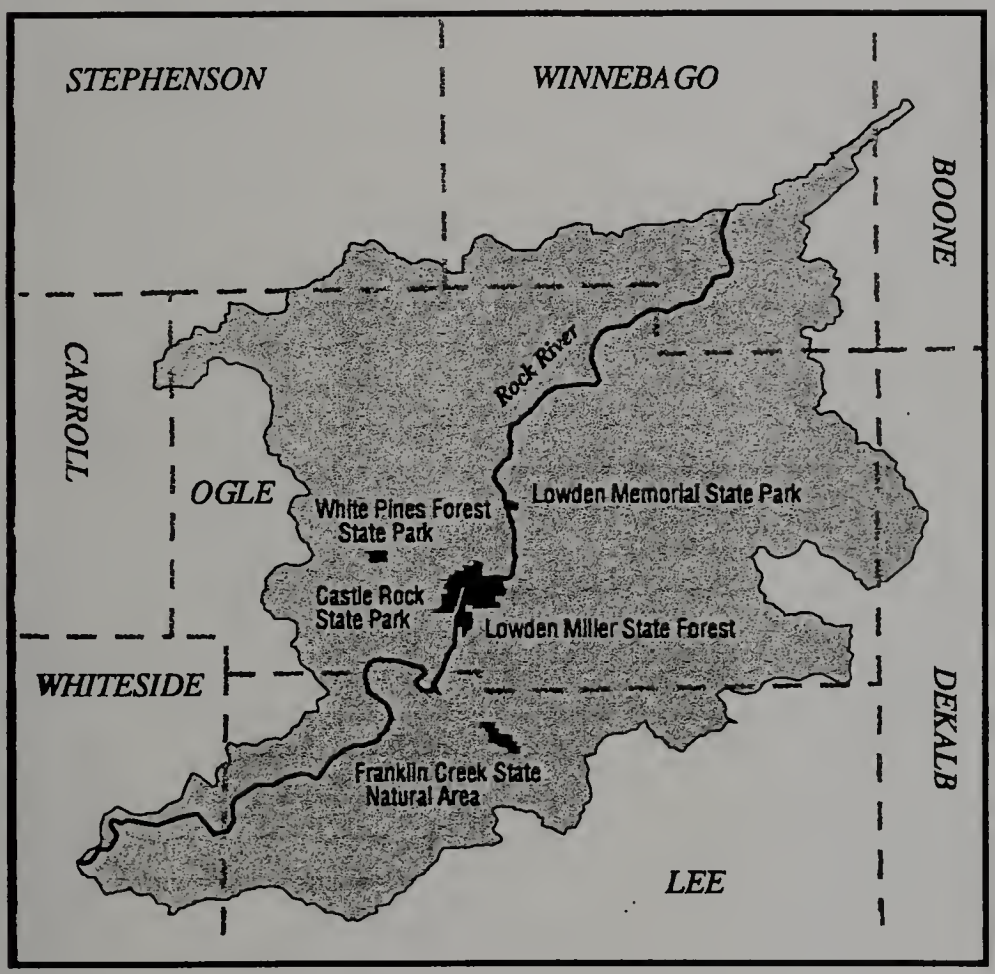
ROCK RIVER AREA ASSESSMENT

VOLUME 1
NATURAL RESOURCES



Jim Edgar, Governor
Brent Manning, Director
November 1996

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

ROCK RIVER AREA ASSESSMENT

VOLUME 1

Illinois Department of Natural Resources
Office of Scientific Research and Analysis
Natural History Survey Division
607 East Peabody Drive
Champaign, Illinois 61820-6917

in conjunction with:
State Geological Survey Division

November 1996

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Assessment Summary

As-part of Phase II of the Critical Trends Assessment Project (CTAP), a regional assessment of the status of natural resources is planned for each model Resource Rich Area (RRA) and for RRAs where a local partnership forms and becomes recognized by the Illinois Department of Natural Resources. These assessments will also serve as a basis for implementing a standardized long-term ecological monitoring program by compiling baseline data and identifying information gaps. This Rock River Area Assessment is the first in this series. The Rock River Assessment Watersheds (RRAW) is an aggregation of 18 (EPA) 305b reporting watersheds[1] and covers approximately 999 mi^2 (639,478.75 acres) or 1.8% of the land area of the state. Land cover data suggest the area is approximately 60% agriculture, 23% grassland, 8% upland forest, 6% urban, 1.5% water, 1.0% bottomland forest, and 0.5% wetland. Public land in the area totals over 9,162 acres, while the majority of land (over 98%) is held in private ownership. A summary of features follows:

The Rock River originates in Horicon Marsh in Dodge County, Wisconsin, and flows in a southerly direction until the river enters Illinois south of Beloit. It flows south for approximately 45 miles, turns to the southwest at Camp Grant, then curves across the northwestern part of the state, and joins the Mississippi River at Rock Island. The river flows approximately 163 miles (262 kilometers) in Illinois and drains 5,343 mi^2 (8,602 km^2). The watershed in Illinois comprises approximately 9.5% of the total area of the state and includes portions of 13 counties—Stephenson, Winnebago, Boone, McHenry, Kane, DeKalb, Ogle, Carroll, Whiteside, Lee, Bureau, Henry, and Rock Island. Five natural divisions are encompassed—Rock River Hill Country, Northeastern Morainal, Grand Prairie, Upper Mississippi River and Illinois River Bottomlands, and Middle Mississippi Border. Soil types in the basin range from thick to thin loess deposits on limestone and thin silty or loamy materials on gravelly Wisconsinan outwash, to sandy or clayey deposits on the bottomlands. The two largest urban centers in the basin are Rockford and Rock Island/Moline.

Earth Resources

Geology and Mineral Resources

Bedrock exposures of numerous formations, including an exposure of the oldest geologic formation in the state, provide unique educational opportunities for studying Earth history and numerous opportunities for scenic overlooks and path/trail development. Plentiful aquifer systems exist in the bedrock of the area, and because St. Peter Sandstone and Galena-Platteville Dolomite are exposed here, rainfall and snowmelt directly recharge these groundwater resources. St. Peter Sandstone is one of Illinois' most productive aquifers. The area also contains several important sources for sand, gravel, and crushed stone.

Hydrologic Resources

The Rock River Basin contains nearly 2,620 miles of streams and the RRAW is 1.5% open water. A total of 16 miles of Biologically Significant Illinois Streams are recognized along portions of the Rock River and the Kishwaukee River within the RRAW. Sixty miles of the Rock River mainstem received the Illinois Environmental Protection Agency's highest water quality rating of "full-support". Fifty-five percent of this "full-support" Rock River segment lies within the RRAW. Statewide, nutrient contamination and sedimentation are the primary causes for streams receiving a less than "full-support" rating; within the Rock River Basin, the major impact on water quality is phosphorous contamination due to municipal wastewater contamination and agricultural runoff.

1 Illinois Environmental Protection Agency 305b reporting watersheds were the unit of analysis used in the statewide screening for Resource Rich Areas. This same physical context has been adopted for the assessment of ecological resources within recognized RRAs.

Living Resources

There is significant natural community and species diversity within the RRAW that can be attributed to a concentration of distinct bedrock and surface geological features that support several rare plant species and the presence of a variety of moisture and pH conditions. Thirty-three Illinois Natural Areas Inventory (INAI) sites, totaling 2,437 hectares (6,020 acres) and containing examples of 18 of the 83 natural community types documented for the state can be found here. These INAI sites represent over 200 acres of high-quality ecological community and nearly 1,900 acres of endangered species habitat. There are eight Illinois Nature Preserves located within the RRAW, totaling over 1,050 acres (approximately 900 acres of forest and 150 acres of prairie).

Approximately 38% of Illinois' native vascular flora and 65% of the state's vertebrate fauna (including 41% of bird, 35% of amphibian and reptile, 66% of mammal, and 41% of fish species), are represented within the RRAW. These figures include 10% of Illinois' endangered and threatened plant species and 13% of the state's endangered and threatened animal species.

Forest

Before European settlement of the area, it is estimated that forest covered nearly 65% of the RRAW. Currently, approximately 50,460 acres (8.0%) of the area is in upland forest cover and 114 acres are designated high-quality INAI sites. The forests of the area support the richest community of breeding forest birds, including the most diverse assemblage of breeding warbler species, in the state. Nearly 60% of the vascular flora known for the area are forest-related species. Forests of the area provide habitat for 76% of bird, 60% of reptile and amphibian, and 64% of mammal species found in the area Over 8% of the forest present in the RRAW is located within the Castle Rock State Park/Lowden- Miller State Forest complex. Nineteen state endangered and threatened plant species are documented for this forest complex.

Grassland

Approximately 146,437 acres (23%) of the RRAW are described as a grassland category that includes pastures, old fields, strip mine reclamations, rights-of-way, and prairies. Currently, only about 19 ha. (48 acres) of remaining high-quality original prairie and a 324-ha (804 acre) restoration and reconstruction represent the native prairie that covered nearly 35% of the area prior to European settlement. This restoration/ reconstruction is the largest contiguous tract of sand prairie owned by a private land conservation group in the state. Grassland in the RRAW provides habitat for 29% of bird, 63% of reptile and amphibian, and 61% of mammal species found in the area.

Wetland

Prior to European settlement, wetland covered about 8% of Ogle County, which represents three-fourths of the land area of the RRAW. Currently, wetlands (including floodplain forest) cover 8,152 acres (1.2%) of the RRAW. Nearly 60 acres of high-quality marsh remains in the area. The wetlands of the RRAW provide habitat for 30% of bird, 77% of reptile and amphibian, and 56% of mammal species found in the area.

Stream

The Rock River Basin contains nearly 2,620 miles of streams. The streams of the RRAW support 41% of fish, 42% of mussel, and 25% of crayfish species native to Illinois. Little is known of the terrestrial insects, but aquatic insects for the area include 29 mayfly species, and 29 caddisfly species. These totals include two state threatened fish species and five state endangered and threatened mussel species. Other faunal groups also make use of the aquatic resources of the area. Of particular interest are the state endangered river otter and federal candidate Blanding's turtle.

Related Publications

The Changing Illinois Environment: Critical Trends
Summary Report
Volume 1: Air Resources
Volume 2: Water Resources
Volume 3: Ecological Resources
Volume 4: Earth Resources
Volume 5: Waste Generation and Management
Volume 6: Sources of Environmental Stress
Volume 7: Bibliography

Annual Report 1995, Illinois RiverWatch Network

Stream Monitoring Manual, Illinois RiverWatch Network

PLAN-IT EARTH, Flowing Waters Module

PLAN-IT EARTH, Forest Module

Forest Monitoring Manual, Illinois ForestWatch

Illinois Land Cover, An Atlas, plus CD-ROM

Inventory of Ecologically Resource-Rich Areas in Illinois

Cache River Area Assessment

Illinois Geographic Information System, CD-ROM of digital geospatial data

The Relationship of Socioeconomic and Environmental Factors with Health Trends in Illinois

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

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

About This Report

The Rock River Area Assessment examines an area situated along the Rock River in the northern part of Illinois. Because significant natural community and species diversity is found in the area, it has been designated a state Resource Rich Area.

This is the first in a series of reports on Illinois Resource Rich Areas in which a public-private partnership has been formed. The Rock River and subsequent assessments will 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.[1] Three conclusions were drawn from the baseline investigation:

the emission and discharge of regulated pollutants over the past 20 years has declined, in some cases dramatically,
existing data suggest that the condition of natural ecosystems in Illinois is rapidly declining as a result of fragmentation and continued stress, and
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 *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 six-year program to begin reversing ecosystem degradation, primarily through the Ecosystems Program, a cooperative process of public-private partnerships that are intended to merge natural resource stewardship with economic and recreational development. To achieve this goal, the program will provide 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 (including the Rock and Cache River areas) throughout the state. The Rock River Area Assessment draws, as will subsequent area assessments, from ecological and socio-economic databases, providing 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 Rock River Assessment

The Rock River enters Illinois at Beloit, Wisconsin and South Beloit, Illinois, and runs southwest to meet the Mississippi River at Rock Island, Illinois. The assessment area is situated within the Illinois portion of the Rock River Basin along a roughly 70-mile section of the river (Figure 1) south of Rockford. It encompasses 18 of the 89 watersheds that IEPA has identified in the basin (Figure 2). The Rock River area was designated a Resource Rich Area because it contains significant natural community and species diversity. The region contains a core of high-quality natural resources as well as nearby ecologically tied natural and human resources.

The 18 watersheds cover approximately 999 mi^2 (639,479 acres). There are several hundred landowners within the area, with the majority of land (over 98%) being held in private ownership. Public land in the area totals 9,162 acres.

The assessment is comprised of four major parts in two volumes. Volume 1 contains *Earth Resources*, which summarizes the physical setting of the area including its geology, soils, minerals, and surface and ground water, and *Living Resources*, which describes the terrestrial and aquatic flora and fauna of the area.

In Volume 2, the *Socio-Economic Profile* discusses the demographics, infrastructure, and economy of the area, focusing on the three counties with the greatest amount of land in the watershed area — Lee, Ogle, and Winnebago counties. Also in this volume, *Early Accounts of the Ecology of the Rock River Hill Country* describes the ecology of the area as recorded by historical writings of explorers, pioneers, early visitors and early historians.

Figure 1. Location of the Rock River Assessment Watersheds

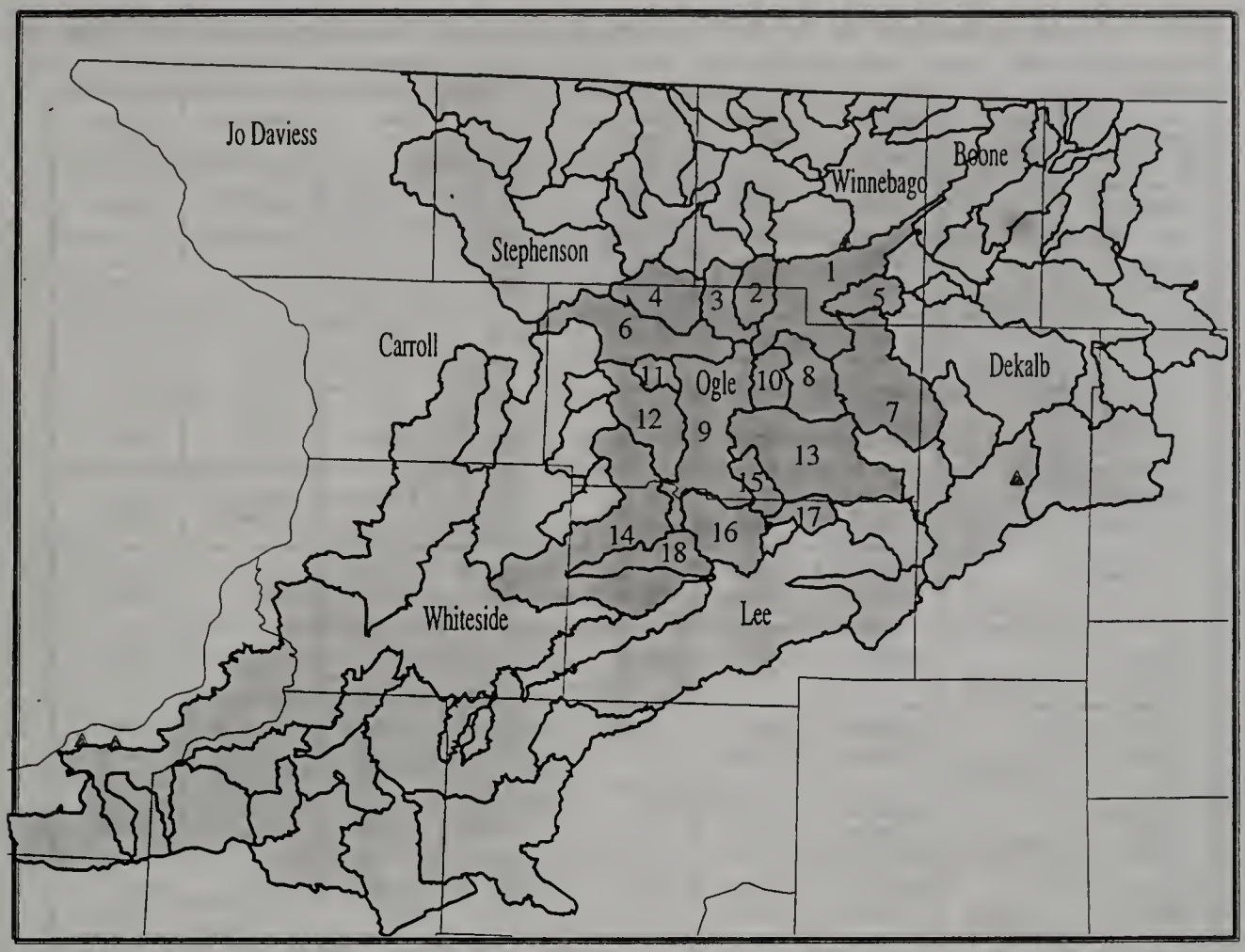


Figure 2. Rock River Basin and Assessment Watersheds

1. Rock River North
2. Middle Creek
3. Mill Creek
4. Mud Creek
5. Kishwaukee River South
6. Leaf River
7. Kilbuck Creek
8. Stillman Creek
9. Rock River Middle
10. Black Walnut Creek
11. Coon Creek
12. Pine Creek
13. Kyte River
14. Rock River South
15. Prairie Creek
16. Franklin Creek
17. Beach Creek
18. Three Mile Creek

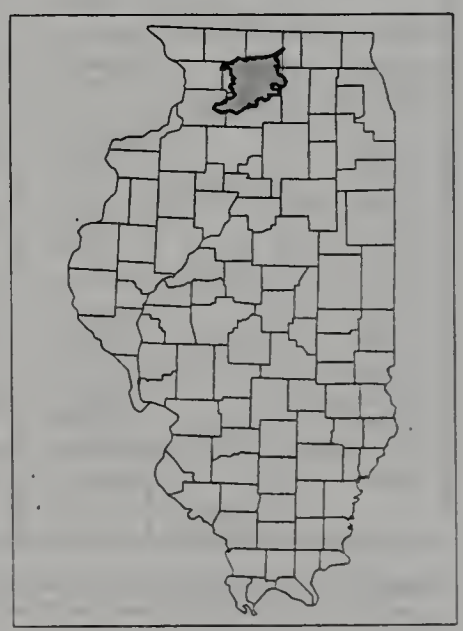


Table 1. Land use acreages for each of 18 watersheds within the Rock River Assessment Watersheds. *Source*: the Land Cover Database of Illinois, 1991-1995 (IDENR, 1995).

