	dm	m	wm	w	dm	m	w	dm	m	w	ss	gf	sm			dc			
Common name ^{4,5}		Scientific Name ^{4,5}																								
	ragweed, giant	<i>Ambrosia trifida</i>																								
	ragwort, balsam	<i>Senecio pauperculus</i>																								
	raspberry, black	<i>Rubus occidentalis</i>																								
	raspberry, dwarf - ST	<i>Rubus pubescens</i> - ST																								
	rattlesnake master	<i>Eryngium yuccifolium</i>																								
	red cedar	<i>Juniperus virginiana</i>																								
	reed, bur	<i>Sparganium eurycarpum</i>																								
	rock jasmine	<i>Androsace occidentalis</i>																								
	rose mallow, halberd-leaved	<i>Hibiscus laevis</i>																								
	rose, early wild	<i>Rosa blanda</i>																								
	rose, Illinois	<i>Rosa setigera</i>																								
	rose, multiflora*	<i>Rosa multiflora</i> *																								
	rose, pasture	<i>Rosa carolina</i>																								
	rose, swamp	<i>Rosa palustris</i>																								
	rosinweed	<i>Silphium integrifolium</i>																								
	rush, common	<i>Juncus effusus</i>																								
	rush, interior	<i>Juncus interior</i>																								
	rush, joint	<i>Juncus nodosus</i>																								
	rush, path	<i>Juncus dudleyi</i>																								
	rush, roadside	<i>Juncus tenuis</i>																								
	rush, sharp-fruited	<i>Juncus acuminatus</i>																								
	rush, short-headed	<i>Juncus brachycephalus</i>																								
	rush, Torrey's	<i>Juncus torreyi</i>																								
	rush, wood	<i>Luzula multiflora</i>																								
	rye*	<i>Secale cereale</i> *																								
	sage, wood	<i>Teucrium canadense</i>																								
	sandwort, slender - ST	<i>Minuartia patula</i> [<i>Arenaria patula</i>] - ST																								
	sandwort, stiff	<i>Minuartia stricta</i>																								
	sandwort, wood	<i>Moehringia lateriflora</i>																								
	satin grass, common	<i>Muhlenbergia frondosa</i>																								
	satin grass, leafy	<i>Muhlenbergia mexicana</i>																								
	satin grass, prairie	<i>Muhlenbergia cuspidata</i>																								
	satin grass, rock	<i>Muhlenbergia sobolifera</i> +																								
	scouring rush, smooth	<i>Equisetum laevigatum</i>																								

Appendix 1. Continued.

Class ¹	Sub-Class	Forest						Prairie						Sav	Wetland				L&P	Strm	Pri	Cu			
		Upland			Floodplain			Prairie			Gravel			Dolomite	Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff		
		dm	m	wm	m	wm	w	dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm				dc	
Common name ^{4,5}	Scientific Name ^{4,5}																								
scouring rush, tall	<i>Equisetum hyemale</i>																								
scurf-pea	<i>Psoralea tenuiflora</i>																								
sedge	<i>Carex retroflexa+</i>																								
sedge, awl-fruited	<i>Carex tribuloides</i>																								
sedge, bent-seeded hop - SE	<i>Carex tuckermanii - SE</i>																								
sedge, brown fox	<i>Carex vulpinoidea</i>																								
sedge, brown-headed fox	<i>Carex alopecoidea</i>																								
sedge, bur	<i>Carex grayii</i>																								
sedge, common fox	<i>Carex stipata</i>																								
sedge, common hop	<i>Carex lupulina</i>																								
sedge, common lake	<i>Carex lacustris</i>																								
sedge, common oak	<i>Carex pennsylvanica</i>																								
sedge, common stiff	<i>Carex tetanica</i>																								
sedge, common tussock	<i>Carex stricta</i>																								
sedge, common wood	<i>Carex blanda</i>																								
sedge, copper-shouldered oval	<i>Carex bicknellii</i>																								
sedge, crested oval	<i>Carex cristatella</i>																								
sedge, crowfoot fox	<i>Carex crus-corvi</i>																								
sedge, curly-styled wood	<i>Carex rosea</i>																								
sedge, dark-scaled	<i>Carex buxbaumii</i>																								
sedge, early fen	<i>Carex crawei</i>																								
sedge, fen panicked	<i>Carex prairiea</i>																								
sedge, fen star	<i>Carex sterilis</i>																								
sedge, fescue oval	<i>Carex festucacea</i>																								
sedge, few-fruited gray	<i>Carex oligocarpa</i>																								
sedge, field oval	<i>Carex molesta</i>																								
sedge, graceful	<i>Carex gracillima</i>																								
sedge, grass	<i>Carex jamesii</i>																								
sedge, gray	<i>Carex amphibola+</i>																								
sedge, green-headed fox	<i>Carex conjuncta</i>																								
sedge, hairy	<i>Carex hirtifolia</i>																								
sedge, hairy-fruited lake	<i>Carex trichocarpa</i>																								
sedge, hairy-leaved lake	<i>Carex atherodes</i>																								

Appendix 1. Continued.

Class ¹	Sub-Class	Forest						Prairie						Sav	Wetland				L&P	Strm	Pri	Cu		
		Upland		Floodplain		Flatwoods	Prairie		Gravel		Dolomite		Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff			
Natural Community ^{2,3}		dm	m	wm	m	wm	w	dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm			dc	
Common name ^{4,5}	Scientific Name ^{4,5}																							
snapdragon, small*	<i>Chaenorrhinum minus*</i>																							x
sneezeweed	<i>Helenium autumnale</i>					x			x									x		x				
Solomon's seal, smooth	<i>Polygonatum commutatum</i>	x	x		x																			
sorrel, field*	<i>Rumex acetosella*</i>																							x
sow thistle, common*	<i>Sonchus arvensis</i> var. <i>glabrescens*</i>																							x
sow thistle, spiny*	<i>Sonchus asper*</i>																							x
speedwell, corn*	<i>Veronica arvensis*</i>																							x
speedwell, marsh - ST	<i>Veronica scutellata - ST</i>																	x		x				
speedwell, purslane	<i>Veronica peregrina</i>												x	x										x
speedwell, thyme-leaved	<i>Veronica serpyllifolia</i>																							x
spiderwort, common	<i>Tradescantia ohiensis</i>							x	x	x														
spike rush, flat-stemmed	<i>Eleocharis elliptica</i> var. <i>compressa</i>												x	x				x		x				
spike rush, golden-seeded	<i>Eleocharis elliptica</i>										x							x	x	x				
spike rush, marsh	<i>Eleocharis macrostachya</i>										x							x	x	x	x	x		x
spike rush, needle	<i>Eleocharis acicularis</i>					x				x								x		x				
spike rush, red-rooted	<i>Eleocharis erythropoda</i>										x							x	x	x		x		x
spike-rush, beaked-ST	<i>Eleocharis rostellata - ST</i>																		x	x				
spring beauty	<i>Claytonia virginiana</i>	x	X		x	x				x														
spurge, cypress*	<i>Euphorbia cyparissias*</i>									x														x
spurge, flowering	<i>Euphorbia corollata</i>	x						x	x			x	x											x
spurge, nodding	<i>Chamaesyce maculata</i>																							x
squashberry*	<i>Viburnum edule+*</i>																							x
squirrel corn	<i>Dicentra canadensis</i>		x		x																			
St. John's wort, common*	<i>Hypericum perforatum*</i>													x	x									x
St. John's wort, round-fruited	<i>Hypericum sphaerocarpum</i>									x														
St. John's wort, sand	<i>Hypericum majus</i>							x										x			x			
St. John's wort, weak	<i>Hypericum mutilum</i>																	x			x			x
star of Bethlehem*	<i>Ornithogalum umbellatum*</i>																							x
starwort, large water	<i>Callitriche heterophylla</i>					x	x											x			x	x		
stickseed	<i>Hackelia virginiana</i>	x																						x
strawberry, wild	<i>Fragaria virginiana</i>	x						x	x			x	x	x				x						x
stringy stonecrop*	<i>Sedum sarmentosum*</i>																							x
sumac, smooth	<i>Rhus glabra</i>	x						x	x			x		x										x
sumac, stag-horn	<i>Rhus typhina</i>	x						x																x

Appendix 1. Continued.