Basin # /Name	Total Acres	Agricult. Ac./%	Grassland Ac./%	Upland Wd. Ac./%	Urban Ac./%	Water Ac./%	Bottom Wd. Ac./%	Wetland Ac./%
1. Rock River North	60,362.17	23,372.66/ 38.70%	13,414.53/ 22.22%	7,429.41/ 12.31%	13,998.99/ 23.19%	1,413.39/ 2.34%	581.25/ 0.96%	151.94/ 0.25%
2. Middle Creek	15,530.98	8,577.66/ 55.23%	5,287.05/ 34.04%	1,309.22/ 8.44%	3.61/ 0.02%	8.83/ 0.06%	179.43/ 1.16%	165.18/ 1.06%
3. Mill Creek	18,249.99	10,831.82/ 59.35%	6,199.07/ 33.97%	647.48/ 3.55%	307.08/ 1.68%	10.84/ 0.06%	140.90/ 0.77%	112.80/ 0.62%
4. Mud Creek	28,374.31	17,001.38/ 59.92%	9,717.89/ 34.25%	1,364.01/ 4.81%	196.09/ 0.69%	19.27/ 0.07%	58.41/ 0.21%	17.26/ 0.06%
5. Kishwaukee River South	14,474.46	3,907.79/ 27.00%	2,749.50/ 19.00%	2,704.54/ 18.68%	4,260.63/ 29.44%	306.08/ 2.11%	473.87/ 3.27%	72.05/ 0.50%
6. Leaf River	46,140.39	27,752.31/ 60.15%	14,893.15/ 32.28%	2,443.62/ 5.30%	700.87/ 1.52%	71.05/ 0.15%	189.87/ 0.41%	89.52/ 0.19%
7. Kilbuck Creek	59,540.07	46,005.92/ 77.27%	10,756.35/ 18.07%	1,085.43/ 1.82%	606.14/ 1.02%	99.95/ 0.17%	647.69/ 1.09%	338.59/ 0.57%
8. Stillman Creek	25,449.19	16,659.78/ 65.46%	6,812.64/ 26.77%	1,037.26/ 4.08%	382.35/ 1.50%	36.73/ 0.14%	208.13/ 0.82%	312.30/ 1.23%
9. Rock River Middle	64,944.53	26,500.50/ 40.80%	17,564.77/ 27.05%	14,765.50/ 22.74%	2,223.24/ 3.42%	2,528.12/ 3.89%	1,109.31/ 1.71%	253.09/ 0.39%
10. Black Walnut Creek	13,788.44	9,791.14/ 71.01%	3,168.98/ 22.98%	687.63/ 4.99%	1.20/ 0.0%1	14.45/ 0.10%	35.32/ 0.26%	89.72/ 0.65%
11. Coon Creek	7,846.49	5,246.71/ 66.87%	1,966.34/ 25.06%	256.71/ 3.27%	336.99/ 4.29%	3.41/ 0.04%	13.65/ 0.17%	22.68/ 0.29%
12. Pine Creek	35,089.60	20,046.13/ 57.13%	10,998.81/ 31.34%	3,575.41/ 10.19%	346.62/ 0.99%	33.92/ 0.10%	49.17/ 0.14%	39.54/ 0.11%
13. Kyte River	70,553.32	49,333.05/ 69.92%	12,989.03/ 18.41%	4,008.54/ 5.68%	2,851.86/ 4.04%	379.31/ 0.54%	591.89/ 0.84%	399.61/ 0.57%
14. Rock River South	101,779.89	61,908.82/ 60.80%	17,658.50/ 17.35%	6,236.80/ 6.13%	10,395.88/ 10.21%	4,352.76/ 4.28%	665.95/ 0.65%	561.18/ 0.55%
15. Prairie Creek	11,933.30	9,110.14/ 76.34%	2,025.15/ 16.97%	653.51/ 5.48%	103.16/ 0.86%	9.03/ 0.08%	17.46/ 0.15%	14.85/ 0.12%
16. Franklin Creek	31,340.79	22,692.06/ 72.40%	5,858.47/ 18.69%	1,983.00/ 6.33%	316.92/ 1.01%	59.41 0.19%	338.80/ 1.08%	92.13/ 0.29%
17. Beach Creek	11,026.50	9,712.67/ 88.08%	1,071.57/ 9.72%	5.22/ 0.05%	165.78/ 1.50%	50.18/ 0.46%	0.40/ 0.00%	20.67/ 0.19%
18. Three Mile Creek	23,054.34	19,198.34/ 83.27%	3,306.06/ 14.34%	266.94/ 1.16%	147.52/ 0.64%	38.34/ 0.17%	32.51/ 0.14%	64.63/ 0.28%
Totals:	639,478.34	387,648.9/ 60.62%	146,437.9/ 22.90%	50,460.2/ 7.89%	37,344.9/ 5.84%	9,435.1/ 1.48%	5,334.01/ 0.83%	2,817.74/ 0.44%

Agricult.= row crops, small grains, and orchards; **Grassland**= grassland, pastureland, prairie, rights-of-way, strip mine reclamations; **Upland Wd.**= upland forest (deciduous and coniferous); **Urban**= developed, barren, lawn; **Water**= open water; **Bottom Wd.**= bottomland forest (floodplain, swamp); **Wetland**= lacustrine, palustrine.

Table 2. Public land acreage within the Rock River Assessment Watersheds. *Sources*: Land and Water Report (IDOC, 1994); respective county plat books.

— Illinois Department of Natural Resources
Total 5, 303 acres:
-Lowden-Miller State Forest - 2,225 acres
-Castle Rock State Park - 1, 966 acres
-Franklin Creek State Natrual Area - 520 acres
-White Pines Forest State Park - 385 acres
-Lowden Memorail State Park - 207 acres

— State University
Northern Illinois University
-Lorado Taft Field Campus - 66 acres
-Pine Rock Nature Preserve - 59 acres

— Local Agency
-Byron Forest Preserve District - 528 acres
-Dixon Park District - 832 acres
-Oregon Park District - 100 acres
-Winnebago County Forest Preserve - 2,272 acres

— Federal Agency
None

EARTH RESOURCES

GEOLOGY

Physical Setting

The Rock River Assessment Watersheds (RRAW) are located in the northern portion of the Rock River Hill Country physiographic province. The rolling surficial topography of the region is the result of both erosional processes and irregularities in the bedrock surface, which have influenced the total drift thickness (Berg, Kempton, and Stecyk, 1984). The maximum elevations of the land surface west of the Rock River are higher than east of the river and the amount of dissection of the landscape by stream erosion is greater. The lowest elevations in the RRAW, about 690 feet above mean sea level (msl) at Rockford and about 620 feet at Sterling, occur along the Rock River. Elevations over 800 feet are common west of the Rock River. Near Mt. Morris and Maryland, elevations exceed 900 feet. East of the Rock River, the topography is flatter with maximum elevations generally less than 800 feet above msl. A prominent ridge located in extreme southeastern Ogle County and eastern Lee County is the Bloomington Moraine (Willman and Frye, 1970), which contains a thick succession of sediments deposited by glaciers during the last episode of the Ice Age (Wisconsin).

Bedrock Topography/Drift Thickness

During the long interval between deposition of the bedrock formations (about 440-490 million years ago) and the advance of continental ice sheets across North America (about 1 million years ago), streams dissected and removed younger rocks, creating an integrated preglacial drainage network on the bedrock surface. By early glacial time this erosion had carved most of the major topographic features of the present bedrock surface. Subsequent scouring by glacial ice and erosion by glacial meltwater and modern streams and rivers further eroded the bedrock surface. The amount of glacial deposition, the amount of subsequent erosion of these deposits, and the many irregularities in the bedrock surface are the important factors controlling the total drift thickness within the region (Berg, Kempton, and Stecyk, 1984).

The most pronounced bedrock topographic feature in the RRAW is the Rock Bedrock Valley (Figure 3). The modern Rock River generally follows the course of the Rock Bedrock Valley through much of Winnebago County. However, in southern Winnebago County, blockage by glacial ice and the construction of Wisconsin Episode moraines to the south diverted the Rock River to the southwest, away from the bedrock valley. Glacial meltwater flowing down the Rock River has cut a gorge into bedrock through most of its course in Ogle County.

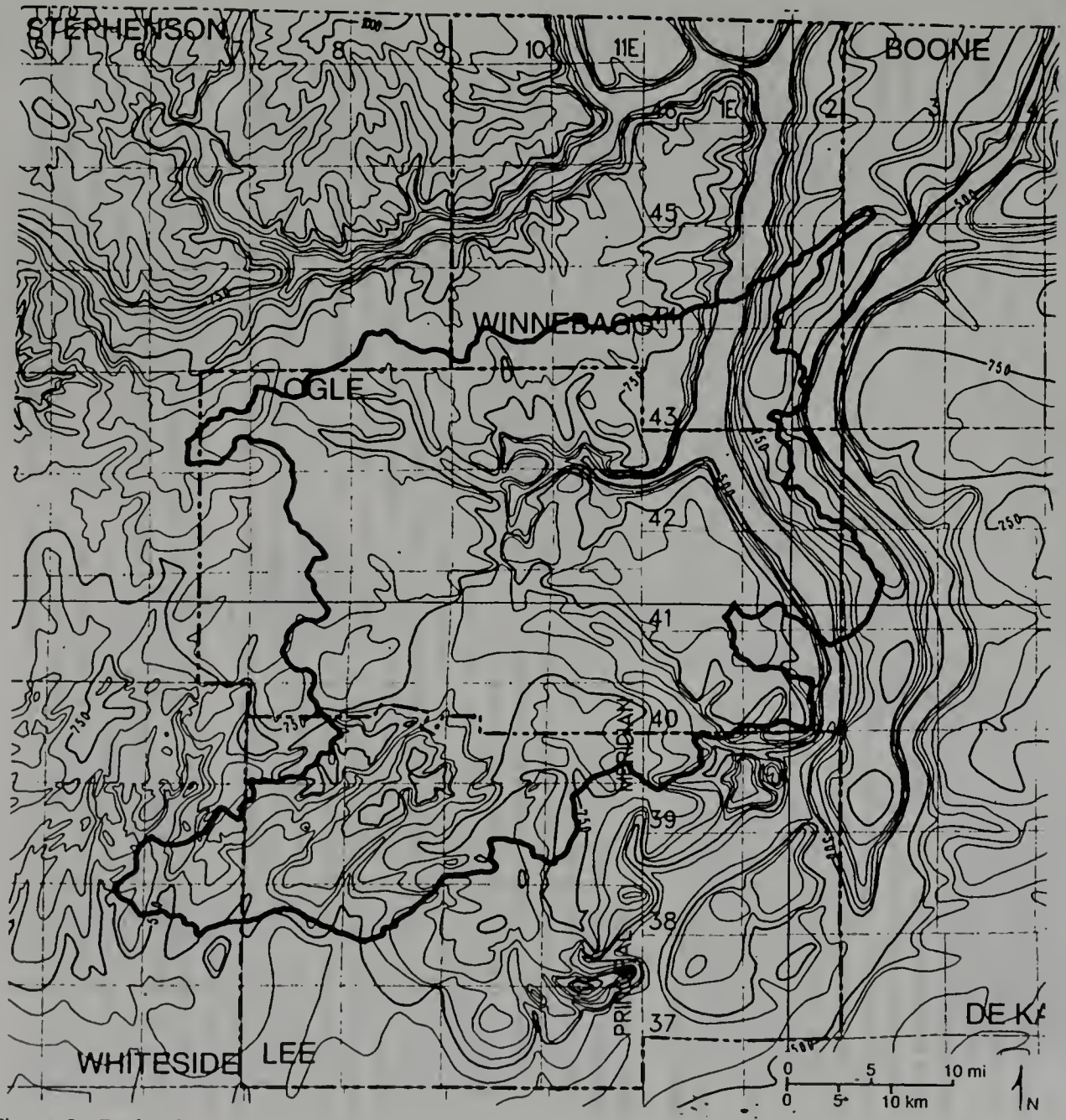
The steep-sided Rock Bedrock Valley generally trends north-south through the eastern portion of the RRAW (Herzog et al, 1994). The thalweg (lowest point) of the valley lies below 500 feet elevation in Winnebago and Ogle counties and below 450 feet in northeastern Lee County. A tributary valley to the Rock (also with a thalweg elevation below 500 feet) trends west to east from north-central Ogle County, through Byron, to its confluence with the Rock Valley just north of Davis Junction. The Rock Bedrock Valley and this tributary are entrenched 200 to 300 feet below the bedrock uplands. Drift thickness increases in the Rock Bedrock Valley from about 250 feet in southern Winnebago County (Berg, Kempton, and Stecyk, 1984) to 300-450 feet in eastern Ogle and northeastern Lee Counties (Piskin and Bergstrom, 1975).

The bedrock surface of the RRAW in northern Lee County is irregular. It is dissected by small channels generally trending north-south toward the Rock Bedrock Valley and the Green River Lowland. Bedrock surface elevations decrease from about 750 feet near the Ogle-Lee County line to near 500 feet south of Sterling and Dixon. Drift thickness in upland areas of Ogle County, northwestern Lee County, and southern Winnebago County is generally less than 50 feet (and often less than 25 feet) and bedrock outcrops are common. The southern and eastern portions of the RRAW of Lee County, however, commonly have over 50 feet of drift overlying bedrock (Piskin and Bergstrom, 1975).

Bedrock Geology

Underlying the entire RRAW is Precambrian granite at depths greater than 2500 feet below land surface (Berg, Kempton, and Stecyk, 1984). Overlying the granite are Cambrian (approximately 500-515 million years old) and Ordovician (approximately 440-490 million years old) marine sediments. Variabilities in the mapped distribution of the uppermost bedrock units are due to regional faulting erosion associated with development of the pre-glacial bedrock valleys and glacial/post-glacial erosion as discussed above.

Two major fault zones cross the RRAW. The Plum River Fault Zone (Kolata and Buschbach, 1976) trends west-east from Carroll County into northwestern Ogle County. (The eastern-most extent is about three miles northeast of Leaf River.) Kolata and Buschbach (1976) report that the Plum River Fault Zone is generally less than one-half mile wide, with rocks downthrown 100-400 feet on the north.



bedrock valleys of Illinois

Note: Bedrock topography is shown as 50-foot contours of elevation above mean sea level. Boundary of the Rock River Resource Rich Area is shown superimposed upon the bedrock surface.

Figure 3. Bedrock Topography of the Rock River Assessment Watersheds: Lee, Ogle, Winnebago Counties, IL.

The uppermost bedrock units north of the fault zone are the Maquoketa Group (youngest Ordovician rocks consisting mostly of shale) and Silurian dolomites. South of the fault zone, in the upthrown block of the fault, the uppermost bedrock units are Ordovician Galena-Platteville Dolomite and St. Peter Sandstone of mid-to-late Ordovician age.

The Sandwich Fault Zone (Kolata, Buschbach, and Treworgy, 1978) extends southeasterly from near Oregon in Ogle County to near Manhattan in Will County. Kolata, Buschbach and Treworgy (1978) report that the Sandwich Fault Zone is about one-half to two miles wide and is upthrown on the southwest side as much as 800 feet. The uppermost bedrock units northeast of the fault zone are Galena-Platteville Dolomite and St. Peter Sandstone. South of the fault zone, the uppermost bedrock units are the Prairie du Chien Group (mainly cherty limestone of early Ordovician age) and Cambrian rocks of various lithologies.

The regional nature and extent of fracturing associated with these fault zones is poorly known. There is no evidence that these faults have been active within the last 1-2 million years. Glacial deposits are not displaced.

Erosion associated with the development of the Rock Bedrock Valley and Rock River also affects variabilities in the mapped distribution of uppermost bedrock units within the RRAW. St. Peter Sandstone underlies thick glacial deposits throughout the extent of the deeply cut Rock Bedrock Valley system and is the uppermost bedrock along the course of the modern Rock River from near Byron to near Dixon (Willman and others, 1967). St. Peter Sandstone can be 300-500 feet thick in the RRAW (Berg, Kempton, and Stecyk, 1984 and Kolata, Buschbach, and Treworgy, 1978). It is a friable quartz sandstone with moderate to high porosity and permeability. Dolomites of the Galena-Platteville Group (Willman and Kolata, 1976) are the most widespread surficial bedrock deposits of the region. They contain significant solution channel and joint porosity, and are interrupted by K-bentonite beds (ancient volcanic ash falls) that are significant barriers to vertical fluid movement.

Because of the faulting and erosion, numerous exposures of Ordovician and Cambrian bedrock occur throughout the RRAW (Mankowski, 1995). Ordovician-age Galena-Platteville Dolomite is exposed in several quarries and at White Pines State Park, while St. Peter Sandstone is exposed along the Rock River between Oregon and Grand Detour, and New Richmond Sandstone is exposed along Franklin Creek in Lee County. Cambrian-age Potosi Dolomite is quarried in Ogle and Lee counties, but the underlying Franconia Formation is exposed in Illinois at only one locality, one-half mile east of Oregon, in Ogle County. This outcrop of Franconia is the oldest formation exposed in Illinois.

The bedrock units at the RRAW have considerable economic importance as sources of groundwater and aggregate materials for construction. Mt. Simon and Ironton-Galesville Sandstones of the Cambrian age and the St. Peter Sandstone and Galena-Platteville Dolomite of the Ordovician age are productive aquifers throughout the region. Dolomite units are quarried in many locations for aggregate and the St. Peter Sandstone is mined near Oregon to produce a wide range of industrial sand products.

Quaternary Geology

Glacial drift and post-glacial sediments overlie bedrock throughout most of the RRAW. The oldest deposits are found in the lowermost portions of the Rock Bedrock Valley and its tributaries. The youngest deposits are wind-blown silt and modern river sediments on the land surface (Figure 4).

Where the Rock River is coincident with the Rock Bedrock Valley in Winnebago County, thick deposits (often greater than 100 feet) of pre-Illinoian, Illinoian, Wisconsinan, and Holocene (Modern) sand and gravel are interspersed with thin (less than 20 feet thick) beds of fine-grained lake sediments (Berg, Kempton, and Stecyk, 1984). The sand and gravel layers represent several episodes of deposition by glacial meltwater streams, whereas the lake sediments suggest deposition in quiet-water lakes during numerous episodes of blockage of the Rock Bedrock Valley and construction of moraines by glacial ice. In Ogle and Lee Counties, the Rock Bedrock Valley is filled with approximately 100 feet of sand and gravel overlain by about 300 feet of tills (diamictons) that consist of unnamed pre-Illinoian units at the base, the Glasford Formation of Illinoian age, and the Tiskilwa Formation of Wisconsinan age (Follmer, Berg, and Acker, 1978) (Figure 5). Diamicton is a mixture of sand, silt, and clay deposited as till or supraglacial and ice-marginal sediment. The sand and grav-el deposits in the Rock Bedrock Valley system provide ample groundwater supplies for municipalities and private residences.

The bedrock upland areas of the RRAW are mostly characterized by relatively thin drift deposited during the Illinois Episode (Willman and Frye, 1970, Lineback, 1979, Berg, Kempton, and Stecyk, 1984, and Berg et al., 1985). The sandy Argyle and Nimtz Members occur in central Winnebago County. The sandy Oregon Member covers south-central and southwestern Winnebago County, north-central Ogle County, and restricted areas in northwestern Lee County/southwestern Ogle County and north-central Lee County. The sandy Fairdale and Ogle Members are the surface units in western Ogle County. The clay-loam Esmond, Sterling, and Lee Center Members are the most widespread surficial units in the RRAW, occurring throughout south-central and eastern

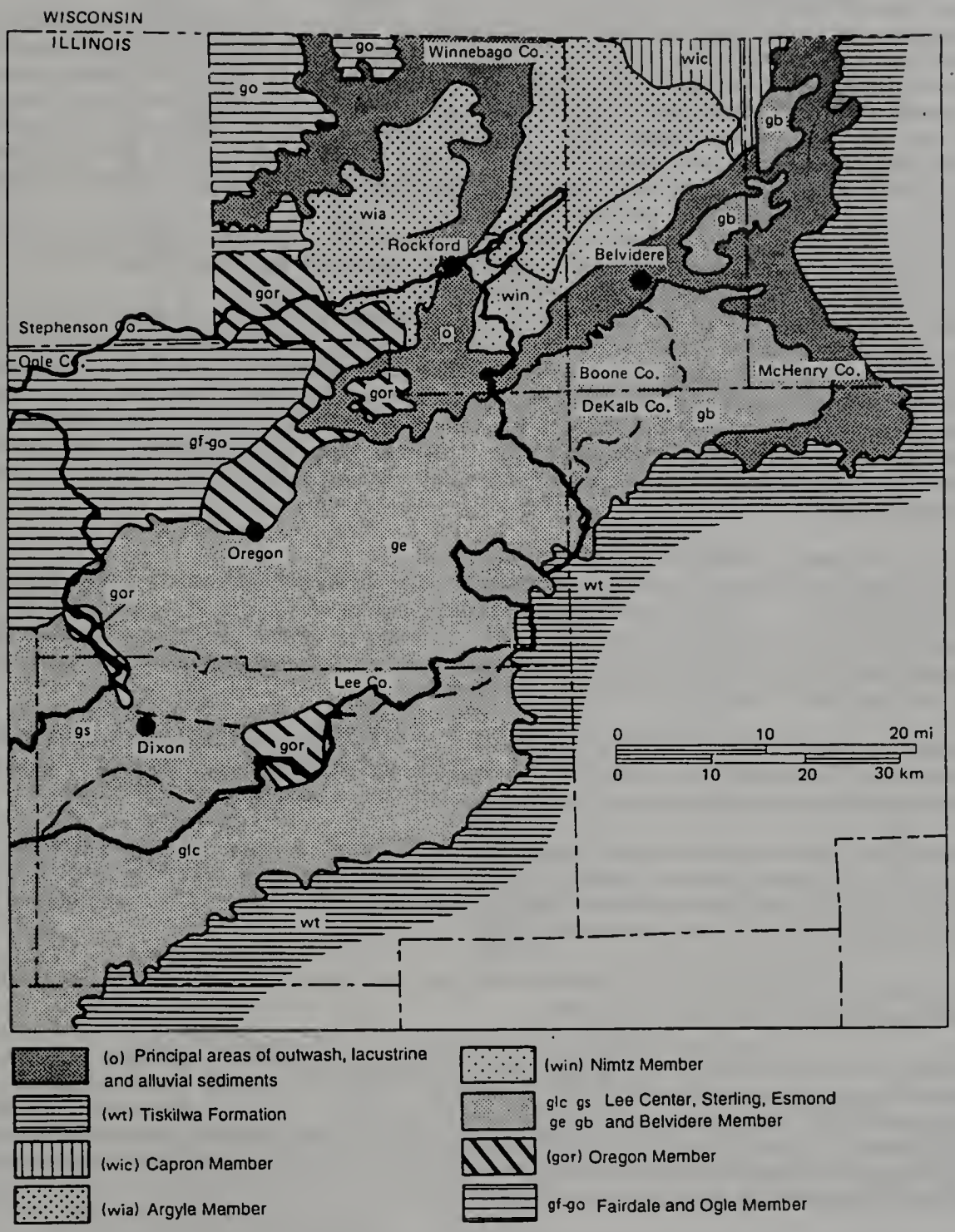


Figure 4. Quaternary Geology of the Rock River Assessment Watersheds: Lee, Ogle, Winnebago Counties, IL. (after Berg et al. 1985)

Ogle County, southeastern Winnebago County, and Lee County.

The thickest unit in the RRAW occurs in extreme southeastern Ogle County and eastern Lee County where the Wisconsin Episode glacier formed the Bloomington Moraine. This moraine cons-ists of more than 100 feet of loam-textured, reddish-brown till of the Tiskilwa Formation.

Throughout the RRAW, the glacial sediments and bedrock are overlain predominantly by fine-grained silts and clays deposited in glacial lakes (Equality Formation), modern river sediments (Cahokia Alluvium), and wind-blown deposits (primarily Peoria Silt and Parkland Sand). The Equality Formation occurs in numerous areas adjacent to the Rock River (Lineback, 1979) where glacial meltwater backed up from the Rock River and flooded into tributaries, creating temporary lakes. The largest areas are east of Byron, southeast of Oregon, and south of Grand Detour. An extensive area of Equality Formation deposits occurs in front of the Bloomington Moraine in southeastern Ogle County and eastern Lee County. Here, the sediment was deposited in lakes formed by the blocking of stream courses by glacial ice.

Cahokia Alluvium, generally consisting of poorly sorted sand, silt, and clay, is prevalent along the entire course of the Rock River and its tributaries (Lineback, 1979). Sometimes referred to as modern alluvium, it has been deposited by modern (post-glacial) river and flooding processes.

Finally, windblown silt (loess) can be as much as 10 feet thick in the western portion of the RRAW and is usually greater than 5 feet thick (Lineback, 1979). Eastern Ogle County is characterized by loamy wind-blown dunes comprised of Parkland Sand (Follmer, Berg, and Acker, 1978). Between 22,000 and 13,000 years ago, sand and silt, exposed in the Rock River valley during periods of low flow, were blown out of the valley and deposited across the landscape, locally producing large areas of eolian loam dunes more than 5 feet thick.

Loess, diamicton, and bedrock are the principal parent materials from which modern soils of the RRAW are developed. Modern soils began developing on the surface as the climate warmed following deglaciation and as loess deposition ceased.

Importance of Geology within the Rock River Assessment Area

The primary objective of *Conservation 2000* is to "protect Illinois' natural resources and develop quality outdoor recreation opportunities". Geology is an integral part of this objective at the RRAW. Unique geological formations and the surface and subsurface distribution of geologic materials provide both exceptional recreational and educational opportunities, and the foundation for unique habitats that contain valuable biotic resources. Following is a list of geologically significant features of the RRAW:

- Bedrock exposures of numerous formations at the RRAW provide unique educational opportunities for studying Earth history. For example, the oldest rocks in Illinois (Cambrian) are exposed at the RRAW. In addition, bedrock exposures provide numerous opportunities for scenic overlooks and path/trail development.

- Plentiful groundwater resources in bedrock are found at the RRAW. Because St. Peter Sandstone and Galena-Platteville Dolomite are exposed at the RRAW, rainfall and snowmelt directly recharge these aquifers. St. Peter Sandstone is one of Illinois' most productive aquifers. It is essential that measures be established to protect critical recharge areas for these regional aquifer systems.

- Two major fault systems (Plum River and Sandwich), that cross the RRAW, reveal information on the early tectonic history and crustal instability of Illinois.

- Sand and gravel deposits that filled the Rock Bedrock Valley are major aquifers in the region, sustaining base stream flow during drought and determining the location and viability of wetlands. The Rock Bedrock Valley system of the RRAW is a portion of a vast drainage network in Illinois cut by pre-glacial rivers, and then by glacial meltwater. Thick deposits of sand and gravel interspersed by thin deposits of silt and clay in the northern portion of the Rock Bedrock Valley and thick diamictons in the southern portion of the valley reveal a unique and complex history of multiple glaciations in north-central Illinois.

- The distribution of tills, glacial lake sediments, wind-blown sediments, and modern river alluvium on the surface document glacial and post-glacial processes that shaped the present-day configuration of the RRAW landscape.

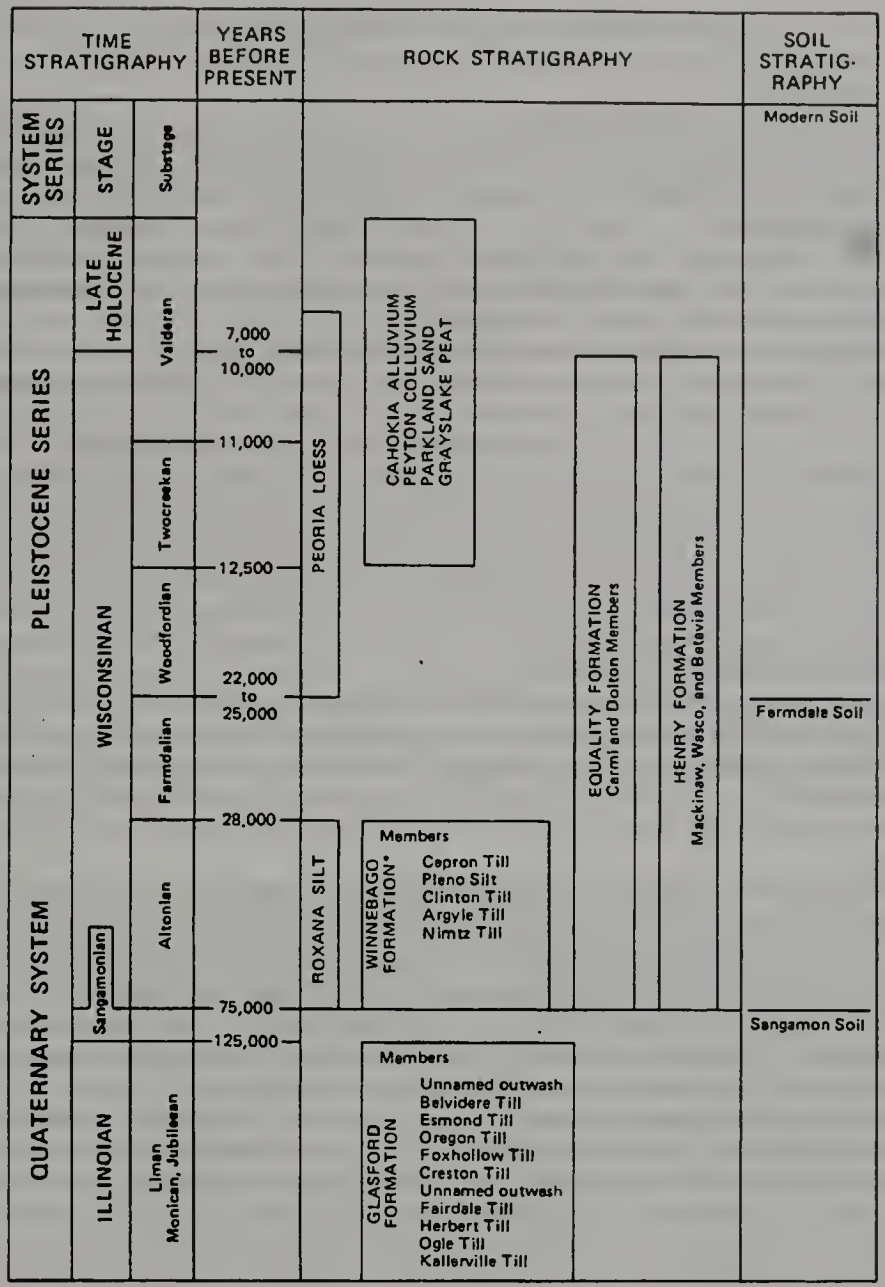


Figure 5. Stratigraphic classification of Quaternary deposits in the Rock River Watersheds.

• Geologic deposits provide the parent materials from which soils of the RRAW are developed. To a large degree, the distribution of the natural flora at the RRAW depends upon, and can be predicted by, variabilities in geologic materials. Crop productivity and the potential to grow plants are equally dependent on the distribution of soils and their hydrologic characteristics.

• Finally, geologic deposits provide direct habitat for fauna. For example, burrowing and subsurface dwelling insects and mammals and rock-nesting birds rely on specific geologic materials and/or settings. Bottom-dwelling aquatic life is dependent on specific substrate conditions dictated by the geologic environment. Groundwater seeps and springs provide local habitats often with unique temperatures and water chemistry. When the geology, topography, and groundwater hydrology are fully mapped and understood, areas where critical habitats for rare and endangered species are likely to occur can be predicted and possible impacts of proposed management practices can be determined.

GEOMORPHOLOGY AND SOIL DEVELOPMENT

Factors of Soil Development

Development of the Modern Soils (hereafter referred to as "soil") within the Rock River Assessment Area (RRAW) has been strongly influenced by variations in topography, geology, and biology that have created habitats conducive to the development and survival of various natural communities. Topographic control of drainage, erosional, and depositional processes are important in the long-term development of the landscape. Differences in the frequency, rate, and magnitude of surficial geologic processes have created many combinations of the angle, length, and orientation of slopes that now influence local drainage and erosion/sedimentation processes. These factors have direct impacts on local natural communities.

The geologic materials in which soils have developed vary considerably in their distribution across the landscape and their physical and chemical characteristics. The Rock River divides the distribution of the soils as mapped by the USDA Natural Resources Conservation Service. West of the Rock River, the soils are developed in loess or loess over an older buried soil (Sangamon Soil) on uplands, whereas east of the river, the soils have developed in loess, diamicton (till), and outwash on upland and upland depressions (Acker et al., 1980). Loess, the principal parent material, covers the majority of the Rock River area to a thickness of 3-10 feet, generally thinning to the east. It overlies glacial till and outwash east of the Rock River, and the buried Sangamon Soil, developed in glacial sediments west of the Rock River. In other areas the loess overlies sandstone and limestone bedrock and bedrock residuum. Other soils have developed in thinner sandy, loamy, and silty materials over bedrock, in glacial lake deposits, bedrock residuum, or wind-blown deposits in both upland and lowland positions or along floodplains in alluvium or outwash.

In many of these combinations, the materials differ sufficiently in their permeability, erodibility, and physical and chemical characteristics to create an erosion hazard. These differences also assist the development of local habitats by creating varying water table elevations, differential erosion and sedimentation patterns, and variable water chemistry.

Soil Classification

The soils within the RRAW are classified predominantly into two soil orders — Alfisols and Mollisols, with scattered occurrences of Entisols and Histosols. In general, Alfisols have developed under forest vegetation, whereas Mollisols have developed under natural prairie or marsh vegetation. The Entisols and Histosols occupy very small acreages in the area, but are still significant because they help create niche communities where exceptionally sandy sediments (Entisols) or materials with high organic content (Histosols) are present. Very poorly and poorly drained Mollisols are common along drainages and floodplains and may also play an important role in the development and maintenance of localized, wet communities.