Common name ^{4,5}	Scientific Name ^{4,5}	Class ¹		Forest						Prairie						Sav	Wetland					L&P	Stm	Pri	Cu	
		Sub-Class		Upland		Floodplain		Flatwoods	Prairie			Gravel		Dolomite			Savanna	Marsh	Swamp	Fen	Sedgem	Seep&Spring			Cliff	
		dm	m	wm	m	wm	w		dm	m	wm	w	dm	m	dm	m	w		ss	gf	sm				dc	
willow, black	<i>Salix nigra</i>						X											X	X				X	X		X
willow, blue-leaved	<i>Salix glaucophylloides</i> var. <i>glaucophylla</i>																		X				X			
willow, bog	<i>Salix pedicellaris</i> var. <i>hypoglauca</i> ⁺																		X							
willow, crack*	<i>Salix fragilis</i> *																		X							X
willow, heart-leaved	<i>Salix eriocephala</i>						X											X	X				X			
willow, peach-leaved	<i>Salix amygdaloides</i>						X											X					X			
willow, prairie	<i>Salix humilis</i>	X						X	X	X							X									
willow, pussy	<i>Salix discolor</i>								X								X	X		X	X					
willow, sand-bar	<i>Salix exigua</i>					X			X	X							X	X			X	X	X	X	X	X
willow, shining	<i>Salix lucida</i>									X								X								
willow, water	<i>Justicia americana</i>																					X	X			
willow, white*	<i>Salix alba</i> *					X												X								X
winged euonymus*	<i>Euonymus alatus</i> *	X	X																							X
winterberry	<i>Ilex verticillata</i>			X														X			X					
witchhazel	<i>Hamamelis virginiana</i>		X																							
wood reed, stout	<i>Cinna arundinacea</i>				X	X	X	X									X									
wood sorrel, common	<i>Oxalis dillenii</i>				X								X													X
wood sorrel, violet	<i>Oxalis violacea</i>		X		X				X																	
wood sorrel, yellow	<i>Oxalis stricta</i>		X		X								X													X
wool grass	<i>Scirpus cyperinus</i>						X										X			X						
woundwort	<i>Stachys palustris</i>				X	X			X	X							X			X						
yarrow*	<i>Achillea millefolium</i> *							X				X				X										X
yellow pimpernel	<i>Taenidia integerrima</i>	X	X					X	X			X	X				X									
yellow rocket*	<i>Barbarea vulgaris</i> *							X									X									X
yellow star grass	<i>Hypoxis hirsuta</i>	X						X	X								X									

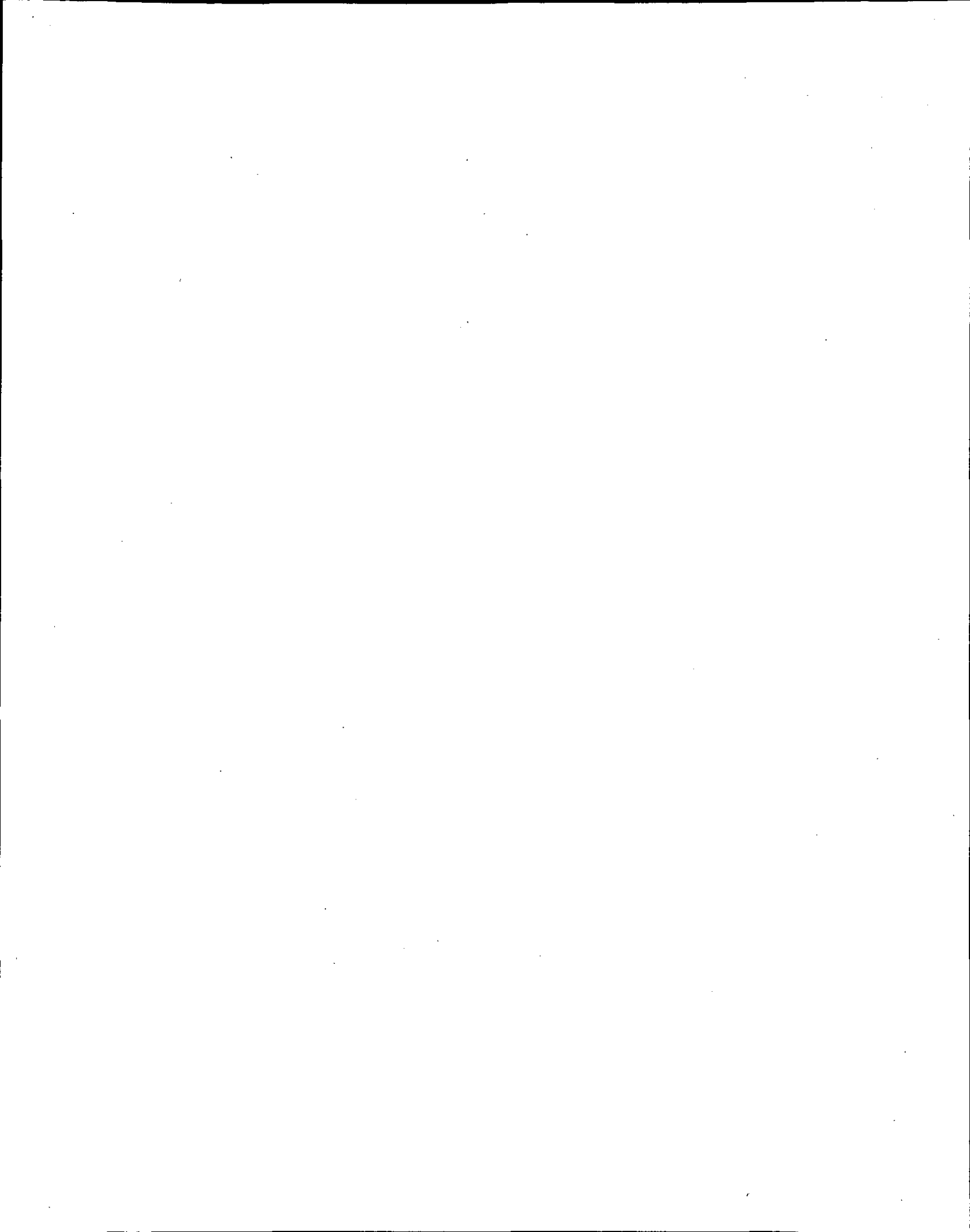
¹ Class abbreviations: Sav = savanna, L&P = Lake and Pond, Stm = Stream, Pri = Primary, Cu = Cultural

² Natural Community abbreviations: dm = dry-mesic, m = mesic, wm = wet-mesic, w = wet, ss = shrub swamp, gf = graminoid fen, sm = sedge meadow, dc = dolomite

³ Upper case "X" denotes dominant species in that natural community. + indicates voucher specimen not seen by Swink and Wilhelm (1984).

⁴ Bold type indicates an Illinois watch list (WL), Illinois endangered (SE), Illinois threatened (ST), federally endangered (FE), and/or federally threatened (FT) species.

⁵ * = non-native species, may be native elsewhere in Illinois.



Appendix 2

Incomplete list of vascular plants known from the Lower Des Plaines River Assessment Area (from Appendix 1), sorted by scientific name.