In general, soils classified within the same soil associations will behave in a similar fashion and can be managed as a single unit for general planning purposes. Differences in drainage are often the reason for differences in soil characteristics on a local scale. Soil maps in the county soil survey reports are valuable sources of information regarding local conditions, and tabulated information within the reports summarizes for each soil series the capabilities and limitations for various land uses, as well as their physical and chemical characteristics.

Because of their topographic position, lowland wet areas are commonly locations for accelerated deposition of sediment eroded from upland areas that have been or are currently in cultivation or transition from undisturbed natural vegetation. The load of sediment can accumulate quickly enough to bury part of the modern soil. This may be observed in the vertical soil profiles exposed along stream courses where a darkened former soil horizon is overlain by recently-deposited, lighter-colored sediments. Where present, this provides evidence of accelerated erosion processes related to human activity and constitutes an environmental indicator of current and potential problems within the drainage system.

Potential Erosion Hazards

Approximately 25% of the soils within the RRAW are classified as moderately eroded. The majority of these soils are located on slopes ranging from 5 to 15%, commonly near and along stream channels and along the Rock River. In the vast majority of these erodible soils, the uppermost parent material is loess, overlying limestone or dolomite bedrock, or other less permeable geologic materials such as fine-textured diamictons. Loessial silt is particularly susceptible to erosion by running water because of its low shear resistance, low cohesion, and ease of transport once detached and entrained in flowing water or wind. The high erodibility of loess is further complicated by its tendency for subsurface piping. Piping occurs when surface water penetrates the subsurface and flows along macropores such as channels formerly occupied by roots or other natural fractures in the ground. These linear "pipes" may enlarge as silt is transported through them and ultimately collapse, caus-

ing the ground surface to subside. Small surface drainage channels form in the collapse areas and enhance erosion as they begin to.collect and transport sediment and water and become integrated into the local drainage system.

Sloping, forested areas are especially susceptible to piping and to hillside gully formation, even when the ground surface has not been disturbed by deforestation or cultivation. Once initiated, small rills and gullies can quickly enlarge and migrate headward, extending the drainage network and directing increased water and sediment into the existing drainage system. This increased water and sediment discharge can initiate streambank erosion and streambed changes that are detrimental to in-channel biologic communities. Lowland areas may be inundated with sediment that degrades fish and wildlife food supplies and fills stream channels, decreasing stream capacity to transport water and increasing the frequency of flooding. Lower gradient and sluggish pool sections of a stream are especially prone to damage from sedimentation. Pesticides and other agricultural chemicals adsorbed on the sediment particles may be deposited in pools.

Limitations and Capabilities of Soils in the Rock River Area

The majority of the RRAW lies within Ogle County, a region typified by relatively flat to somewhat rolling terrain, with the majority of the relief formed by incision by rivers and streams. The streams in the area have moderate gradients and incision into the underlying silt and glacial materials is widespread. Surface drainage is well developed as evidenced by the absence of wide interfluves. Areas not presently drained by perennial streams are generally drained by an extensive network of ephemeral gullies, a fact that should be considered when land disturbance activities are planned.

For general purposes, the soils within each soil association exhibit similar capabilities and limitations with respect to land use. For example, an association may be characterized as having a high water table and surface flooding, which are major limiting factors to human development of the land (i.e., the use of septic systems and the potential damage to structures, trails, and roads). That same area, however, may be ideal for certain wildlife and vegetation communities because of the seasonal flooding. More specific site characterization is necessary when multiple-use planning is employed because of the occasional conflicting requirements of various land uses.

There are few completely natural areas remaining within the RRAW relative to the total area. Much of the land away from the Rock River is currently in cultivation or other human-related land use. Between Oregon and Grand Detour and along adjacent tributary drainages, however, a number of significant biological communities occur (Mankowski, 1995). Most are located along tributary drainages that feed directly into the Rock River and many are found in the lower segments of the drainage basin. This positions them in areas that may be susceptible to disturbance from sedimentation resulting from erosion farther upstream in cultivated or other disturbed areas. Depending on the community, changes in erosion and sedimentation rates triggered by upstream activities could significantly affect biologic functions. The close, dynamic interaction between topography, geology, and biology has created specialized conditions that have assisted in the development of desirable biological communities and will continue to do so. Human interactions can potentially affect the frequency, magnitude, and patterns of disturbance.

MINERAL RESOURCES OF OGLE COUNTY AND SURROUNDING AREAS

Construction sand and gravel: surficial sand and gravel deposits

Sand and gravel deposits of this area have played an essential role in the economic development of the area, providing (along with crushed stone) the aggregate products necessary for highway and bridge development and residential, commercial, and industrial construction. Local aggregate production provides jobs and helps hold down the cost of construction because the delivered price of aggregates doubles within the first 50 miles of transportation away from the source (S.B. Bhagwat, ISGS, personal communication). Within this area are finite deposits that contain sand and gravel resources important to the maintenance and improvement of the existing infrastructure. The area has the potential for economic growth, but it also contains many unique scenic, ecological, and historic sites that may be slated for preservation. Significant sand and gravel deposits may underlie some of these sites, so it is important to know the locations of the aggregate resource deposits in order to examine potentially conflicting land uses. Many major sand and gravel deposits are already lost as far as aggregate resources are concerned, because they are located at sites where various other types of development are already in place. Some unique sites have been already been preserved in the area for their scenic rock formations and other features, such as Castle Rock State Park where the Rock River has cut cliffs into Saint Peter Sandstone. A quarry in St. Peter sandstone just north of the park and west of Oregon is an important source of industrial sand (described below).

The potential importance of a sand and gravel deposit as an aggregate resource depends on such factors as: (1) the thickness and extent of the deposit, (2) the thickness and variability of the overburden, (3) the particle-size distribution and rock types (quality of material) in the deposit, (4) accessibility of the deposit to heavy-duty roads or railroads, and (5) distance of the deposit from the point of use.

Most sand and gravel deposits in Ogle County and vicinity formed roughly between 200,000 and 20,000 years ago during periods of continental glaciation when immense lobes of ice flowed out of Canada into the northern U.S., including Illinois, carrying enormous amounts of rock debris (Anderson, 1967; Hunter and Kempton, 1967; Masters, 1984). Large volumes of sand and gravel, collectively known as outwash, were deposited by meltwater draining away from these glaciers. Relatively wide-spread, well-sorted upland deposits are called outwash plains or fans; similar deposits that tend to be lower in the landscape and partially fill long meltwater channels are called valley trains, and erosional remnants of valley trains are called terraces. Ice contact deposits, occurring in the form of hills (kames) and ridges (eskers) are less extensive than the above, generally poorly sorted and highly variable deposits. During deposition of the outwash strong winds often blew fine-grain material off the surfaces of the deposits, causing sand to accumulate into dunes.

The shaded areas on Figure 6 (after Berg and Kempton, 1988) encompass a broad spectrum of sand and gravel deposits (Anderson, 1967; Lineback, 1979; Masters, 1984). Portions of these deposits have excellent potential for containing aggregate resources. However the location of those areas is often not well known because the drilling and testing required to determine what deposits are economically minable are too expensive unless a company is considering purchasing or leasing a property for a future mining site or expansion of an existing one. Locations of pits active in 1994 and 1995 are shown with black spots (Figure 6). The number next to each spot is the pit number in the respective county. pit numbers identify pits on the enclosed table of pit locations and other information from Samson et al., this report (Table 3).

Rock River Valley

In the Rock River Valley, valley train deposits are present almost continuously in four of five different terrace levels (Anderson, 1967). The upper and lower terraces contain the most important sand and gravel resources in the area, especially south of Rockford in the vicinity of Pit 7 (Figure 6), where they are the coarsest and thickest. They gradually become finer-grained downstream, but the upper terrace usually contains coarser material than the lower terrace at any point in the valley.

Downstream from the mouth of the Kishwaukee River, the valley of the Rock is much narrower, bedrock is much shallower, and terrace remnants are much smaller. Numerous pits have operated in the past between Byron and Sterling, but only one (number 22, Figure 6) is known to be active at this time. Downstream from Sterling, the valley becomes very broad, but no pits are known to be currently active in that area.

Leaf River Valley

Outwash in the Leaf River Valley is an important source of construction aggregate in northwestern Ogle County (Lineback, 1979) where three pits (numbers 2, 4, and 61, Figure 6) are known to be active.

Figure 6. Gravel and Sand Resources and Locations of Active Mining Pits in the Rock River Assessment Watersheds.

Other River Valleys

Terraces in the valleys of the Kishwaukee River contain finer-grained sand and gravel, and bedrock is shallower than in the Rock (Masters, 1984). However, pits in them are important sources of construction aggregate in the Belvidere area. Similar valley train deposits are present in the narrower valleys of the South Branch of the Kishwaukee River and Killbuck Creek (Bretz, 1923) that have good resource potential.

Upland Ice-Contact Deposits

A complex of kames, eskers, and kame terrace deposits forms rolling hills and ridges in southeastern Winnebago County (Masters, 1984) where two pits are known to be active (numbers 9 and 30, Figure 6). Other similar but smaller deposits are probably present in east-central and west-central Ogle County as shown on the enclosed map (Lineback 1979).

Kilbuck Creek Outwash Plain

A large outwash plain is located in the head waters of Kilbuck Creek (Bretz, 1923; Lineback, 1979). No sand and gravel pits are located in it and information is limited, but it has good potential for containing construction aggregate resources.

Table 3. Ogle County and vicinity sand and gravel producers, 1995 (Sampson, et al., this report).

OGLE COUNTY AND VICINITY SAND AND GRAVEL PRODUCERS IN 1995		
COUNTY	COMPANY	MINE LOCATION
CONSTRUCTION SAND AND GRAVEL PITS		
OGLE 141-00 2 REMARKS: ROCK UNITS:	CIVIL CONSTRUCTORS P.O. BOX 750 FREEPORT, IL 61032 sand and gravel (all classes) PEARL	FORRESTON-MCGRATH PIT 2.5 MI N FORRESTON LOCATION: SE 15 25N 8E (815) 235-2200
OGLE 141-00 4 REMARKS: ROCK UNITS:	FORRESTON CONSTRUCTION MATERIALS C/O BEE LINE 1738 SOUTHWEST FREEPORT, IL 61032 sand (all classes) PEARL	2.5 MI N FORRESTON LOCATION: SE 16 25N 8E
OGLE 141-022 REMARKS: ROCK UNITS:	ROGERS READY-MIX & MATERIALS, INC. P.O. BOX 25 BYRON, IL 61010 sand and gravel (all classes) HENRY-MACKINAW	ASCHELFORD N EDGE BYRON LOCATION: SW 29 25N 11E (815) 234-8044
OGLE 141-061 REMARKS: ROCK UNITS:	SHEELY AGGREGATES 8200 W. WHITE EAGLE FORRESTON, IL 61030 sand and gravel PEARL	4 MI E FORRESTON LOCATION: SW 24 25N 8E
WINNEBAGO 201-00 7 REMARKS: ROCK UNITS:	ROCKFORD SAND & GRAVEL CO. 5290 NIMTZ RD. LOVES PARK, IL 61111 sand and gravel (all classes) HENRY-MACKINAW	AIRPORT PIT SW EDGE ROCKFORD LOCATION: NW 22 43N 1E (815) 654-4700
WINNEBAGO 201-030 REMARKS: ROCK UNITS:	ROCKFORD SAND & GRAVEL CO. 5290 NIMTZ RD. LOVES PARK, IL 61111 sand and gravel (class B, C & D) GLASFORD OUTWASH	ROCKVIEW PIT 5 MI S ROCKFORD, BAXTER RD LOCATION: NW 31 43N 2E (815) 654-4700
WINNEBAGO 201-00 9 REMARKS: ROCK UNITS:	ROGERS MATERIALS SERVICES 5510 S. MULFORD ROAD ROCKFORD, IL 61109 sand (all classes) GLASFORD OUTWASH	DOCTOR'S PIT 5 MI SE ROCKFORD LOCATION: NE 22 43N 2E
INDUSTRIAL SAND MINES		
OGLE 141 REMARKS: ROCK UNITS:	UNIMIN CORP. ILLINOIS DIV. 4000 BAKER ROAD OTTAWA, IL 61350 (815) 434-4178 GLASS, FOUNDRY, ETC. ST. PETER	MANLEY-OREGON QY. WHITE PINES RD. 1 MI W OREGON, 61061-0156 LOCATION: 8 23N 10E (815) 732-2121

Alluvium

Included in the shaded areas of Figure 6 are relatively small and often poorly sorted sand and gravel deposits that occur in creek and river beds and their floodplains. Such deposits are known as alluvium and are the result of postglacial to modern erosional and depositional processes. Sand and gravel was excavated from creek and river beds in the area to a limited extent years ago (Anderson, 1967) mainly during periods of low water. Where these deposits overlie thick valley train deposits, such as just south of Rockford, they have good potential for containing construction aggregate resources.

Industrial Sand: Saint Peter Sandstone

A quarry in Saint Peter Sandstone, located near Oregon, is indicated by the quarry symbol on Figure 6. St. Peter is exposed in the vicinity of Oregon and Castle Rock State Park due to uplift of the bedrock along the Oregon anticline (Treworgy, 1981) and to weathering and erosion of the bedrock for much of the last 200 million years. The St. Peter is a very pure, well sorted, fine-grained quartz sandstone that was deposited near the shoreline of a shallow sea that covered much of central North America (Willman and Buschbach, 1975) about 470 million years ago (Palmer, 1983).

The St. Peter is a major U.S. source of industrial sand, because it is one of the purest quartz sandstones in the world. Processed St. Peter sand is shipped long distances, mainly for use in glass manufacturing. Other uses include molding sand, sand-blasting sand, railroad-traction sand, filtration sand, and proppant or hydrofrac sand. St. Peter sand is also ground for use in abrasives, chemicals, enamels, pottery, porcelain, tile, and various filler applications. The state of Illinois ranks first in the volume and value of industrial sand production among all states.

Crushed Stone Resources

Crushed stone for construction is an important mineral resource derived by quarrying bedrock in Ogle, Lee, and Winnebago Counties. Dolomite and limestone strata of the Ordovician Galena and Platteville Groups, which crop out or are close to the ground surface throughout much of this area, provide a convenient source of this material; most of these localities are concentrated along the Rock River and its tributaries. Twenty-five operating quarries currently produce aggregate and there are also numerous inactive pits present in the study area. The majority (19) of the active quarries mine carbonate rocks, primarily of the Galena Group, whereas five quarries mine carbonate rocks of the Platteville Group only and one quarries Oneota Dolomite. Nearly all of the aggregate produced at these sites is currently used within the study area, which is primarily rural. In the future, this pattern of production and use will most likely change because urban areas to the east will require new sources of aggregate as their local sources become exhausted. At least two quarries just east of the study area are presently being developed to supply this new market.

In addition to aggregate, cement is an important product derived from the Platteville Group carbonate rocks in the study area. A single large cement plant has been in operation at Dixon since the 19th century. Demand for this resource will probably increase.

Fossil Fuels

The Rock River study area is not underlain by rock of the Pennsylvanian system and is free of any coal resources. No oil or gas production has been reported in the past from the area.