Scientific Name ^{1,2}	Common Name ^{1,2}	Scientific Name ^{1,2}	Common Name ^{1,2}
<i>Abutilon theophrasti</i> *	velvet leaf*	<i>Andropogon gerardii</i>	bluestem, big
<i>Acalypha rhomboidea</i>	mercury, three-seeded	<i>Androsace occidentalis</i>	rock jasmine
<i>Acer negundo</i>	box elder	<i>Anemone canadensis</i>	anemone, meadow
<i>Acer saccharinum</i>	maple, silver	<i>Anemone cylindrica</i>	thimbleweed
<i>Acer saccharum</i>	maple, sugar	<i>Anemone quinquefolia</i>	anemone, wood
<i>Achillea millefolium</i> *	yarrow	<i>Anemone virginiana</i>	anemone, tall
<i>Acorus calamus</i>	sweet flag	<i>Angelica atropurpurea</i>	angelica
<i>Actaea pachypoda</i>	baneberry, white	<i>Antennaria neglecta</i>	pussy toes, little
<i>Actaea rubra</i>	baneberry, red	<i>Antennaria plantaginifolia</i>	pussy toes
<i>Adiantum pedatum</i>	fern, maidenhair	<i>Apios americana</i>	ground nut
<i>Agalinis besseyana</i>	false foxglove, slender	<i>Apocynum cannabinum</i>	dogbane
<i>Agalinis paupercula</i>	false foxglove, purple	<i>Apocynum sibiricum</i>	Indian hemp
<i>Agalinis purpurea</i>	false foxglove, purple	<i>Arabis canadensis</i>	sicklepod
<i>Agalinis tenuifolia</i>	foxglove, slender false	<i>Arabis glabra</i>	mustard, tower
<i>Agrimonia gryposepala</i>	agrimony, tall	<i>Arabis hirsuta</i>	cress, hairy rock
<i>Agrimonia parviflora</i>	agrimony, swamp	<i>Aralia nudicaulis</i>	wild sarsaparilla
<i>Agrimonia pubescens</i>	agrimony, soft	<i>Arctium minus</i> *	burdock, common*
<i>Agropyron repens</i> *	grass, quack*	<i>Arisaema dracontium</i>	green dragon
<i>Agropyron trachycaulum</i>	grass, bearded wheat	<i>Arisaema triphyllum</i>	Jack-in-the-pulpit
var. unilaterale [Elymus trachycaulus] - SE		<i>Aristida oligantha</i>	grass, plains three-awn
<i>Agrostis alba</i> *	grass, redtop*	<i>Asarum canadense</i>	wild ginger
<i>Agrostis hyemalis</i>	grass, tickle	<i>Asarum canadense</i>	wild ginger
<i>Agrostis perennans</i>	grass, thin	var. reflexum	
<i>Ailanthus altissima</i> *	tree-of-heaven*	<i>Asclepias incarnata</i>	milkweed, swamp
<i>Alisma plantago-aquatica</i>	water plantain, large	<i>Asclepias purpurascens</i>	milkweed, purple
var. americana	flowered	<i>Asclepias sullivantii</i>	milkweed, Sullivant's
<i>Alisma plantago-aquatica</i>	water plantain,	<i>Asclepias syriaca</i>	milkweed, common
var. parviflorum	common	<i>Asclepias tuberosa</i>	butterflyweed, orange
<i>Alliaria petiolata</i> *	garlic mustard*	<i>Asclepias verticillata</i>	milkweed, whorled
<i>Allium burdickii</i>	wild leek	<i>Asclepias viridiflora</i>	milkweed, green
<i>Allium canadense</i>	wild onion	<i>Asimina triloba</i>	paw paw
<i>Allium cernuum</i>	wild onion, nodding	<i>Asparagus officinalis</i> *	asparagus*
<i>Allium tricoccum</i>	wild leek	<i>Asplenium rhizophyllum</i>	fern, walking
<i>Alopecurus aequalis</i>	foxtail, short-awned	<i>Aster azureus</i>	aster, sky-blue
<i>Alopecurus pratensis</i> *	foxtail, meadow*	<i>Aster drummondii</i>	aster, Drummond's
<i>Amaranthus tuberculatus</i>	hemp, water	<i>Aster ericoides</i>	aster, heath
<i>Ambrosia artemisiifolia</i>	ragweed, common	<i>Aster laevis</i>	aster, smooth
<i>Ambrosia trifida</i>	ragweed, giant	<i>Aster lateriflorus</i>	aster, side-flowering
<i>Amelanchier arborea</i>	Juneberry	<i>Aster macrophyllus</i>	aster, big-leaved
<i>Amelanchier interior - SE</i>	shadbush - SE	<i>Aster novae-angliae</i>	aster, New England
<i>Amorpha canescens</i>	leadplant	<i>Aster ontarionis</i>	aster, Ontario
<i>Amphicarpa bracteata</i>	hog peanut, upland	<i>Aster pilosus</i>	aster, hairy

Appendix 2. Continued.

Scientific Name ^{1,2}	Common Name ^{1,2}	Scientific Name ^{1,2}	Common Name ^{1,2}
<i>Aster praealtus</i>	aster, willow	<i>Cardamine bulbosa</i>	cress, bulbous
<i>Aster puniceus</i>	aster, swamp	<i>Cardamine douglassii</i>	cress, purple spring
<i>Aster sagittifolius</i>	aster, arrow-leaved	<i>Cardamine pensylvanica</i>	cress, Pennsylvania bitter
<i>Aster shortii</i>	aster, Short's	<i>Carduus nutans*</i>	thistle, musk*
<i>Aster simplex</i>	aster, paniced	<i>Carex alopecoidea</i>	sedge, brown-headed fox
<i>Aster umbellatus</i>	aster, flat top	<i>Carex amphibola+</i>	sedge, gray
<i>Astragalus canadensis</i>	milk-vetch, Canada	<i>Carex annectans</i>	sedge, large yellow fox
<i>Astragalus</i>	milk-vetch,	<i>Carex atherodes</i>	sedge, hairy-leaved lake
<i>tennesseensis</i> - SE	Tennessee - SE	<i>Carex bicknelli</i>	sedge, copper-
<i>Athyrium angustum</i>	fern, lady		shouldered oval
<i>Atriplex patula*</i>	orach, common*	<i>Carex blanda</i>	sedge, common wood
<i>Baptisia lactea</i>	wild indigo, white	<i>Carex brevior</i>	sedge, plain oval
<i>Baptisia leucophaea</i>	wild indigo, cream	<i>Carex buxbaumii</i>	sedge, dark-scaled
<i>Barbarea vulgaris*</i>	yellow rocket*	<i>Carex cephalophora</i>	sedge, rough clustered
<i>Beckmannia</i>	grass, American	<i>Carex conjuncta</i>	sedge, green-headed fox
<i>syzigachne</i> - SE	slough - SE	<i>Carex crawei</i>	sedge, early fen
<i>Berberis thunbergii*</i>	barberry, Japanese*	<i>Carex cristatella</i>	sedge, crested oval
<i>Bidens aristosa</i>	marigold, swamp	<i>Carex crus-corvi</i>	sedge, crowfoot fox
<i>Bidens cernua</i>	marigold, nodding bur	<i>Carex festucacea</i>	sedge, fescue oval
<i>Bidens coronata</i>	swamp marigold, tall	<i>Carex gracillima</i>	sedge, graceful
<i>Bidens frondosa</i>	beggar's ticks, common	<i>Carex granularis</i>	sedge, pale
<i>Bidens tripartita</i>	tickseed, swamp	<i>Carex grayii</i>	sedge, bur
<i>Bidens vulgata</i>	beggar's ticks, tall	<i>Carex grisea</i>	sedge, wood grey
<i>Blephilia ciliata</i>	horse mint, Ohio	<i>Carex hirtifolia</i>	sedge, hairy
<i>Boehmeria cylindrica</i>	nettle, false	<i>Carex hystericina</i>	sedge, porcupine
<i>Boltonia asteroides</i>	aster, false	<i>Carex interior</i>	sedge, prairie star
<i>Botrychium dissectum</i>	grape-fern, cut leaf	<i>Carex jamesii</i>	sedge, grass
<i>Botrychium multifidum</i> - SE	fern, northern grape-SE	<i>Carex lacustris</i>	sedge, common lake
<i>Botrychium virginianum</i>	grape-fern, rattlesnake	<i>Carex lanuginosa</i>	sedge, wooly
<i>Bouteloua curtipendula</i>	grass, side oats grama	<i>Carex leptalea</i>	sedge, slender
<i>Brassica nigra*</i>	mustard, black*	<i>Carex lupuliformis</i>	sedge, knobbed hop
<i>Brassica rapa*</i>	mustard field*	<i>Carex lupulina</i>	sedge, common hop
<i>Brickellia eupatorioides</i>	boneset, false	<i>Carex meadii</i>	sedge, Mead's stiff
<i>Bromus inermis*</i>	grass, smooth brome*	<i>Carex molesta</i>	sedge, field oval
<i>Bromus kalmii</i>	grass, prairie brome	<i>Carex muskingumensis</i>	sedge, Muskingum River
<i>Bromus purgans</i>	grass, ear-leaved brome	<i>Carex normalis</i>	sedge, spreading oval
<i>Bromus racemosus*</i>	chess, smooth*	<i>Carex oligocarpa</i>	sedge, few-fruited gray
<i>Bromus tectorum*</i>	grass, downy brome*	<i>Carex pensylvanica</i>	sedge, common oak
<i>Cacalia atriplicifolia</i>	Indian plantain, pale	<i>Carex prairiea</i>	sedge, fen paniced
<i>Cacalia plantaginea</i>	Indian plantain, prairie	<i>Carex retroflexa+</i>	sedge
<i>Calamagrostis canadensis</i>	grass, blue-joint	<i>Carex rosea</i>	sedge, curly-styled wood
<i>Calamagrostis inexpansa</i>	grass, bog-reed	<i>Carex sartwellii</i>	sedge, running marsh
<i>Calamintha arkansana</i>	calamint, low	<i>Carex scoparia</i>	sedge, lance-fruited oval
<i>Callitriche heterophylla</i>	starwort, large water	<i>Carex sparganioides</i>	sedge, loose-headed bracted
<i>Calopogon tuberosus</i> - SE	orchid, grass pink-SE	<i>Carex sterilis</i>	sedge, fen star
<i>Caltha palustris</i>	marsh marigold	<i>Carex stipata</i>	sedge, common fox
<i>Calystegia sepium</i>	hedge bindweed	<i>Carex stricta</i>	sedge, common tussock
<i>Camassia scilloides</i>	hyacinth, wild	<i>Carex suberecta</i>	sedge, wedge-fruited oval
<i>Campanula americana</i>	bellflower, tall	<i>Carex tenera</i>	sedge, narrow-leaved oval
<i>Campanula aparinoides</i>	bellflower, marsh	<i>Carex tetanica</i>	sedge, common stiff

Appendix 2. Continued.