LIVING RESOURCES

NATURAL COMMUNITIES INTRODUCTION

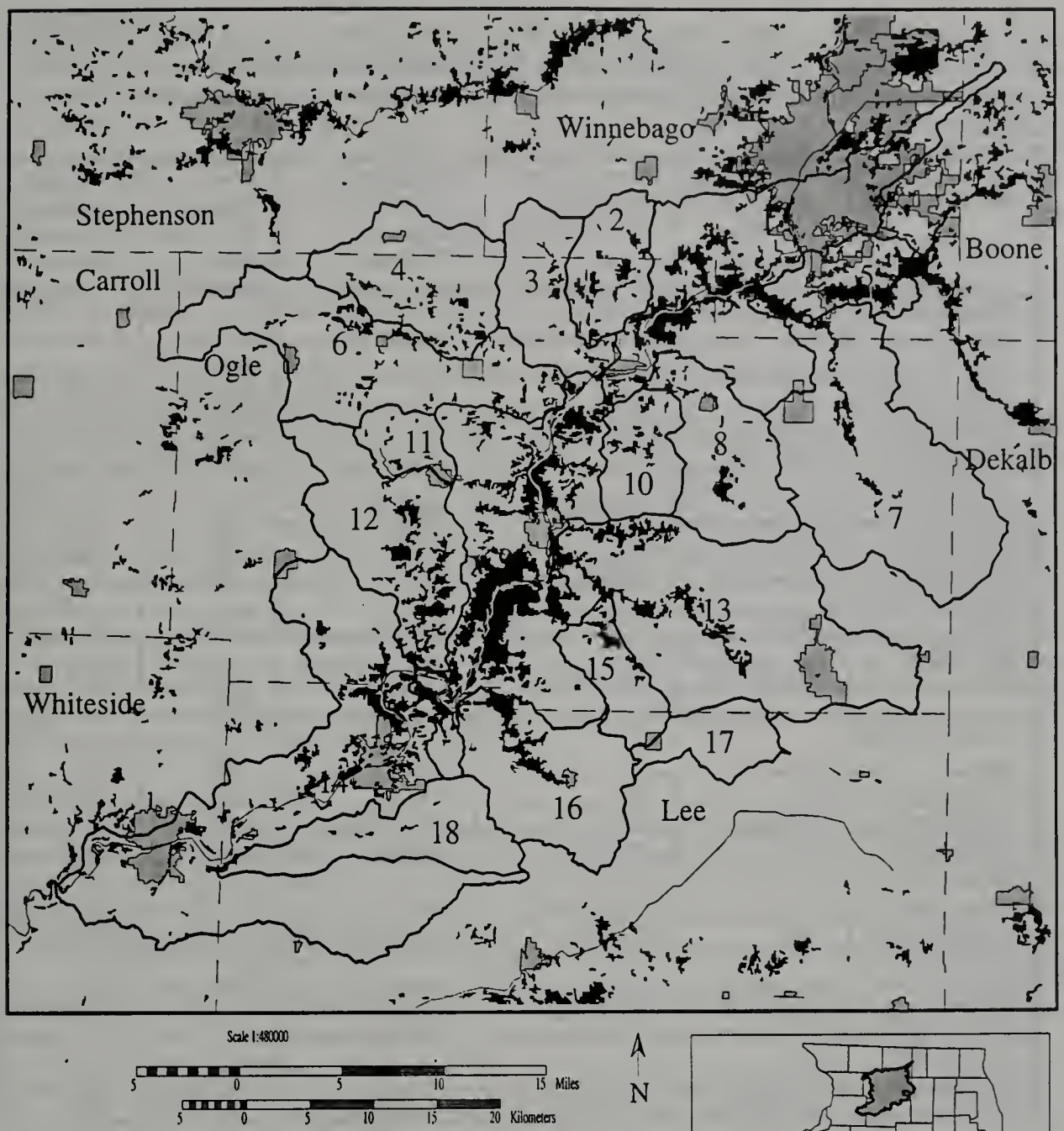
There is significant natural community and species diversity within the Rock River Assessment Watersheds (RRAW). Thirty-three sites within the RRAW are recognized as natural areas of state-wide significance by the Illinois Natural Areas Inventory (INAI; White, 1978). These 33 sites comprise less than 1% of the acreage of the RRAW, but contain examples of 18 (21.7%) of the 83 natural community types documented for the state by the INAI (see Table 9) (Illinois Natural Heritage Database, 1995). In addition, 6- and 10-mile sections of the Rock River and the Kishwaukee River, respectively, have been designated as Biologically Significant Illinois Streams, based on water quality and aquatic biodiversity (Page et al., 1992). The Illinois Environmental Protection Agency rated approximately 60 miles (37%) of the mainstem of the Rock River as "full support" (water quality meets the needs of all designated uses protected by applicable water quality standards) (Illinois Environmental Protection Agency, 1994). Thirty-three miles (55%) of this "full support" portion of the Rock River lie within the RRAW.

The Land Cover Database of Illinois (Illinois Department of Natural Resources, Critical Trends Assessment Project [IDNR {CTAP}], 1995) documents the following current land uses within the RRAW: 60.62% agriculture (row crops, small grains, and orchards); 22.89% grassland (grassland, pastureland, prairie, rights-of-way, and strip mine reclamations); 7.89% upland forest (deciduous and coniferous); 5.84% urban (developed, barren, lawns); 1.48% water, 0.83% bottomland forest (floodplain and swamps); and 0.44% wetland (lacustrine and palustrine) (see Table 1). Forest cover is illustrated in Figure 7. Recent satellite data (Luman, 1995) suggest similar trends for the larger, Rock River area.

Approximately 38% of Illinois' native vascular flora and 43% of those species that have become naturalized are present in this 999 -mi^2 area that represents about 1.8% of the land area of the state. Appendix A lists plant species cited within this present report. The native species include 37 (10%) of the state's listed (threatened and endangered) plant species (see Table 11) (Illinois Natural Heritage Database, 1995).

There are 122 native breeding bird species documented for the area, which constitutes 41% of those known for the state (see Table 12). Of the 42 state endangered and threatened bird species, 8 (19%) are known to breed in the area (see Table 17; Illinois Natural Heritage Database, 1995). The area supports the richest community of breeding forest birds (85 species) in the state (Robinson, 1995). The RRAW is known for 35 (35%) of the 101 species of herpetofauna found in the state, including 2 state threatened and 1 federal candidate/state watch list species (see Tables 13 and 7; Illinois Natural Heritage Database, 1995). The 13 amphibian and 22 reptile species reported for the area represent all of the amphibian and 91% of the reptile species with a current or pre-European settlement range for the area (Smith, 1961; Phillips, this report). There are 39 native species of mammals documented for the area within the last 10 years (see Table 15; Hoffmeister, 1989; Heske, this report). This represents 66% of the species known for the state including 1 (11%) of those considered threatened or endangered (Illinois Natural Heritage Database, 1995). The streams of the RRAW are known to support 78 native freshwater fish species (see Table 31), 33 native mussel species (see Table 32), and 10 native crustacean species (see Table 33; Page et al., 1992; Page et al., this report). Statewide, these numbers represent 41% of the fish species known, including 3 (10%) of the state listed species, and 42% of the mussel species known, including 5 (20%) of the state listed species, and 25% of the crayfish species. Of the special status mussel species, one is also federally listed, and an additional species is a federal candidate species (see Tables 7 and 32; Illinois Natural Heritage Database, 1995). Aquatic insects for the area include 29 mayfly species and 29 caddisfly species (Table 34). Appendix A list all species cited within this report.

A breakdown of several natural community features (public land, Illinois Natural Areas Inventory acreage, Illinois Nature Preserve acreage, and Biologically Significant Illinois Stream miles) by basin is listed in Table 4. Locations of these features within the RRAW are illustrated in the following figures: Illinois Department of Natural Resources owned public land (see Figure 25), Illinois Natural Areas Inventory sites (see Figure 12), Illinois Nature Preserves (see Figure 13), and Biologically Significant Stream segments (see Figure 22).



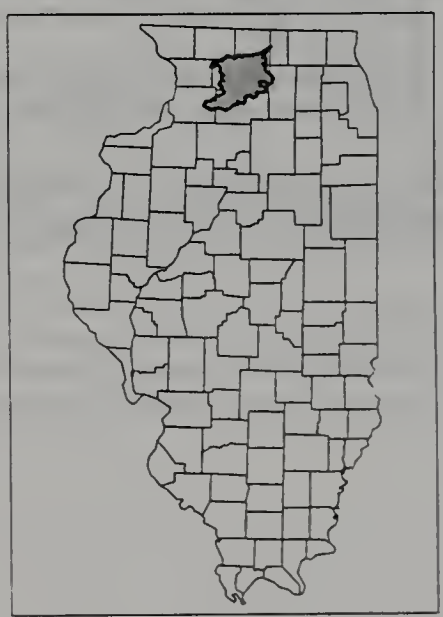


Figure 7. Forest cover classification for the Rock River Assessment Watersheds (IDNR [CTAP], 1995). Table 1 lists land cover statistics for each basin.

Table 4. Public land, Illinois Natural Areas, Illinois Nature Preserves, and Biologically Significant Illinois Stream segments within the Rock River Assessment Watersheds. *Sources*: Page et al., 1992; Illinois Department of Conservation, 1994; respective county plat books; Illinois Natural Heritage Database, 1995.

Basin #/Name	IDNR Owned Public Land Ac./% Basin Area	Other Agencies* Public Land Ac./% Basin Area	Illinois Natural Areas Inventory Sites #/Acreage	Illinois Nature Preserves #/Ac. (Buffer)	Biologically Significant IL Streams Miles
1. Rock River North	0/0	1,179/1.95%	3/158.72	2/137.5 (43.3)	0
2. Middle Creek	0/0	0/0	0/0	0/0	0
3. Mill Creek	0/0	0/0	0/0	0/0	0
4. Mud Creek	0/0	0/0	1/3.18	0/0	0
5. Kishwaukee River South	0/0	1,447/10.00%	2/676.36	0/0	10.70
6. Leaf River	0/0	0/0	1/4.70	0/0	0
7. Kilbuck Creek	0/0	174/0.29%	2/5.13	0/0	0
8. Stillman Creek	0/0	0/0	2/14.84	2/13.7	0
9. Rock River Middle	4,398/6.77%	166/0.25%	11/3,282.97	1/685.6 (23.4)	6.80
10. Black Walnut Creek	0/0	0/0	0/0	0/0	0
11. Coon Creek	0/0	0/0	0/0	0/0	0
12. Pine Creek	385/1.10%	0/0	1/63.05	0/0	0
13. Kyte River	0/0	59/0.84%	1/55.37	1/59.0	0
14. Rock River South	0/0	832/0.82%	4/25.59	1/0.8	0
15. Prairie Creek	0/0	0/0	2/7.57	0/0	0
16. Franklin Creek	520/1.66%	0/0	2/1,716.17	1/96.0	0
17. Beach Creek	0/0	0/0	1/6.46	0/0	0
18. Three Mile Creek	0/0	0/0	0/0	0/0	0
Totals:	5,303/0.83%	3,857/0.60%	33/6,020.11	8/1,050	17.50

* Other agencies include Byron Forest Preserve District, Dixon Park District, Oregon Park District, Northern Illinois University, and Winnebago County Forest Preserve District.

Natural Divisions

The Natural Divisions of Illinois (Schwegman et al., 1973) combined the physiographic divisions of Leighton et al. (1948), vegetation mapping done by Vestal (1931), and herpetofaunal mapping done by Smith (1961), with distributional information about rare or restricted plant and animal associations, and in some cases entire natural communities, with respect to the physiography and topography of the state. The majority of the Rock River Assessment Watersheds (RRAW) lies within the Rock River Hill Country and the Grand Prairie Natural Divisions, and a small section of the northeast corner extends into the Northeastern Morainal Division (Figure 8). The following descriptions borrow heavily from a *Comprehensive Plan for the Illinois Nature Preserve System: The Natural Divisions of Illinois* (Schwegman et al., 1973).

The Rock River Hill Country Division is divided into two sections; Freeport and Oregon. *The Natural Divisions of Illinois* recognizes two distinct bedrock types within the Rock River Hill Country division, dolomite and limestone under the Freeport Section and sandstone under the Oregon Section. These different bedrocks have a significant effect on the resultant flora and natural communities of the two sections. The Oregon Section is distinguished by relict northern natural communities and specialized habitat types that harbor numerous state listed species.

The Grand Prairie Division occupies a large plain across the central and eastern part of the state, that was historically dominated by tall grass prairie. It is divided into five sections which are based on differences in soil, topography, and glacial history. A small portion of the RRAW lies within the Grand Prairie Section which is characterized by Wisconsinan drift and is defined by the Bloomington and Shelbeyville morainal systems to the west and south, respectively. The area of the RRAW that does fall in the Grand Prairie Section is not known for any significant natural features or communities presently. However, this area was dominated by mesic black-soil prairies and was dotted with marsh and prairie pothole communities prior to European settlement and the subsequent cultivation of the land. As is the case across most of the state, essentially none of this prairie remains.

The Northeastern Morainal Division is unique in that it is the region of most recent glaciation in the state and its soils are derived from glacial drift rather than loess. While glacial landforms and natural lakes are common within this division, the Winnebago Drift Section that is occupied by the RRAW is not known for these features. This section was dominated by prairie and is noted for extensive distribution of gravel hill prairies that occur along the eroded east bluffs of the Rock River.

Illinois Natural Areas Inventory

The Rock River Assessment Watersheds (RRAW) are host to a variety of natural communities and vegetation types, many of which are inherently dependent upon the features of a major river system. The distribution and extent of these natural communities has been altered significantly since European settlement. Many of the natural communities that remain were spared the conversion to cultivation due to uncompromising topography, unproductive soils, or preservation efforts on the part of the landowner.

The Illinois Natural Areas Inventory (INAI) (White, 1978) was conducted by the University of Illinois, the Natural Land Institute, and the Illinois Department of Conservation over a three-year period in the mid 1970's to document remaining examples of the natural communities of Illinois. Results from the Inventory indicated that, statewide, only 0.07% of Illinois' total land and water area remained in what the INAI described as "high quality, relatively undisturbed" condition at that time (White, 1978). The Inventory 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 Geologic 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. The natural quality of a community or area was graded from A (Relatively Stable or undisturbed) to D (Very early successional or severely disturbed). In general only A and B communities are designated as significant unless a community with a lower grading is one of the last (and consequently, the best) remaining examples of this community type in the state.

The INAI recognized 83 natural community types from 9 community classes for the state. The Inventory documented examples of 18 different natural community types, from 6 community classes, for the Rock River Assessment Watersheds (Table 5; INHD, 1995). Some of these represent the only or best remaining examples of a particular community type for the state. The features and associated vegetation of many of these communities make them unique within the state.

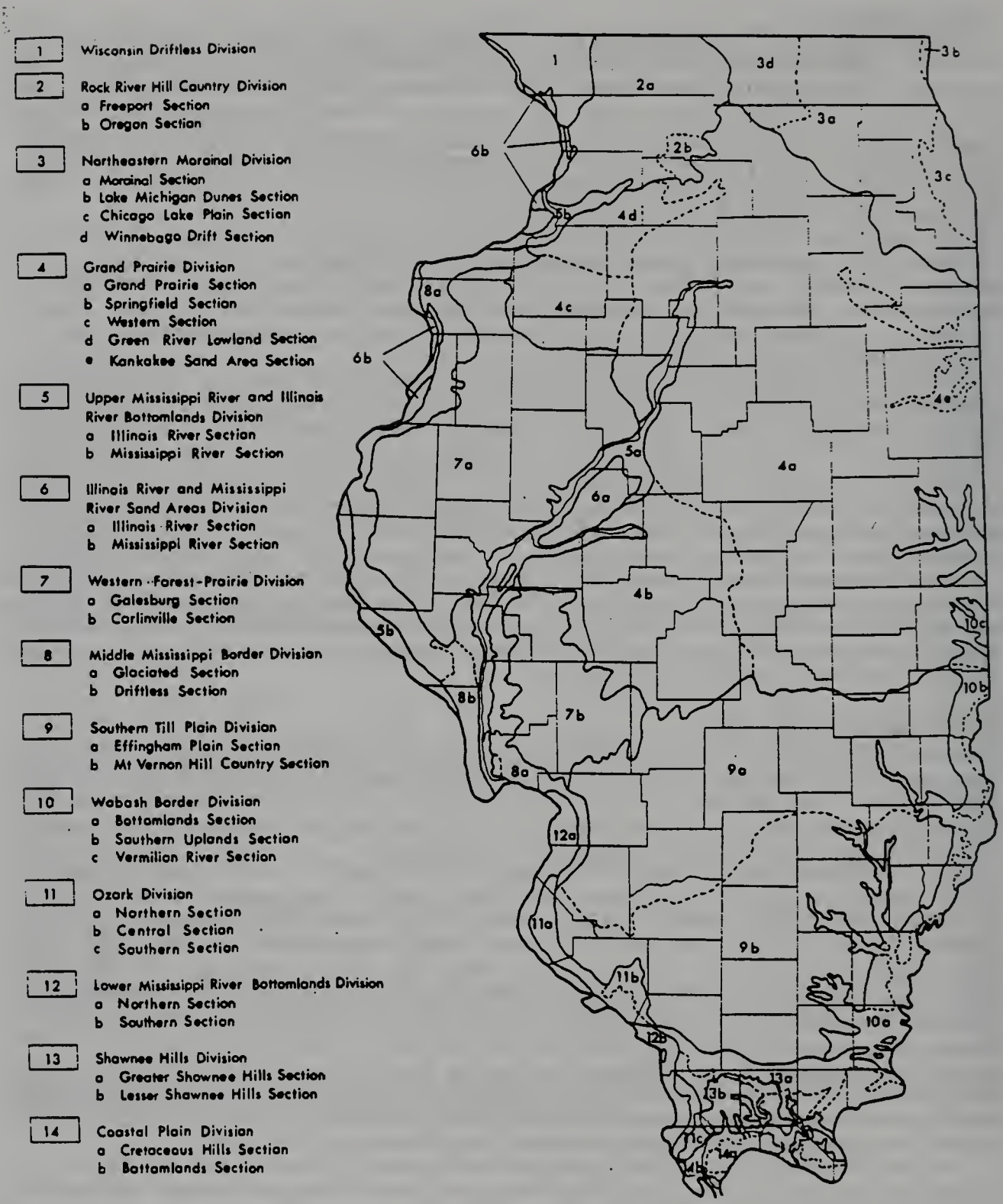
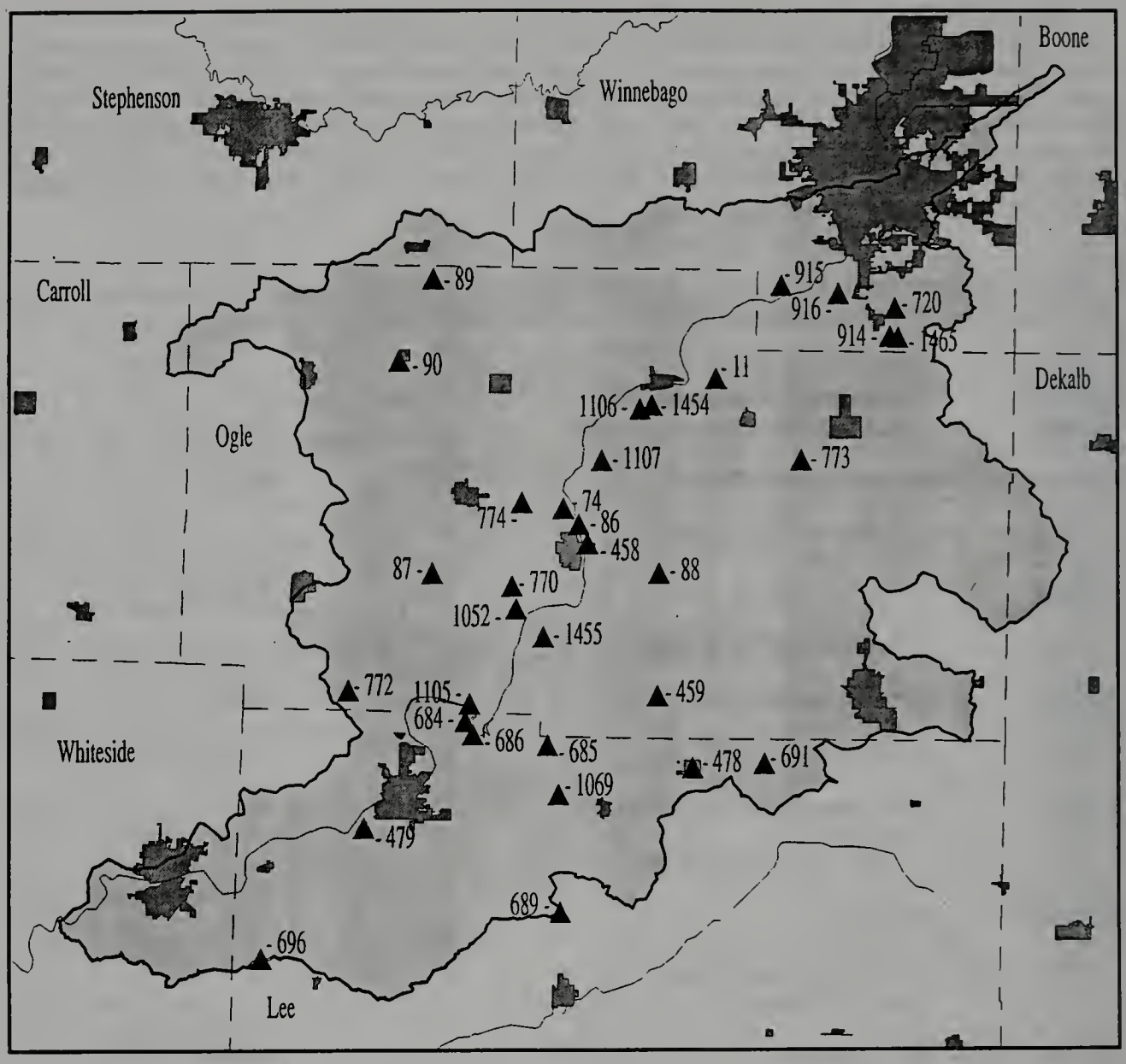


Figure 8. Natural Divisions of Illinois (after Schwegman, et al. 1973).