Scientific Name ^{1,2}	Common Name ^{1,2}	Scientific Name ^{1,2}	Common Name ^{1,2}
<i>Carex tribuloides</i>	sedge, awl-fruited	<i>Crataegus punctata</i>	hawthorn, dotted
<i>Carex trichocarpa</i>	sedge, hairy-fruited lake	<i>Cryptotaenia canadensis</i>	honestwort
<i>Carex tuckermanii</i> - SE	sedge, bent-seeded hop - SE	<i>Cuscuta glomerata</i>	dodder, rope
<i>Carex vulpinoidea</i>	sedge, brown fox	<i>Cuscuta polygonorum</i>	dodder, knotweed
<i>Carex woodii</i> - ST	sedge, pretty- ST	<i>Cyperus ferruginescens</i>	flatsedge, brownish shoreline
<i>Carya cordiformis</i>	hickory, bitternut	<i>Cyperus rivularis</i>	flatsedge, brook nut
<i>Carya ovata</i>	hickory, shagbark	<i>Cypripedium candidum</i> - ST	orchid, white lady's slipper
<i>Cassia fasciculata</i>	pea, partridge	<i>Cystopteris protrusa</i>	fern, bulblet
<i>Castilleja coccinea</i>	Indian paint brush	<i>Dactylis glomerata</i> *	grass, orchard*
<i>Catalpa speciosa</i> *	catalpa, hardy*	<i>Dalea candida</i>	prairie clover, white
<i>Caulophyllum thalictroides</i>	blue cohosh	<i>Dalea foliosa</i> - SE, FE	prairie-clover, leafy-SE, FE
<i>Ceanothus americanus</i>	New Jersey tea	<i>Dalea purpurea</i>	prairie clover, purple
<i>Celtis occidentalis</i>	hackberry	<i>Danthonia spicata</i>	grass, poverty oat
<i>Cephalanthus occidentalis</i>	buttonbush	<i>Daucus carota</i> *	carrot, wild*
<i>Ceratophyllum demersum</i>	coontail	<i>Dentaria laciniata</i>	toothwort
<i>Chaenorrhinum minus</i> *	snapdragon, small*	<i>Deschampsia cespitosa</i>	grass, tufted hair
<i>Chaerophyllum procumbens</i>	chervil, wild	<i>Desmodium canadense</i>	tick trefoil, showy
<i>Chamaesyce maculata</i>	spurge, nodding	<i>Desmodium glutinosum</i>	tick trefoil, pointed
<i>Chelone gabra</i>	turtlehead	<i>Desmodium illinoiense</i>	tick trefoil, Illinois
<i>Chenopodium album</i> *	lamb's quarters*	<i>Dicentra canadensis</i>	squirrel corn
<i>Cichorium intybus</i> *	chicory*	<i>Dicentra cucullaria</i>	Dutchman's breeches
<i>Cicuta bulbifera</i>	hemlock, bulblet- bearing water	<i>Dichanthelium acuminatum</i>	grass, old-field panic
<i>Cicuta maculata</i>	hemlock, water	<i>Dichanthelium latifolium</i>	grass, broad-leaved panic
<i>Cinna arundinacea</i>	wood reed, stout	<i>Dichanthelium leibergii</i>	grass, prairie panic
<i>Circaea lutetiana</i>	enchanter's nightshade	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	grass, Scribner's panic
<i>Cirsium arvense</i> *	thistle, field*	<i>Dioscorea villosa</i>	wild yam
<i>Cirsium discolor</i>	thistle, pasture	<i>Diplotaxis muralis</i> *	wall rocket*
<i>Cirsium muticum</i>	thistle, swamp	<i>Dipsacus laciniatus</i> *	teasel, cut-leaved*
<i>Cirsium vulgare</i> *	thistle, bull*	<i>Dispsacus sylvestris</i> *	teasel, common*
<i>Claytonia virginiana</i>	spring beauty	<i>Dodecatheon meadia</i>	shooting star
<i>Collinsia verna</i>	blue-eyed Mary	<i>Draba reptans</i>	cress, common whitlow
<i>Comandra umbellata</i>	false toadflax	<i>Dryopteris carthusiana</i>	fern, spinulose shield
<i>Convallaria majalis</i> *	lily-of-the-valley*	<i>Dryopteris intermedia</i>	fern, florist's wood
<i>Convolvulus arvensis</i> *	bindweed, field*	<i>Echinacea pallida</i>	coneflower, pale purple
<i>Conyza canadensis</i>	horseweed	<i>Echinacea purpurea</i>	coneflower, purple
<i>Coreopsis lanceolata</i>	coreopsis, sand	<i>Echinochloa crus-galli</i> *	grass, barnyard*
<i>Coreopsis palmata</i>	coreopsis, prairie	<i>Echinochloa muricata</i>	grass, barnyard
<i>Coreopsis tripteris</i>	coreopsis, tall	<i>Echinocystis lobata</i>	wild cucumber
<i>Cornus alternifolia</i>	dogwood, alternate- leaved	<i>Echium vulgare</i> *	viper's bugloss*
<i>Cornus obliqua</i>	dogwood, pale	<i>Eleocharis acicularis</i>	spike rush, needle
<i>Cornus racemosa</i>	dogwood, gray	<i>Eleocharis elliptica</i>	spike rush, golden-seeded
<i>Cornus stolonifera</i>	dogwood, red-osier	<i>Eleocharis elliptica</i> var. <i>compressa</i>	spike rush, flat-stemmed
<i>Coronilla varia</i> *	vetch, crown*	<i>Eleocharis erythropoda</i>	spike rush, red-rooted
<i>Corylus americana</i>	hazelnut, American	<i>Eleocharis macrostachya</i>	spike rush, marsh
<i>Crataegus crus-galli</i>	hawthorn, cockspur	<i>Eleocharis rostellata</i> - ST	spike-rush, beaked-ST
<i>Crataegus mollis</i>	hawthorn, downy	<i>Ellisia nyctelea</i>	Aunt Lucy
<i>Crataegus pruinosa</i>	hawthorn, frosted		

Appendix 2. Continued.

Scientific Name ^{1,2}	Common Name ^{1,2}	Scientific Name ^{1,2}	Common Name ^{1,2}
<i>Elymus canadensis</i>	wild rye, Canada	<i>Galium tinctorium</i>	bedstray, stiff
<i>Elymus hystrix</i>	grass, bottle brush	<i>Galium triflorum</i>	bedstraw, sweet scented
<i>Elymus villosus</i>	wild rye, silky	<i>Gaura biennis</i>	gaura, biennial
<i>Elymus virginicus</i>	wild rye, Virginia	<i>Gaura parviflora*</i>	gaura, small-flowered*
<i>Epilobium ciliatum</i>	willow herb, northern	<i>Gentiana andrewsii</i>	gentian, closed
<i>Epilobium coloratum</i>	willow herb, cinnamon	<i>Gentiana procera</i>	gentian, small fringed
<i>Epilobium hirsutum*</i>	willow herb, hairy	<i>Gentiana puberulenta</i>	gentian, downy
<i>Epilobium leptophyllum</i>	willow herb, fen	<i>Geranium carolinianum</i>	cranesbill, carolina
<i>Epipactis helleborine*</i>	orchid, helleborine*	<i>Geranium maculatum</i>	geranium, wild
<i>Equisetum arvense</i>	horsetail	<i>Geum canadense</i>	avens, white
<i>Equisetum hyemale</i>	scouring rush, tall	<i>Geum laciniatum</i>	avens, rough
<i>Equisetum laevigatum</i>	scouring rush, smooth	<i>Geum vernum</i>	avens, spring
<i>Eragrostis frankii</i>	grass, sandbar love	<i>Glechoma hederacea*</i>	creeping Charlie*
<i>Erechtites hieracifolia</i>	fireweed	<i>Gleditsia triacanthos</i>	locust, honey
<i>Erigenia bulbosa</i>	harbinger of spring	<i>Glyceria septentrionalis</i>	grass, floating manna
<i>Erigeron annuus</i>	fleabane, annual	<i>Glyceria striata</i>	grass, fowl manna
<i>Erigeron philadelphicus</i>	fleabane, marsh	<i>Gymnocladus dioica</i>	Kentucky coffeetree
<i>Erigeron strigosus</i>	fleabane, daisy	<i>Hackelia virginiana</i>	stickseed
<i>Eriophorum angustifolium</i>	cotton grass, narrow-leaved	<i>Hamamelis virginiana</i>	witchhazel
<i>Eryngium yuccifolium</i>	rattlesnake master	<i>Hedeoma hispida</i>	pennyroyal, rough
<i>Erythronium albidum</i>	trout lily, white	<i>Hedeoma pulegioides</i>	pennyroyal, American
<i>Euonymus alatus*</i>	winged euonymus*	<i>Helenium autumnale</i>	sneezeweed
<i>Euonymus atropurpureus</i>	wahoo	<i>Helianthus annuus*</i>	sunflower, garden*
<i>Eupatorium altissimum</i>	boneset, tall	<i>Helianthus grosseserratus</i>	sunflower, grosseserratus
<i>Eupatorium coelestinum*</i>	mistflower	<i>Helianthus hirsutus</i>	sunflower, hispid
<i>Eupatorium maculatum</i>	Joe Pye weed, spotted	<i>Helianthus rigidus</i>	sunflower, prairie
<i>Eupatorium perfoliatum</i>	boneset, common	<i>Helianthus strumosus</i>	sunflower, pale leaved
<i>Eupatorium purpureum</i>	Joe Pye weed, purple	<i>Helianthus tuberosus</i>	Jerusalem artichoke
<i>Eupatorium rugosum</i>	snakeroot, white	<i>Heliopsis helianthoides</i>	sunflower, false
<i>Eupatorium serotinum</i>	boneset, late	<i>Hemerocallis fulva*</i>	day lily, orange*
<i>Euphorbia corollata</i>	spurge, flowering	<i>Hepatica nobilis var. acuta</i>	hepatica, sharp-lobed
<i>Euphorbia cyparissias*</i>	spurge, cypress*	<i>Heracleum maximum</i>	parsnip, cow
<i>Euthamia graminifolia</i>	goldenrod, grass-leave	<i>Hesperis matronalis*</i>	dame's rocket*
<i>Euthamia gymnospermoides</i>	goldenrod, viscid	<i>Heuchera richardsonii</i>	alum root, prairie
<i>Festuca arundinacea*</i>	fescue, tall*	<i>Hibiscus laevis</i>	rose mallow, halberd- leaved
<i>Festuca pratensis*</i>	fescue, meadow*	<i>Hibiscus trionum*</i>	flower-of-an-hour
<i>Floerkea proserpinacoides</i>	false mermaid	<i>Hieracium longipilum</i>	hawkweed, long-bearded
<i>Fragaria virginiana</i>	strawberry, wild	<i>Hierochloa odorata</i>	grass, sweet
<i>Fraxinus americana</i>	ash, white	<i>Hordeum jubatum*</i>	grass, squirrel-tail*
<i>Fraxinus nigra</i>	ash, black	<i>Hydrastis canadensis</i>	goldenseal
<i>Fraxinus pennsylvanica</i>	ash, red	<i>Hydrophyllum appendiculatum</i>	waterleaf, great
<i>Fraxinus pensylvanica</i>	ash, green	<i>Hydrophyllum virginianum</i>	waterleaf, virginia
var. <i>subintegerrima</i>		<i>Hymenoxys acaulis</i> - SE, FE	daisy, lakeside - SE, FE
<i>Fraxinus quadrangulata</i>	ash, blue	var. <i>glabra</i> [<i>Hymenoxys herbacea</i>]	
<i>Galium aparine</i>	cleavers	<i>Hypericum majus</i>	St. John's wort, sand
<i>Galium asprellum</i>	bedstraw, rough	<i>Hypericum mutilum</i>	St. John's wort, weak
<i>Galium boreale</i>	bedstraw, northern	<i>Hypericum perforatum*</i>	St. John's wort, common*
<i>Galium circaezans</i>	hairy wild licorice		
<i>Galium concinnum</i>	bedstraw, shining		
<i>Galium obtusum</i>	wild madder		

Appendix 2. Continued.

Scientific Name ^{1,2}	Common Name ^{1,2}	Scientific Name ^{1,2}	Common Name ^{1,2}
<i>Hypericum sphaerocarpum</i>	St. John's wort, round-fruited	<i>Lilium michiganense</i>	lily, Turk's cap
<i>Hypoxis hirsuta</i>	yellow star grass	<i>Lilium philadelphicum</i>	lily, prairie
<i>Ilex verticillata</i>	winterberry	var. <i>andinum</i> +	
<i>Impatiens capensis</i>	jewel weed, orange	<i>Linaria vulgaris</i> *	butter-and-eggs*
<i>Impatiens pallida</i>	jewel weed, yellow	<i>Lindernia dubia</i>	pimpernel, false
<i>Ipomoea hederacea</i> *	morning glory, ivy-leaved*	<i>Linum sulcatum</i>	flax, grooved yellow
<i>Ipomoea pandurata</i>	wild sweet potato	<i>Linum usitatissimum</i> *	flax, common*
<i>Iris shrevei</i>	blue flag	<i>Liparis lilifolia</i>	orchid, twayblade
<i>Isopyrum biternatum</i>	anemone, false rue	<i>Liparis loeselii</i>	orchid, lesser twayblade
<i>Jeffersonia diphylla</i>	twinleaf	<i>Lithospermum canescens</i>	puccoon, hoary
<i>Juglans cinerea</i> - WL	butternut - WL	<i>Lithospermum carolinense</i>	puccoon, hairy
<i>Juglans nigra</i>	walnut, black	<i>Lithospermum incisum</i>	puccoon, yellow
<i>Juncus acuminatus</i>	rush, sharp-fruited	<i>Lithospermum latifolium</i>	puccoon, broad-leaved
<i>Juncus brachycephalus</i>	rush, short-headed	<i>Lobelia cardinalis</i>	cardinal flower
<i>Juncus dudleyi</i>	rush, path	<i>Lobelia inflata</i>	Indian tobacco
<i>Juncus effusus</i>	rush, common	<i>Lobelia kalmii</i>	lobelia, Kalm's
<i>Juncus interior</i>	rush, interior	<i>Lobelia siphilitica</i>	lobelia, great blue
<i>Juncus nodosus</i>	rush, joint	<i>Lobelia spicata</i>	lobelia, pale spiked
<i>Juncus tenuis</i>	rush, roadside	<i>Lolium perenne</i> *	grass, English rye*
<i>Juncus torreyi</i>	rush, Torrey's	<i>Lonicera japonica</i> *	honeysuckle, Japanese*
<i>Juniper virginiana</i>	red cedar	<i>Lonicera mackii</i> *	honeysuckle, amur*
<i>Justicia americana</i>	willow, water	<i>Lonicera morrowi</i> +	honeysuckle, Morrow's*
<i>Kochia scoparia</i> *	burning bush*	<i>Lonicera prolifera</i>	honeysuckle, yellow
<i>Krigia biflora</i>	dandelion, false	<i>Lonicera tatarica</i> *	honeysuckle, Tartarian*
<i>Lactuca canadensis</i>	lettuce, wild	<i>Lonicera X bella</i> *	honeysuckle, showy fly*
<i>Lactuca serriola</i> *	lettuce, prickly*	<i>Lonicera X muendeniensis</i> *	honeysuckle, common fly*
<i>Laportea canadensis</i>	nettle, wood	<i>Lotus corniculatus</i> *	birdsfoot-trefoil*
<i>Lapula echinata</i> *	beggar's lice*	<i>Ludwigia palustris</i>	purslane, marsh
<i>Lathyrus palustris</i>	marsh vetchling	var. <i>americana</i>	
<i>Lathyrus venosus</i>	pea, veiny	<i>Ludwigia polycarpa</i>	loosestrife, false
<i>Leersia oryzoides</i>	grass, rice cut	<i>Luecanthemum vulgare</i> *	ox-eye daisy*
<i>Leersia virginica</i>	grass, white	<i>Luzula multiflora</i>	rush, wood
<i>Lemna minor</i>	duckweed, small	<i>Lychnis alba</i> *	white campion*
<i>Lemna trisulca</i>	duckweed, forked	<i>Lycium barbarum</i> *	matrimony, common*
<i>Leonurus cardiaca</i> *	motherwort*	<i>Lycopus americanus</i>	water horehound, common
<i>Leonurus marrubiastrum</i> *	lion's tail*	<i>Lycopus uniflorus</i>	bugle weed, northern
<i>Lepidium campestre</i> *	cress, field*	<i>Lycopus virginicus</i>	bugle weed
<i>Lepidium virginicum</i>	peppergrass, common	<i>Lysimachia ciliata</i>	loosestrife, fringed
<i>Lespedeza capitata</i>	bush clover, round-headed	<i>Lysimachia lanceolata</i>	loosestrife, lance-leaved
<i>Lespedeza leptostachya</i> - SE, FT	bush-clover, prairie - SE, FT	<i>Lysimachia nummularia</i> *	moneywort*
<i>Liatis aspera</i>	blazing star, rough	<i>Lysimachia quadriflora</i>	loosestrife, narrow-leaved
<i>Liatis cylindrica</i>	blazing star, cylindrical	<i>Lysimachia terrestris</i>	swamp candles
<i>Liatis pycnostachya</i>	blazing star, prairie	<i>Lythrum alatum</i>	loosestrife, winged
<i>Liatis scariosa</i>	blazing star - ST	<i>Lythrum salicaria</i> *	loosestrife, purple*
var. <i>nieuwlandii</i> - ST		<i>Maclura pomifera</i> *	osage orange*
<i>Liatis spicata</i>	blazing star, marsh	<i>Malus coronaria</i>	crab apple, wild sweet
		<i>Malus ioensis</i>	crab apple, Iowa
		<i>Malus pumila</i> *	apple*
		<i>Malva neglecta</i> *	mallow, common*
		<i>Matricaria matricarioides</i> *	pineapple-weed*