There are 33 Illinois Natural Area Inventory sites (Figure 9), totalling 2,437 hectares (6020.11 acres), located in the Rock River Assessment Watersheds (Tables 4 and 5; INHD, 1995)). INAI sites may have a variety of significant and exceptional features, may be included in more than one category, and may have more than one grade. All seven categories are represented in this Resource Rich Area and many are grade A and B quality. Many natural areas are found in association with the exposures of St. Peter's sandstone bedrock in the Oregon Section of the Rock River Hill Country Natural Division. The cliffs, bluffs, associated soils formed from the sandstone, some of the vegetation they support, and the river itself, are also features unique to this part of the state.

Table 5. Illinois Natural Areas Inventory sites within the Rock River Assessment Watersheds. ***Sources*****: White, 1978; Illinois Natural Heritage Database, 1995.**

INAI No/ County	Natural Area Name - Category: (# of occurrences) * (significant/exceptional features)	Acreage	Ownership
11/Ogle	**Douglas E. Wade Prairie** - Cat. I * (B dry-mesic gravel prairie)	11.84	Private
74/Ogle	**Stronghold Prairie** - Cat. I * (B glacial drift hill prairie)	0.40	Private
86/Ogle	**Lowden Memorial State Park** - Cat. I * (B dry-mesic upland forest)	21.68	Public
87/Ogle	**White Pines Forest State Park** - Cat. I(2), II, III * (B dry-mesic upland forest)	63.05	Public
88/Ogle	**Pine Rock** - Cat. I(2), II * (A sandstone cliff comm., wet-mesic prairie)	55.37	Public
89/Ogle	**Hereen Prairie** - Cat. I * (A dry dolomite prairie)	3.18	Private
90/Ogle	**Adeline Prairie** - Cat. I * (B dry gravel prairie	4.70	Private
458/Ogle	**Oregon Geological Area** - Cat. IV * (exposed Franconian, Potosi dolom.)	6.64	unknown
459/Ogle	**Prairie Star School Geolic. Area** - Cat. IV * (Potosi dolomite outcrop)	2.83	Private
478/Lee	**Ashton Geological Area** - Cat. IV * (exposed Oneota dolomite)	6.46	unknown



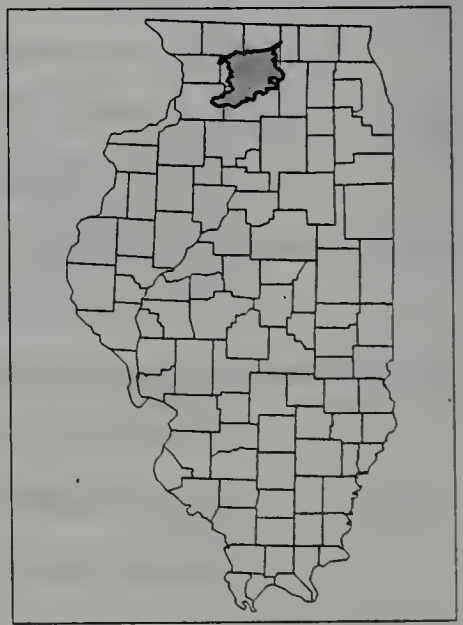


Figure 9. Illinois Natural Area Inventory Sites Within the Rock River Assessment Watersheds (White, 1978; Illinois Natural Heritage Database, 1995).

11. Douglas E. Wade Prairie
74. Stronghold Prairie
86. Lowden Memorial State Park
87. White Pines Forest State Park
88. Pine Rock
89. Hereen Prairie
90. Adeline Prairie
458 . Oregon Geological Area
459. Prairie Star School Geological Area
478. Ashton Geological Area
479. Dixon Southwest Geological Area
684. Rock River Yellow Birch Stand
685. Nachusa Grasslands
686.Grand Detour Yellow Birch Site
689. Temperance Hill Cemetery Prairie
691. Ashton East Geological Area
696. Walnut Railroad Prairie
720. Kishwaukee River
770. Fearer Tract at Castle Rock State Park
772. L & M Prairie
773. Beach Cemetery Prairie
774. Mt. Morris East Geological Area
914. Winquist Prairie
915. Silver Creek Prairie
916. Bell Bowl Prairie
1052. Castle Rock State Park
1069. Franklin Creek Natural Area
1105. Babson Hollow
1106. Byron Dragway Prairie
1107. Commonwealth Edison Prairie
1454. Jarret Prairie
1455. Lowden-Miller
1465. Rockview Stone Quarry

table 5 continued

479/Lee	**Dixon Southwest Geological Area** - Cat. IV * (exposed Champlainian series)	17.68	Private
684/Lee	**Rock River Yellow Birch Stand** - Cat. II * (A sandstone cliff comm., perenn. stream)	7.07	Private
685/Ogle/Lee	**Nachusa Grasslands** - Cat. I(2), II(11) * (A dry gravel prairie, A sandstone cliff comm., B marsh, B seep)	1,569.46	Publ/Priv
686/Lee	**Grand Detour Yellow Birch Site** - Cat. II * (B sandstone cliff comm., perenn. stream)	10.99	Private
689/Lee	**Temperance Hill Cemetery Prairie** - Cat. I * (B mesic prairie)	2.33	unknown
691/Lee	**Ashton East Geological Area** - Cat. IV * (exposed Franconia trace fossils)	10.00	Private
696/Lee	**Walnut Railroad Prairie** - Cat. I * (A & B dry prairie)	4.49	Private
720/Winn	***Kishwaukee River** - Cat. II, VII * (rivers and creeks of the Mississippi watershed)	655.16*	Publ/Priv
770/Ogle	**Fearer Tract at Castle Rock S.P.** - Cat. II(4), III * (A sandstone cliff comm., exposed St. Peter formation)	143.25	Private
772/Ogle	**L & M Prairie** - Cat. II	1.09	Private
773/Ogle	**Beach Cemetery Prairie** - Cat. I, II * (A & B dry-mesic prairie)	3.00	Private
774/Ogle	**Mt. Morris East Geological Area** - Cat. IV * (exposed of Mud Creek Fault)	10.00	Private
914/Winn.	**Winquist Prairie** - Cat. I * (B dry-mesic prairie)	1.86	Private
915/Winn.	**Silver Creek Prairie** - Cat. I * (dry-mesic prairie)	4.28	Private

table 5 continued

916/Winn.	**Bell Bowl Prairie** - Cat. I, II * (dry gravel prairie)	21.20	Public
1052/Ogle	**Castle Rock State Park** - Cat. I, II(7), IV * (A seep, B sandstone cliff community.)	638.97	Public
1068/Lee	**Franklin Creek Natural Area** - Cat. IV * (A sandstone cliff comm., perenn. stream)	146.71	Publ/Priv
1105/Lee	**Babson Hollow** - Cat. II	4.27	unknown
1106/Ogle	**Byron Dragway Prairie** - Cat. II(2) * (dry-mesic prairie)	15.44	Private
1107/Ogle	**Commonwealth Edison Prairie** - Cat. II * (dry prairie, dry-mesic prairie)	145.36	Private
1454/Ogle	**Jarrett Prairie** - Cat. II(2)	139.00	Public
1455/Ogle	**Lowden-Miller** - Cat. I(2), II(10), IV(2), VII(2) * (A sandstone cliff comm., B & C dry and dry-mesic upland forest, perenn. stream)	2294.34	Public
1465/Winn	**Rockview Stone Quarry** - Cat. II	3.27	unknown

* Natural Area boundary and acreage extends into another county (Boone) and beyond the Rock River Area Assessment Watersheds.
Categories: I - ecological areas; II - endangered sp. habitats; III - relict sp. habitat; IV - geological area; V - natural community restoration and endangered species relocation/reintroduction aeras; VI - unique natural areas; VII - aquatic areas (streams and rivers).

Illinois Nature Preserves

Illinois Nature Preserves are publicly or privately owned areas of land and/or water which have been formally dedicated to be maintained in their natural condition. The Illinois Nature Preserves System and the nine-member Illinois Nature Preserves Commission were established in 1963. The Illinois Natural Areas Preservation Act is the statute which defines the system itself and the duties of the Commission in the maintenance of the system, which is a responsibility also shared by the Illinois Department of Natural Resources and the landowners who have dedicated their land as preserves. Dedication is presented by the administering agency/owner, and then must be approved by the Nature Preserves Commission, the Department of Natural Resources, and the Governor.

A nature preserve must have ecological, geological, and/or archaeological features of educational and/or scientific significance, or it must retain a high degree of its pre-European settlement character. Once a preserve has been formally dedicated, it is to be used in a manner which is consistent with its public purpose and continued preservation. Use of the preserves should be for the purpose of education, scientific research, and aesthetic enjoyment and should cause no unreasonable impairment, disturbance, or development (McFall and Karnes, 1995).

As of October 1995, Illinois had 252 nature preserves containing over 33,350 acres, located in 73 counties across the state (Illinois Natural Heritage Database, 1995). There are 8 preserves located within the Rock River Assessment Watersheds (RRAW) (Figure 10), totalling over 1,050 acres (approximately 900 acres of forest and 150 acres of prairie). Ownership of these 8 preserves represents a range of different ownership types; IDNR, local Forest Preserve/ Conservation Districts, state university, nonprofit conservation organization, and private individual/family. Table 6 lists the features, size, and ownership of the Illinois Nature Preserve within the RRAW.

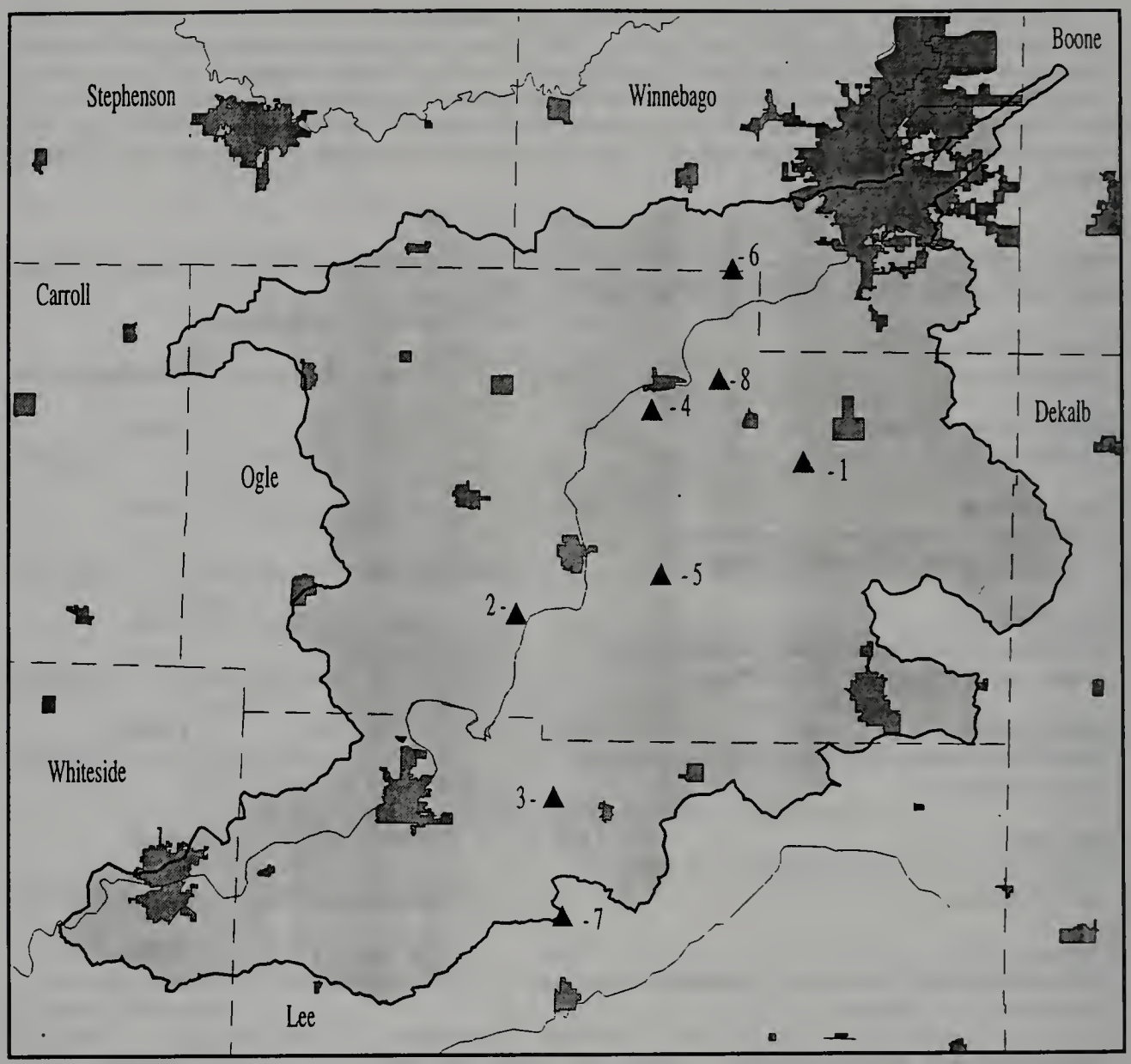
Table 6. Illinois Nature Preserves within the Rock River Assessment Watersheds. ***Sources:*** **McFall and Karnes, 1995; Illinois Natural Heritage Database, 1995.**

Nature Preserve Name * features	County	Acreage (buffer)	Ownership
Beach Cemetery Prairie * INAI Cat. I, II, IV; A & B dry-mesic prairie.	Ogle	2.5	Private
George B. Fell * INAI Cat. I, II, IV; dry-mesic upland forest, mesic upland forest, bedrock outcrops.	Ogle	685.6 (23.4)	Public
Franklin Creek * INAI Cat. IV; upland and ravine forests, large stream, springs, bedrock outcrops.	Lee	96.0	Public
Jarrett Prairie * INAI Cat. II; dry dolomite and dry-mesic dolomite prairie remnants	Ogle	115.8 (25.2)	Public
Pine Rock * INAI Cat. I, II, IV; dry upland black oak forest and savanna	Ogle	59.0	Public
Severson Dells * dry-mesic upland forest, mesic floodplain forest, dolomite cliff communities	Winn.	21.7 (18.1)	Public
Temperance Hill Cemetery Prairie * INAI Cat. I; mesic prairie	Lee	0.8	Private
Douglas E. Wade Prairie * INAI Cat. I; dry-mesic gravel prairie, dry-mesic dolomite prairie	Ogle	11.2	Private

INAI Categories: I - ecological areas; II - endangered sp. habitats; III - relict sp. habitat; IV - geological area; V - natural community restoration and endangered species relocation/reintroduction aeras; VI - unique natural areas; VII - aquatic areas (streams and rivers).

Special Status Species

Prior to extensive development, Illinois possessed approximately 14.6 million hectares (36 million acres) of natural habitats which were dominated by eastern tallgrass prairie and deciduous forest. As of 1987 only about 10,202 hectares (25,200 acres) of high quality natural communities remained in the state (Neely and Heister, 1987). Habitat destruction, as well as illegal or unregulated hunting, competition from introduced exotic species, and environmental contaminants are all causes of the loss or extirpation of native species (Herkert, 1991a). In Illinois, 75% of the habitat that supports the 511 state listed species occurs on private property (Herkert, 1994).