Appendix 2. Continued.

Scientific Name ^{1,2}	Common Name ^{1,2}	Scientific Name ^{1,2}	Common Name ^{1,2}
<i>Medicago lupulina</i> *	black medick*	<i>Parietaria pensylvanica</i>	pellitory
<i>Melilotus alba</i> *	sweet clover, white*	<i>Parnassia glauca</i>	grass-of-parnassus
<i>Melilotus officinalis</i> *	sweet clover, yellow*	<i>Parthenium integrifolium</i>	wild quinine
<i>Menispermum canadense</i>	moonseed	<i>Parthenocissus quinquefoia</i>	Virginia creeper
<i>Mentha arvensis</i> var. <i>villosa</i>	mint, wild	<i>Pastinaca sativa</i> *	parsnip, wild
<i>Mentha arvensis</i> *	mint, wild*	<i>Pedicularis canadensis</i>	betony, wood
<i>Mertensia virginica</i>	virginia bluebells	<i>Pedicularis lanceolata</i>	betony, fen
<i>Mimulus alatus</i>	monkey flower, winged	<i>Pellaea glabella</i>	fern, purple cliff brake
<i>Mimulus ringens</i>	monkey flower	<i>Penstemon calycosus</i>	beard tongue, smooth
<i>Minuartia patula</i>	sandwort, slender- ST	<i>Penstemon digitalis</i>	beard tongue, foxglove
[<i>Arenaria patula</i>] - ST		<i>Penstemon hirsutus</i>	beard tongue, hairy
<i>Minuartia stricta</i>	sandwort, stiff	<i>Penstemon pallidus</i>	beard tongue, pale
<i>Mirabilis nyctaginea</i> *	wild four-o'clock	<i>Penthorum sedoides</i>	ditch stoncrop
<i>Mitella diphylla</i>	bishop's cap	<i>Perideridia americana</i>	parsley, thicket
<i>Moehringia lateriflora</i>	sandwort, wood	<i>Phalaris arundinacea</i> *	grass, reed canary*
<i>Mollugo verticillata</i> *	carpetweed	<i>Phegopteris hexagonoptera</i>	fern, broad beech
<i>Monarda fistulosa</i>	bergamot, wild	<i>Phleum pratense</i> *	timothy*
<i>Morus alba</i> *	mulberry, white*	<i>Phlox divaricata</i>	phlox, woodland
<i>Morus rubra</i>	mulberry, red	<i>Phlox glaberrima</i>	phlox, marsh
<i>Muhlenbergia cuspidata</i>	satin grass, prairie	var. <i>interior</i>	
<i>Muhlenbergia frondosa</i>	satin grass, common	<i>Phlox paniculata</i> *	phlox, garden
<i>Muhlenbergia glomerata</i>	wild timothy, marsh	<i>Phlox pilosa</i>	phlox, prairie
<i>Muhlenbergia mexicana</i>	satin grass, leafy	<i>Phragmites australis</i>	grass, common reed
<i>Muhlenbergia sobolifera</i> +	satin grass, rock	<i>Phryma leptostachya</i>	lopseed
<i>Myosotis scorpioides</i> *	forget-me-not, common*	<i>Phyla lanceolata</i>	fog fruit
<i>Napaea dioica</i>	mallow, glade	<i>Physalis heterophylla</i>	ground cherry, clammy
<i>Nasturtium officinale</i> *	cress, water*	<i>Physalis pubescens</i> *	ground cherry, hairy*
<i>Nepeta cataria</i> *	catnip*	<i>Physalis subglabrata</i>	ground cherry, tall
<i>Nuphar luteum</i>	water lily, yellow	<i>Physalis virginiana</i>	ground cherry, lance-leaved
var. <i>macrophyllum</i>		<i>Physocarpus opulifolius</i>	ninebark
<i>Nymphaea tuberosa</i>	water lily, white	<i>Physostegia virginiana</i>	dragonhead, false
<i>Oenothera biennis</i>	evening primrose, common	<i>Pilea fontana</i>	clearweed, bog
<i>Oenothera perennis</i> - ST	sundrops, small - ST	<i>Pilea pumila</i>	clearweed
<i>Oenothera pilosella</i>	sundrops, prairie	<i>Plantago cordata</i> + - SE	plantain, heart-leaved
<i>Oenothera speciosa</i> *	evening primrose,	<i>Plantago lanceolata</i> *	plantain, lance-leaved*
showy	fern, sensitive	<i>Plantago major</i> *	plantain, common*
<i>Onoclea sensibilis</i>	marbleseed	<i>Plantago rugelii</i>	plantain, red-stalked
<i>Onosmodium hispidissimum</i>	star of Bethlehem*	<i>Platanthera hyperborea</i>	orchid, northern bog
<i>Ornithogalum umbellatum</i> *	sweet cicely, hairy	var. <i>huronensis</i>	
<i>Osmorhiza claytonii</i>	sweet cicely, smooth	<i>Platanthera leucophaea</i>	orchid, prairie white-
<i>Osmorhiza longistylis</i>	ironwood	- SE, FT	fringed - SE, FT
<i>Ostrya virginiana</i>	wood sorrel, common	<i>Platanthera psycodes</i> -SE	orchid, purple-fringed-SE
<i>Oxalis dilenii</i>	wood sorrel, yellow	<i>Platanus occidentalis</i>	sycamore
<i>Oxalis stricta</i>	wood sorrel, violet	<i>Poa annua</i> *	grass, annual blue*
<i>Oxalis violacea</i>	cowbane	<i>Poa compressa</i> *	grass, Canada blue*
<i>Oxypolis rigidior</i>	grass, old witch	<i>Poa palustris</i>	grass, marsh blue
<i>Panicum capillare</i>	grass, knee	<i>Poa pratensis</i> *	grass, Kentucky blue*
<i>Panicum dichotomiflorum</i>	grass, wiry panic	<i>Poa sylvestris</i>	grass, woodland
<i>Panicum flexile</i>	grass, switch	<i>Podophyllum peltatum</i>	may apple
<i>Panicum virgatum</i>		<i>Poinsettia dentata</i>	wild poinsettia

Appendix 2. Continued.