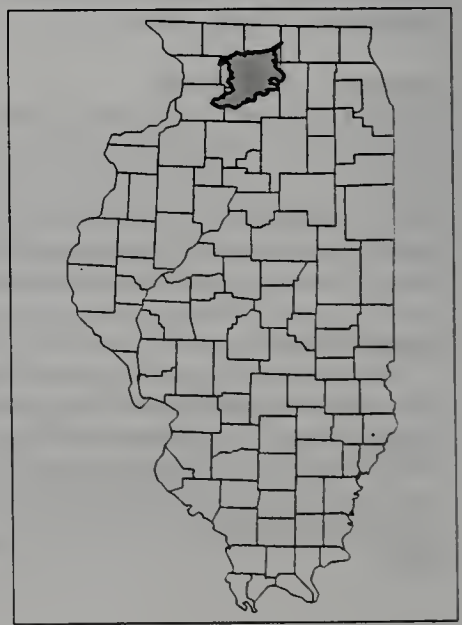


Figure 10. Illinois Nature Preserve Sites within the Rock River Assessment Watersheds (Illinois Natural Heritage Database, 1995).

1. Beach Cemetery Prairie
2. George B. Fell
3. Franklin Creek
4. Jarrett Prairie
5. Pine Rock
6. Severson Dells
7. Temperance Hill Cemetery Prairie
8. Douglas E. Wade Prairie

The Endangered Species Protection Act was created in 1972. The Act created the Endangered Species Protection Board (ESPB), which has the responsibility of identifying endangered and threatened species. The board also works in conjunction with the Illinois Department of Natural Resources (DNR), which regulates the permit system for special status species. The board works with other agencies on programs that work to evaluate and preserve currently threatened populations and to possibly reintroduce habitat for a species or the species itself, if the habitat exists.

As of 1994, state listed-species in Illinois included 109 endangered and 39 threatened animal species, and 306 endangered and 57 threatened plant species (Illinois Endangered Species Protection Board, 1994). The Illinois Natural Heritage Database (1995) documents a total of 56 (38 endangered, 18 threatened) species currently known for the Rock River Assessment Watersheds (Table 7). This number is derived from recent element occurrence information (after 1980) and does not reflect historic occurrence records (prior to 1980). That these historic occurrences have not been relocated within the last 15 years may be due to a combination of factors (no recent or poorly timed surveys, extreme environmental conditions, and/or inadequate information flow) and does not necessarily mean that occurrence is no longer valid.

State-listed species in the RRAW include 28 endangered and 9 threatened plant species, and 10 endangered and 9 threatened animal species. The area is also host to one federally endangered animal, one federally threatened plant, two federal candidate animals, and one federal candidate plant species (United States Department of the Interior, 1994; Illinois Natural Heritage Database, 1995). State-listed plant and animal species are discussed within the following **Natural Communities** sections.

Table 7. Special Status Species of the Rock River Assessment Watersheds. *Sources*: Illinois Natural Heritage Database (1995). Nomenclature: plants-Mohlenbrock (1986), amphibians and reptiles-Collins (1990).

Illinois Endangered Species	38
Plants	28
Animals	10
Illinois Threatened Species	18
Plants	9
Animals	9
Federally Endangered Species (Mussel)	1
Federally Threatened Species (Plant)	1
Federal Candidate Species	4
Plants	1
Animals	3

Special Status Plants of the Rock River Assessment Watersheds (38 sp)

Amelanchier sanguina	Shadbush	SE
Arctostaphylos uva-ursi	Bearberry	SE
Artemisia dranunculus	Dragon wormwood	SE
Asclepias lanuginosa	Wooly milkweed	SE
Aster furcatus	Forked aster	ST
Besseya bullii	Kittentails	ST
Betula alleghaniensis	Yellow birch	SE
Castilleja sessiliflora	Downy yellow painted cup	SE
Carex echinata	Sedge	SE
Carex tonsa	Shaved sedge	SE
Carex woodii	Pretty sedge	SE
Ceonothus herbaceus	Redroot	SE
Cirsium hillii	Hill's thistle	ST
Cornus canadensis	Bunchberry	SE
Corydalis sempervirens	Pink corydalis	SE
Cypripedium acaule	Moccasin flower	SE
Cystopteris laurentiana	Fragile fern	SE
Dichanthelium boreale	N. panic grass	SE
Equisetum pratense	Meadow horsetail	SE
Equisetum sylvaticum	Horsetail	SE

Table 7 continued

Filipendula rubra	Queen-of-the-prairie	ST
Gymnocarpium dryopteris	Oak fern	SE
Hudsonia tomentosa	False heather	SE
Lathyrus ochroleucus	Pale vetchling	ST
Lespedeza leptostachya	Prairie bush clover	FT,SE
Luzula acuminata	Hairy woodrush	SE
Lycopodium clavatum	Running pine	SE
Lycopodium dendroideum	Ground pine	SE
Nothocalais cuspidata	Prairie dandelion	SE
Orobanche ludoviciana	Broomrape	SE
Oryzopsis racemosa	Rice grass	ST
Ranunculus rhomboideus	Prairie buttercup	ST
Sorbus americana	American mountain ash	SE
Sullivantia renifolia	Sullivantia	ST
Talinum rugospermum	Prairie fame-flower	FC,SW
Thelypteris phegopteris	Long beech fern	SE
Trientalis borealis	Star-flower	ST
Woodsia ilvensis	Rusty woodsia	SE

Special Status Birds of the Rock River Assessment Watersheds (8 sp)

Accipiter cooperii	Cooper's hawk	SE
Asio otus	Long-eared owl	SE
Bartramia longicauda	Upland sandpiper	ST
Catharus fuscescens	Veery	SE
Certhia americana	Brown creeper	ST
Circus cyaneus	Northern harrier	SE
Lanius ludovicianus	Loggerhead shrike	ST
Pandium haliaetus	Osprey	ST

Special Status Mammals of the Rock River Assessment Watersheds (1 sp)

Lutra canadensis	River otter	SE

Special Status Reptiles/Amphibians of the Rock River Assessment Watersheds (3 sp)

Emydoidea blandingii	Blanding's turtle	FC,SW
Hemidactylium scutatum	Four-toed salamander	ST
Heterodon nasicus	Dusty hognose snake	ST

Special Status Insects of the Rock River Assessment Watersheds (1 sp)

Speyeria idalia	Regal fritillary	FC,SW

Special Status Fish of the Rock River Assessment Watersheds (3 sp)

Acipenser fulvescens	Lake surgeon	SE
Moxostoma carinatum	River redhorse	ST
Notropis texanus	Weed shiner	SE

Special Status Mussels of the Rock River Assessment Watersheds (6 sp)

Alasmidonta marginata		FC
Alasmidonta viridis	Slippershell	SE
Elliptio dilatata	Spike	ST
Fusconaia ebena	Ebonyshell	ST
Lampsilis higginsii	Higgins' eye pearly	FE,SE
Plethobasus cyphus	Sheepnose	SE

SE - State Endangered, **ST** - State Threatened, **SW** - State Watch List, **FE** - Federally Endangered, **FT** - Federally Threatened, **FC** - Federal Candidate.

TERRESTRIAL NATURAL COMMUNITIES

Introduction: Flora

Estimates of pre-European settlement vegetation are typically derived from interpretations of General Land Office Survey Notes and can vary depending upon methodology. According to Iverson and Joselyn (1989), the approximately 1,608 km^2 (999 mi^2) Rock River Assessment Watersheds (RRAW) were about 35% prairie and 65% forest, woodland, or savanna. Wetland types were not distinguished from these general classifications and presently, there are no comparative data available for the historic distribution of wetlands in the RRAW. However, based on a soil survey of hydric soils (Havera and Suloway, 1994), it is estimated that wetlands covered 8% of Ogle County (which includes most of the the RRAW).

Currently, only about 19 ha. (48 acres) of high quality original prairie remain in the RRAW according to the Illinois Natural Areas Inventory (INAI) (White, 1978). Upland and bottomland forest currently covers about 22,579 ha. (8.7%) of the RRAW. Forty-six hectares (114 acres), or about 0.20%, of this forest is designated high quality natural area [Category I, grade A or B] by the INAI). Only 24 ha. (60 acres) or 2.1% of wetland (not including bottomland forest) that is currently present in the RRAW is designated as high quality natural area (Category I, grade A or B) by the INAI (White, 1978).

Despite widespread habitat loss and degradation, a great diversity of plant species and habitat types remain within the RRAW, including several distinct forest, prairie, wetland, and cliff communities. Thirty-three areas within the RRAW are recognized as INAI natural areas (see Table 5). These total about 2,437.29 hectares (6,020.11 acres) or about 0.94% of the RRAW. This amount compares with about 0.07% for the entire state (White, 1978). As defined by the INAI, 16 of these sites comprise over 87 ha. (216 acres) of high quality ecological areas (Grade A or B), representing 10 natural communities, and 17 areas contain 765 ha. (1890 acres) of endangered and threatened species habitat.

About 950 plant taxa have been reported from an area that represents most of the RRAW (Mankowski, 1995); 525 species are represented in the compiled plant lists presented in this present report (see Appendix A). Of the 950 taxa, about 16% (155) are adventive or not native to the region. This compares to about 30% for the total state flora. The approximately 795 taxa native to the RRAW comprise about 38% of the state's native flora, including 38 species known from extant populations that are listed as threatened or endangered in Illinois (see Table 7). Nineteen state-listed plant species and two watch-list species occur at the Castle Rock State Park/ Lowden-Miller State Forest complex (Illinois Natural Heritage Database, 1995; Jones, 1994).

Much of this species richness and habitat diversity can be attributed to a concentration of distinct bedrock and surface geological features which support several rare plant species and the presence of a variety of moisture and pH conditions. Exposures of sandstone, dolomite, gravel, and glacial till are present. Perhaps most noteworthy from a botanical perspective among bedrock features within the area is the local prominence of sandstone, particularly the St. Peter Formation, an Ordovician-aged bedrock which is exposed mostly near the Rock River and associated minor drainages in the region (Willman, 1967). This bedrock is very fragile and easily weathered, forming in places such as Castle Rock State Park, a dissected system of valleys, ravines, and cliffs. Where the sandstone is near the surface, weathering has produced sandy soils from the residuum of the sandstone parent material. These soils, including Boone sand and Eleva sandy loam in upland areas, are highly permeable, usually well-drained, and strongly acidic, particularly beneath the shallow A horizon (Acker et al., 1980).

The dissected landscape characterized by deep, cool ravines and protected cliff faces has provided habitat for species that otherwise have more northern distributions (eg., *Gymnocarpium dryopteris* [oak fern], *Phegopteris connectilis* [long beech fern], *Lycopodium clavatum* [running pine], *Sorbus americana* [American mountain ash]). These species are present as relicts of a more boreal climate in northern Illinois following Wisconsinan glaciation. Perhaps of equal phytogeographic importance is the fact that these relict species survived a pronounced post-glacial xerothermic period, from about 8,300 to 5,000 years before present (BP) (King, 1981), characterized by hot, dry weather conditions. Other species, like *Pinus strobus* (white pine), *Taxus canadensis* (Canada yew), *Betula alleghaniensis* (yellow birch), and *Luzula acuminata* (hairy woodrush), are near their midwestern southern range extent. Though mesic to dry-mesic forest are currently the predominant upland forest community types in the region, locally xeric conditions (eg., south-to-southwest exposures, shallow soil depth) maintain barrens or savanna-like habitats for many shade-intolerant species including several prairie species. Locally in the region, sand prairie/savanna complexes occur where the bedrock is weathered into a sandy soil. Two species endemic to the upper Midwest, *Talinum rugospermum* (prairie fame-flower) and *Besseya bullii* (kitten tails), are locally common in dry, shallow-soil habitats associated with St. Peter sandstone. Several ferns and fern allies that are rare in Illinois are present and include *Gymnocarpium dryopteris* (oak fern), *Phegopteris connectilis* (long beech fern), *Woodsia ilvensis* (rusty woodsia), *Equisetum sylvaticum* (horsetail),

E. pratense (meadow horsetail), *Lycopodium clavatum* (running pine), *L. dendroideum* (ground pine), *L. lucidulum* (shining clubmoss), *L. digitatum* (ground pine), and *Selaginella rupestris* (sand club moss). Several of these are limited in distribution to areas of exposed sandstone bedrock. Many of the uncommon species found in the region associated with these cliff communities and sandy residuum (eg., *Vaccinium myrtilloides* (Canada blueberry), *V. corymbosum* high-bush blueberry [now extirpated from region], *Gaylussacia baccata* (huckleberry), *Aronia melanocarpa* (black chokecherry), and *Trientalis borealis* (star flower), are also found in acid bogs and tolerate a wide range of moisture conditions.

Dolomite is also exposed locally in the area, particularly in White Pine Forest State Park and along the Rock River north of Oregon. The soils derived from this parent material, such as the Sogn loam where slopes are steep, and the bedrock outcrops support a flora mostly distinct from that associated with the sandstone. However, it is not as rich in rare or uncommon species. *Pinus strobus* (white pine) and *Taxus canadensis* (Canada yew), are notable exceptions as they each are present on both bedrock types. A few rare plants are found in prairie remnants associated with calcareous soils formed where loess is eroded, exposing calcareous, gravelly glacial outwash and till, mostly in the eastern portion of the RRAW. Examples include *Asclepias ontarioides* (wooly milkweed), *Castilleja sessilifolia* (downy yellow painted cup), *Ceanothus herbaceous* (redroot), *Lespedeza leptostachya* (prairie bushclover), and *Nothocalais cuspidata* (prairie dandelion).

Introduction: Fauna

References in italics in the following sections refer to tables in Appendix B

There are 198 species of predominantly terrestrial vertebrates documented for the RRAW since 1985. This represents 47% of the 420 species of Illinois' vertebrate fauna. Appendix A lists species cited within this present report.

The Rock River area has the richest breeding forest bird community in the state with 85 native species (see Table 11; *Robinson, 1995; Table 2.5*). The location of the RRAW at the northern end of the breeding ranges of many southern species and the southern end of many northern species enriches the species list (see Table 12). There are 12 species of Illinois endangered and threatened birds reported for the area, 8 of which are confirmed breeders. The RRAW contains one significant grassland habitat for avifauna, the Nachusa grassland, which is of particular interest because of the extensive efforts to restore grasslands, which appears to be working for birds.

The Rock River Assessment Watersheds contains portions of three of Smith's (1961) Herpetofaunal Divisions; Prairie, Sand Areas, and Western Division Woodlands (Figure 11). The intersection of these three Divisions provides a variety of habitat types and therefore, above average species diversity for northern Illinois. Several species can be considered unique because of their relictual or disjunct distribution. There are 13 amphibian species and 22 reptile species known or thought to occur in the RRAW (see Table 14). This represents all of the amphibian species and 91% of the reptile species whose current or pre-settlement range includes the RRAW. Two state threatened species (western hognose snake and four-toed salamander) and one federal candidate/state watch list species (Blanding's turtle) are known from the area. No exotic amphibians or reptiles are known from the RRAW at the present time.

The mammals of Illinois can be divided into three subsets: 1) species that occur statewide, 2) species that occur primarily in the northern half of the state, and 3) species that occur primarily in the southern portion of the state. There are 39 native mammal species documented for the area (see Table 15), including the state endangered river otter. Because of the diversity of habitats included in the RRAW (upland forest and bluffs, lowland forest, open habitats such as grassland and old field, river and stream systems, and other wetlands), and the extensive areas of remaining habitat, most of the species that could potentially occur in the northern part of the state should be found within the RRAW.