Scientific Name ^{1,2}	Common Name ^{1,2}	Scientific Name ^{1,2}	Common Name ^{1,2}
<i>Polanisia dodecandra</i>	clammy weed	<i>Pycnanthemum pilosum</i>	mountain mint, hairy
<i>Polemonium reptans</i>	Jacob's ladder	<i>Pycnanthemum tenuifolium</i>	mountain mint, slender
<i>Polygala sanguinea</i>	milkwort, field	<i>Pycnanthemum virginianum</i>	mountain mint, common
<i>Polygala senega</i>	snakeroot, Seneca	<i>Quercus alba</i>	oak, white
<i>Polygonatum commutatum</i>	Solomon's seal, smooth	<i>Quercus bicolor</i>	oak, swamp white
<i>Polygonum amphibium</i>	knotweed, water	<i>Quercus ellipsoidalis</i>	oak, northern pin
var. <i>stipulaceum</i>		<i>Quercus imbricaria</i>	oak, shingle
<i>Polygonum arenastrum</i> *	knotweed, sidewalk*	<i>Quercus macrocarpa</i>	oak, bur
<i>Polygonum cespitosum</i>	smartweed, creeping*	<i>Quercus palustris</i>	oak, pin
var. <i>longisetum</i> *		<i>Quercus rubra</i>	oak, red
<i>Polygonum coccineum</i>	heartsease, water	<i>Quercus velutina</i>	oak, black
<i>Polygonum convolvulus</i> *	black bindweed*	<i>Ranunculus pensylvanicus</i>	buttercup, bristly
<i>Polygonum cuspidatum</i> *	knotweed, Japanese*	<i>Ranunculus acris</i>	buttercup, tall
<i>Polygonum hydropiper</i>	knotweed, water pepper	<i>Ranunculus abortivus</i>	buttercup, small flowered
<i>Polygonum hydropiperoides</i>	water pepper, mild	<i>Ranunculus flabellaris</i>	crowfoot, yellow water
<i>Polygonum lapathifolium</i>	heartsease	<i>Ranunculus longirostris</i>	crowfoot, white water
<i>Polygonum pensylvanicum</i>	knotweed, Pennsylvania	<i>Ranunculus sceleratus</i>	buttercup, cursed
<i>Polygonum persicaria</i> *	lady's thumb*	<i>Ranunculus septentrionalis</i>	buttercup, swamp
<i>Polygonum punctatum</i>	smartweed, dotted	<i>Ratibida pinnata</i>	coneflower, yellow
<i>Polygonum ramossissimum</i>	knotweed, bushy	<i>Rhamnus cathartica</i> *	buckthorn, European*
<i>Polygonum sagittatum</i>	tearthumb, arrow-leaved	<i>Rhamnus frangula</i> *	buckthorn, glossy*
<i>Polygonum scandens</i>	false buckwheat, climbing	<i>Rhus glabra</i>	sumac, smooth
<i>Polygonum virginianum</i>	knotweed, woodland	<i>Rhus typhina</i>	sumac, stag-horn
<i>Populus alba</i> *	poplar, white*	<i>Rhynchospora capillacea</i>	beak rush, hair
<i>Populus deltoides</i>	cottonwood, eastern	<i>Ribes americanum</i>	black currant, wild
<i>Populus grandidentata</i>	aspens, large-toothed	<i>Ribes cynosbati</i>	gooseberry, prickly
<i>Populus nigra</i> var. <i>italica</i> *	poplar, Lombardy*	<i>Ribes missouriense</i>	gooseberry, wild
<i>Populus tremuloides</i>	aspens, quaking	<i>Robinia pseudoacacia</i> *	locust, black*
<i>Potamogeton crispus</i> *	pondweed, beginner's*	<i>Rorippa islandica</i>	cress, marsh
<i>Potamogeton foliosus</i>	pondweed, leafy	var. <i>fernaldiana</i>	
<i>Potamogeton pectinatus</i>	pondweed, sago	<i>Rosa blanda</i>	rose, early wild
<i>Potamogeton pusillus</i>	pondweed, small	<i>Rosa carolina</i>	rose, pasture
<i>Potentilla argentea</i> *	cinquefoil, silvery*	<i>Rosa multiflora</i> *	rose, multiflora*
<i>Potentilla arguta</i>	cinquefoil, prairie	<i>Rosa palustris</i>	rose, swamp
<i>Potentilla norvegica</i>	cinquefoil, rough	<i>Rosa setigera</i>	rose, Illinois
<i>Potentilla recta</i> *	cinquefoil, sulfur*	<i>Rubus allegheniensis</i>	blackberry, common
<i>Potentilla simplex</i>	cinquefoil, common	<i>Rubus flagellaris</i>	dewberry, common
<i>Prenanthes alba</i>	lion's foot	<i>Rubus occidentalis</i>	raspberry, black
<i>Prenanthes aspera</i>	white lettuce, rough	<i>Rubus pensilvanicus</i>	blackberry, yankee
<i>Prenanthes racemosa</i>	white lettuce, glaucous	<i>Rubus pubescens</i> - ST	raspberry, dwarf - ST
<i>Proserpinaca palustris</i>	mermaid weed	<i>Rudbeckia hirta</i>	black-eyed susan
<i>Prunella vulgaris</i> *	selfheal*	<i>Rudbeckia laciniata</i>	wild golden glow
<i>Prunus americana</i>	plum, wild	<i>Rudbeckia triloba</i>	brown-eyed Susan
<i>Prunus serotina</i>	cherry, wild black	<i>Ruellia humilis</i>	petunia, wild
<i>Prunus virginiana</i>	cherry, choke	<i>Rumex acetosella</i> *	sorrel, field*
<i>Psoralea tenuiflora</i>	scurf-pea	<i>Rumex altissimus</i>	dock, pale
<i>Ptelea trifoliata</i>	hop tree	<i>Rumex crispus</i> *	dock, curly*
<i>Pteridium aquilinum</i>	fern, bracken	<i>Rumex obtusifolius</i> *	dock, bitter
<i>Puccinellia distans</i> *	grass, alkali*	<i>Rumex orbiculatus</i>	dock, great water
		<i>Rumex verticillatus</i>	dock, swamp

Appendix 2. Continued.

Scientific Name ^{1,2}	Common Name ^{1,2}	Scientific Name ^{1,2}	Common Name ^{1,2}
<i>Sagittaria latifolia</i>	arrowhead, common	<i>Silphium perfoliatum</i>	cup plant
<i>Salix alba</i> *	willow, white*	<i>Silphium terebinthinaceum</i>	prairie dock
<i>Salix amygdaloides</i>	willow, peach-leaved	<i>Sisymbrium altissimum</i> *	mustard, tumble*
<i>Salix discolor</i>	willow, pussy	<i>Sisymbrium officinale</i> *	mustard, hedge*
<i>Salix eriocephala</i>	willow, heart-leaved	<i>Sisyrinchium albidum</i>	blue-eyed grass, common
<i>Salix exigua</i>	willow, sand-bar	<i>Sisyrinchium angustifolium</i>	blue-eyed grass, stout
<i>Salix fragilis</i> *	willow, crack*	<i>Sisyrinchium montanum</i> - SE	blue-eyed grass, mountain - SE
<i>Salix glaucophylloides</i>	willow, blue-leaved	<i>Sium suave</i>	parsnip, tall water
var. <i>glaucophylla</i>		<i>Smilacina racemosa</i>	false Solomon's seal
<i>Salix humilis</i>	willow, prairie	<i>Smilacina stellata</i>	false Solomon's seal, starry
<i>Salix lucida</i>	willow, shining	<i>Smilax eccirrhata</i>	carriion flower, upright
<i>Salix nigra</i>	willow, black	<i>Smilax hispida</i>	green briar, bristly
<i>Salix pedicularis</i>	willow, bog	<i>Smilax lasioneura</i>	carriion flower, common
var. <i>hypoglauca</i> +		<i>Solanum americanum</i>	black nightshade
<i>Sambucus canadensis</i>	elder, common	<i>Solanum carolinense</i> *	horse nettle*
<i>Sanguinaria canadensis</i>	bloodroot	<i>Solanum dulcamara</i> *	nightshade, bittersweet*
<i>Sanicula canadensis</i>	snakeroot, black	<i>Solidago canadensis</i>	goldenrod, Canada
<i>Sanicula gregaria</i>	snakeroot, clustered black	<i>Solidago flexicaulis</i>	goldenrod, broad leaved
<i>Saponaria officinalis</i> *	bouncy bet*	<i>Solidago gigantea</i>	goldenrod, late
<i>Schizachyrium scoparium</i>	grass, little bluestem	<i>Solidago juncea</i>	goldenrod, early
<i>Scirpus acutus</i>	bulrush, hard-stemmed	<i>Solidago missouriensis</i>	goldenrod, Missouri
<i>Scirpus atrovirens</i>	bulrush, dark green	<i>Solidago nemoralis</i>	goldenrod, old-field
<i>Scirpus cyperinus</i>	wool grass	<i>Solidago ohioensis</i>	goldenrod, Ohio
<i>Scirpus fluviatilis</i>	bulrush, river	<i>Solidago patula</i>	goldenrod, swamp
<i>Scirpus hattorianus</i> - SE	bulrush, early dark green - SE	<i>Solidago ptarmicoides</i>	goldenrod, few-flowered
<i>Scirpus pendulus</i>	bulrush, red	<i>Solidago riddellii</i>	goldenrod, Riddell's
<i>Scirpus tabernaemontanii</i>	bulrush, great	<i>Solidago rigida</i>	goldenrod, stiff
<i>Scrophularia lanceolata</i>	figwort, early	<i>Solidago uliginosa</i>	goldenrod, bog
<i>Scrophularia marilandica</i>	figwort, late	<i>Solidago ulmifolia</i>	goldenrod, elm leaved
<i>Scutellaria epilobifolia</i>	skullcap, marsh	<i>Sonchus arvensis</i>	sow thistle, common*
<i>Scutellaria lateriflora</i>	skullcap, mad-dog	var. <i>glabrescens</i> *	
<i>Scutellaria leonardii</i>	skullcap, small	<i>Sonchus asper</i> *	sow thistle, spiny*
<i>Scutellaria parvula</i>	skullcap, small	<i>Sorghastrum nutans</i>	grass, Indian
<i>Secale cereale</i> *	rye*	<i>Sparganium eurycarpum</i>	reed, bur
<i>Sedum acre</i> *	wall pepper*	<i>Spartina pectinata</i>	grass, prairie cord
<i>Sedum sarmentosum</i> *	stringy stonecrop*	<i>Sphenopholis obtusata</i>	grass, prairie wedge
<i>Selaginella eclipes</i>	club moss, marsh	<i>Spiraea alba</i>	meadowsweet
<i>Senecio glabellus</i> *	butterweed*	<i>Spiraea tomentosa</i>	hardhack
<i>Senecio pauperculus</i>	ragwort, balsam	<i>Spiranthes cernua</i>	orchid, nodding ladies' tresses
<i>Setaria faberi</i> *	foxtail, giant*	<i>Spiranthes magnicamporum</i>	orchid, great plains ladies' tresses
<i>Setaria glauca</i> *	foxtail, yellow*	<i>Spirodela polyrhiza</i>	duckweed, great
<i>Setaria viridis</i> *	foxtail, green*	<i>Sporobolus asper</i> *	dropseed, rough*
<i>Silene antirrhina</i>	catchfly, sleepy	<i>Sporobolus heterolepis</i>	dropseed, prairie
<i>Silene cserei</i> *	campion, glaucous*	<i>Sporobolus vaginiflorus</i>	grass, sheathed rush
<i>Silene stellata</i>	campion, starry	<i>Stachys palustris</i>	woundwort
<i>Silene virginica</i>	fire pink	<i>Stachys tenuifolia</i>	hedge nettle, smooth
<i>Silphium integrifolium</i>	rosinweed	var. <i>hispida</i>	
<i>Silphium laciniatum</i>	compass plant		

Appendix 2. Continued.

Scientific Name ^{1,2}	Common Name ^{1,2}	Scientific Name ^{1,2}	Common Name ^{1,2}
<i>Staphylea trifolia</i>	bladdernut	<i>Utricularia vulgaris</i>	bladderwort, common
<i>Stellaria meadia*</i>	chickweed, common*	<i>Uvularia grandiflora</i>	bellwort
<i>Stipa spartea</i>	grass, porcupine	<i>Valeriana edulis</i>	valerian, common
<i>Symphoricarpos orbiculatus*</i>	coralberry*	<i>Verbascum blattaria*</i>	mullein, moth*
<i>Symplocarpus foetidus</i>	skunk cabbage	<i>Verbascum thapsus*</i>	mullein, common*
<i>Taenidia integerrima</i>	yellow pimpernel	<i>Verbena bracteata</i>	vervain, creeping
<i>Tanacetum vulgare*</i>	tansy*	<i>Verbena hastata</i>	vervain, blue
<i>Taraxacum officinale*</i>	dandelion*	<i>Verbena simplex</i>	vervain, narrow-leaved
<i>Teucrium canadense</i>	sage, wood	<i>Verbena stricta</i>	vervain, hoary
<i>Thalictrum dasycarpum</i>	meadow rue, tall	<i>Verbena urticifolia</i>	vervain, hairy white
<i>Thalictrum dioicum</i>	meadow rue, early	<i>Vernonia fasciculata</i>	ironweed, common
<i>Thalictrum revolutum</i>	meadow rue, waxy	<i>Vernonia gigantea</i>	ironweed, smooth tall
<i>Thalictrum thalictroides</i>	anemone, wood	<i>Vernonia missurica</i>	ironweed, Missouri
<i>Thaspium trifoliatum</i>	parsnip, meadow	<i>Veronica arvensis*</i>	speedwell, corn*
<i>Thelypteris palustris</i>	fern, marsh	<i>Veronica peregrina</i>	speedwell, purslane
<i>Thlaspi arvense*</i>	cress, penny*	<i>Veronica scutellata</i> - ST	speedwell, marsh - ST
<i>Tilia americana</i>	basswood	<i>Veronica serpyllifolia</i>	speedwell, thyme-leaved
<i>Tomanthera auriculata</i> - ST	foxglove, earleaf - ST	<i>Veronicastrum virginicum</i>	Culver's root
<i>Torilis japonica*</i>	Japanese hedge parsley	<i>Viburnum acerifolium</i>	arrow-wood, maple leaved
<i>Toxicodendron radicans</i>	poison ivy	<i>Viburnum dentatum*</i>	arrow-wood*
<i>Tradescantia ohiensis</i>	spiderwort, common	<i>Viburnum edule+*</i>	squashberry*
<i>Tragopogon dubius*</i>	goat's beard, sand*	<i>Viburnum lentago</i>	nannyberry
<i>Tragopogon pratensis*</i>	goat's beard, common*	<i>Viburnum opulus*</i>	highbush cranberry, European*
<i>Trichostema brachiatum</i>	pennyroyal, false	<i>Viburnum prunifolium</i>	black haw
<i>Tridens flavus</i>	grass, purpletop	<i>Viburnum rafinesquianum</i>	arrow-wood, downy
<i>Trifolium dubium*</i>	clover, little hop*	<i>Viburnum recognitum*</i>	arrow-wood, smooth*
<i>Trifolium hybridum*</i>	clover, alsike*	<i>Vicia americana</i>	vetch, American
<i>Trifolium pratense*</i>	clover, red*	<i>Vicia villosa*</i>	vetch, hairy
<i>Trifolium repens*</i>	clover, white*	<i>Viola affinis</i>	violet, LeConte's
<i>Triglochin maritima</i>	bog arrow-grass, common	<i>Viola canadensis</i>	violet, Canada - SE
<i>Triglochin palustris</i> - ST	bog arrow-grass, slender - ST	var. <i>corymbosum+</i> - SE	
<i>Trillium flexipes</i>	trillium, declined	<i>Viola obliqua</i>	violet, hooded
<i>Trillium grandiflorum</i>	trillium, large-flowered	<i>Viola pedatifida</i>	violet, prairie
<i>Trillium recurvatum</i>	trillium, red	<i>Viola pratincola</i>	violet, common blue
<i>Trillium sessile</i>	trillium, sessile	<i>Viola pubescens</i>	violet, yellow
<i>Triodanis perfoliata</i>	Venus's looking glass	<i>Viola sagittata</i>	violet, arrow-leaved
<i>Triosteum aurantiacum</i>	horse gentian, early	<i>Viola sororia</i>	violet, hairy wood
<i>Triosteum illinoiense</i>	horse gentian, Illinois	<i>Vitis riparia</i>	grape, riverbank
<i>Typha angustifolia*</i>	cattail, narrow-leaf	<i>Wolffia columbiana</i>	water meal, American
<i>Typha latifolia</i>	cattail, common	<i>Xanthium strumarium*</i>	cocklebur*
<i>Ulmus americana</i>	elm, American	<i>Zanthoxylum americanum</i>	ash, prickly
<i>Ulmus pumila*</i>	elm, Siberian*	<i>Zea mays*</i>	corn*
<i>Ulmus rubra</i>	elm, slippery	<i>Zizia aptera</i>	parsnip, heart-leaved meadow
<i>Urtica dioica</i>	nettle, tall	<i>Zizia aurea</i>	golden Alexanders

¹ Bold type indicates an Illinois watch list (WL), endangered (SE), Illinois threatened (ST), Federally endangered (FE), and/or Federally threatened (FT) species.

² Asterisk (*) indicates introduced, non-native species