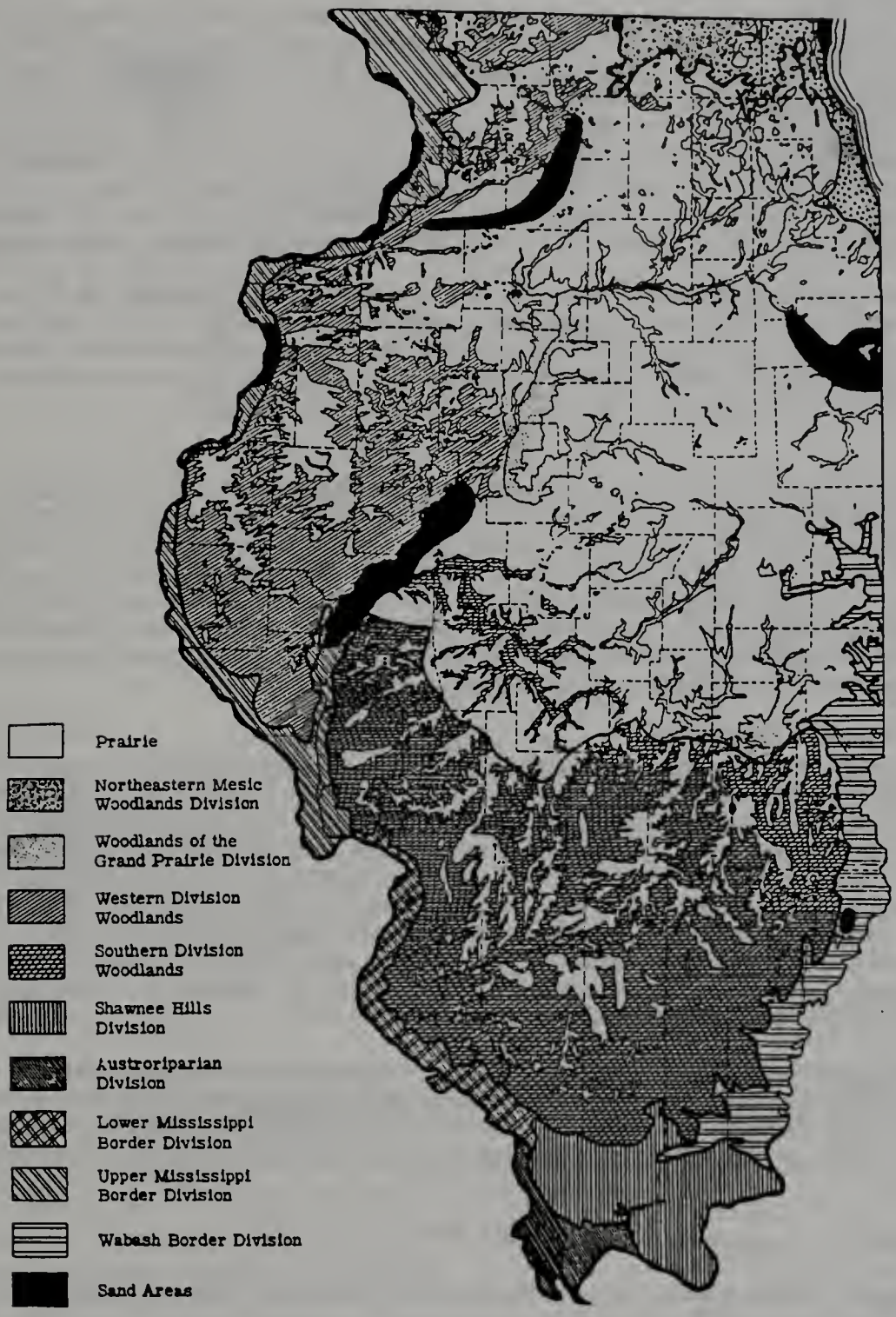


Figure 11. Herpetofaunal Divisions of Illinois (after Smith, 1961)

COMMUNITY DESCRIPTIONS: FOREST

Characteristics of Forest Vegetation

The following vegetational community descriptions are based on a series of botanical inventories conducted over a period of several years (1970 - 1995) from within the region described here as the Rock River Assessment Watersheds (RRAW). Most community descriptions combine data from more than one site or remnant. Community classification follows White and Madany (1978). Upland forest types are grouped by soil parent material for ease of description. Not all moisture classes of each community type are described and not all communities were represented equally in survey attention. Rather, inventory focus has been on the higher quality areas and unique habitats. Because compositional similarity between remnants of the same community type within a region are often not high (sometimes less than 60%) (eg., Taft and Solecki, 1990; Taft, et al., 1995) these descriptions should not be considered comprehensive for the RRAW. Botanical nomenclature follows Mohlenbrock (1986).

Data for community descriptions presented in this section include data collected for the Illinois Natural Areas Inventory (White, 1978); Illinois Natural Heritage Database (1995); Taft and Solecki, 1986; Taft, 1989a, 1989b, 1990, 1992; field surveys conducted by Division of Natural Heritage staff at the Illinois Department of Natural Resources, 1986-1995; and a collection of wetland delineation efforts from the area conducted by staff in the Center for Wildlife Ecology at the Illinois Natural History Survey (Figure 12).

Introduction

Most forests are concentrated on the uplands associated with the Rock River and its major tributaries. Of the 1,608 km^2 (999 mi^2), the Land Cover Database of Illinois (IDNR [CTAP], 1995) documents 7.89% is in upland forest cover (deciduous and coniferous) and 0.83% is in bottomland forest cover (floodplain and swamps) (see Table 1 and Figure 10). About 1,710 ha. (4,225 acres [~13%]) of the forest currently present in Ogle County is found within the Castle Rock State Park/Lowden-Miller State Forest complex (Mankowski, 1995). According to the Illinois Plant Information Network (ILPIN), over 68% of the native vascular flora of the state are forest-associated species (Iverson and Schwartz, 1994). Of the 795 native species documented for the area of the RRAW, approximately 59% are forest-associated species.

Wet to Wet-Mesic Floodplain Forest

Bottomland forest is distributed along the major waterways throughout the region and is mostly restricted to riparian border strips. The amount of floodplain forest in this region has been greatly reduced by conversion to agriculture. This practice has been carried out to an even greater degree here than in Illinois as a whole. The narrowness of the riparian forest strips and their proximity to agriculture appear to have resulted in increased sedimentation. These conditions have allowed the understory to be often dominated by invasive, disturbance-tolerant alien species such as *Phalaris arundinacea* (reed canary grass), *Glechoma hederacea* (ground ivy), and *Lysimachia nummularia* (moneywort). In addition, *Alliaria petiolata* (garlic mustard) is increasingly abundant in the more well-drained portions of floodplain forests. As a result, species diversity in floodplain forests is low. A compiled species list for this community type is presented in Table 8. See **Wetland** Section later in this report for descriptions of graminoid wetland communities.

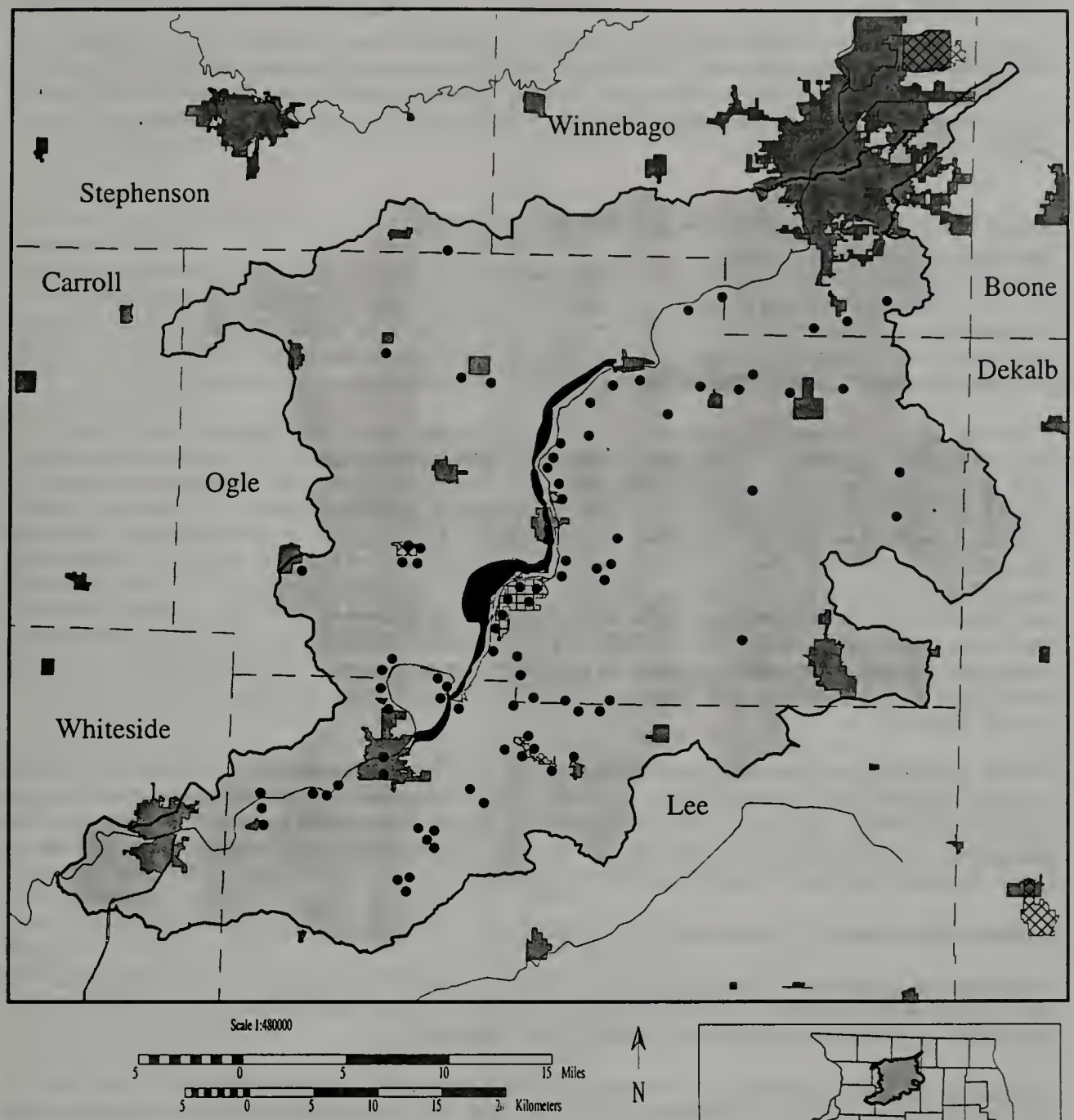
Table 8. Compiled list of vascular plant species of wet to wet-mesic floodplain forest within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

canopy dominants - *Acer saccharinum* (silver maple)

occasional canopy - *Populus deltoides* (eastern cottonwood), *Celtis occidentalis* (hackberry), *Juglans nigra* (black walnut), *Ulmus americana* (American elm), *Platanus occidentalis* (American sycamore), *Fraxinus pennsylvanicus* (green ash)

common to occasional subcanopy - *Acer negundo* (black maple), *Ulmus rubra* (slippery elm), *Salix nigra* (black willow), *Sambucus canadensis* (elderberry)

vines - *Toxicodendron radicans* (poison ivy), *Parthenocissus quinquefolius* (Virginia creeper), *Smilax hispida* (green-brier)



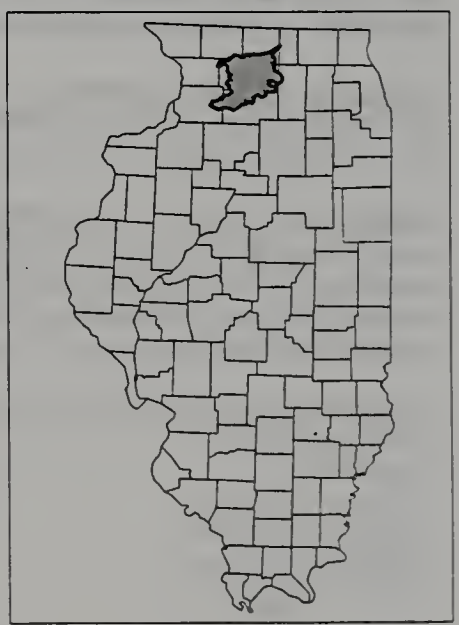


Figure 12. Terrestrial Communities: Vegetation. Floristic survey for the Illinois Natural History Survey and Illinois Department of Natural Resources, Division of Natural Heritage staff (1970-1995).

Table 8 continued

herbaceous species - *Elymus virginicus* (Virginia wild rye), *Cryptotaenia canadensis* (honewort), *Geum canadense* (white avens), *Lysimachia nummularia** (moneywort), *Glechoma hederacea** (ground ivy), *Laportea canadensis* (wood nettle), *Rudbeckia laciniata* (goldenglow), *Leersia oryzoides* (rice cutgrass), *Bromus inermis** (smooth brome), *Ambrosia trifida* (giant ragweed), *Impatiens capensis* (spotted touch-me-not), *Napaea dioica* (glade mallow)

Upland Forest Associated with Loess, Dolomite, or Glacial Drift

Mesic to Dry-Mesic Upland Forest

Upland forest in the RRAW is concentrated among the dissected upland areas bordering the Rock River and tributaries. Mesic upland forest occurs on sites with soils that are not excessively drained or permeable and/or in protected coves in dissected terrain. The INAI recognized 1,024 ha. (2,531 acres) of high quality mesic upland forest in the state (White, 1978). About 8 hectares (20 acres) are found in the Castle Rock State Park/George B. Fell Nature Preserve (Illinois Natural Heritage Database, 1994; R.W. Nyboer, pers. comm.).

Forests associated with these parent materials, like most forests in the region, often have been degraded by livestock grazing. Exceptions include areas too steep to have been heavily grazed. At localized areas along the Rock River, steep slopes have dolomite outcroppings with up to 6-meter-tall cliffs. Taller cliffs occur in the White Pines State Park where about 22 ha (54 acres) of high quality (Category I, grade A or B) dry-mesic upland forest are recognized by the INAI (see Table 5). An additional 12 ha. (30 acres) of INAI high quality dry-mesic upland forest is distributed between the following sites: Lowden State Park (20 acres) and Silver Creek Natural Area (10 acres) (Illinois Natural Heritage Database, 1994; R.W. Nyboer, pers. comm.). Including a 20 acres parcel (associated with sandstone) at Lowden-Miller Natural Area, the more than 100-acre total RRAW distribution for this forest type represents 3.3% of the statewide INAI high quality distribution. Typical structure and composition of mesic to dry-mesic upland forest associated with loess, dolomite, or glacial drift is summarized below (Table 9). Forest communities associated with sandstone are included with the next community description (see Table 10).

Table 9. Compiled list of vascular plant species of mesic to dry-mesic upland forest associated with loess, dolomite, or glacial drift within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

dominant canopy species - *Quercus alba* (white oak), *Q. rubra* (red oak), *Acer saccharum* (sugar maple)

occasional canopy species - *Quercus velutina* (black oak), *Q. prinoides var. acuminata* (chinkapin oak), *Tilia americana* (American basswood), *Juglans nigra* (black walnut), *Acer nigrum* (black maple), *Fraxinus americana* (white ash), *F. quadrangulata* (blue ash), *Pinus strobus* (white pine)

common to occasional subcanopy - *Acer saccharum* (sugar maple), *Fraxinus americana* (white ash), *F. quadrangulata* (blue ash), *Carya cordiformis* (bitternut hickory), *Celtis occidentalis* (hackberry), *Ostrya virginiana* (eastern hophornbeam), *Ulmus rubra* (slippery elm)

shrubs/vines - *Staphylea trifolia* (bladdernut), *Prunus virginiana* (choke cherry), *Cornus alternifolia* (alternate-leaved dogwood), *C. racemosa* (gray dogwood), *Corylus americana* (hazelnut), *Ribes missouriense* (Missouri gooseberry), *Viburnum prunifolium* (black haw), *Taxus canadensis* (Canada yew), *Physocarpus opulifolius* (ninebark), *Asimina triloba* (pawpaw), *Dirca palustris* (leatherwood), *Smilax hispida* (green-brier), *Parthenocissus quinquefolius* (Virginia creeper), *Toxicodendron radicans* (poison ivy), *Lonicera prolifera* (yellow honeysuckle)

herbaceous species - (no species is dominant)

Actaea pachypoda+	White baneberry
Actaea rubra	Red baneberry
Adiantum pedatum+	Maidenhair fern
*Alliaria petiolata**	Garlic mustard
Aquilegia canadensis	Columbine
Arabis laevigata	Smooth bank cress

Table 9 continued

Arabis shortii	Toothed cress
Arisaema triphyllum+	Jack-in-the-pulpit
Asarum canadense+	Wild ginger
Athyrium angustum	Lady fern
Botrychium virginianum	Rattlesnake fern
Carex albursina+	Sedge
Carex blanda	Woodland sedge
Caulophyllum thalictroides+	Blue cohosh
Claytonia virginica	Spring beauty
Clematis virginiana	Virgin's bower
Cystopteris protrusa	Fragile fern
Dentaria laciniata	Toothwort
Desmodium glutinosum	Pointed tick trefoil
Desmodium nudiflorum	Bare-stemmed tick trefoil
Dicentra cucullaria	Dutchman's breeches
Dioscorea villosa	Wild yam
Dodecatheon meadia	Shooting star
Dryopteris cristata	Crested shield fern
Dryopteris intermedia	Intermediate fern
Dryopteris marginalis	Leather fern
Erythronium albidum+	White trout lily
Festuca obtusa+	Nodding fescue
Galearis spectabilis	Showy orchis
Geranium maculatum	Wild geranium
Hepatica nobilis var. *acuta*	Sharped-lobed hepatica
Hydrastis canadensis	Golden seal
Hydrophyllum appendiculatum+	Great waterleaf
Hydrophyllum virginianum	Virginia waterleaf
Isopyrum biternatum	False rue anemone
Menispermum canadense	Moonseed
Mertensia virginica	Bluebells
Mitella diphylla	Miterwort
Panax quinquefolius+	Ginseng
Phlox divaricata	Blue phlox
Podophyllum peltatum	May apple
Polygonatum commutatum+	Great Solomon's seal
Polymnia canadensis+	Leafcup
Ranunculus abortivus	Small-flowered buttercup
Ranunculus fascicularis	Early buttercup
Ranunculus hispidus	Bristly buttercup
Sanguinaria canadensis+	Bloodroot
Sicyos angulatus	Bur cucumber
Silene stellata	Starry campion
Smilacina racemosa	False Solomon's seal
Smilacina stellata	Starry false Solomon's seal
Solidago flexicaulis+	Broadleaved goldenrod
Solidago ulmifolia	Elm-leaved goldenrod
Thalictrum dioicum+	Early meadow rue
Trillium grandiflorum+	Large white trillium
Trillium nivale	Snow trillium
Trillium recurvatum	Red trillium
Triphora trianthophora+	Nodding pogonia
Uvularia grandiflora+	Bellwort
Viola pubescens var. *eriocarpa*	Smooth yellow viloet
Viola sororia	Hairy wood violet

Forests/Woodlands Associated with Sandstone:

Mesic, Dry-Mesic, and Dry Upland Forest

Three oak species are dominant throughout all three moisture classes with the driest sites dominated by *Quercus velutina* (black oak), dry-mesic sites dominated by *Q. alba* (white oak), and more mesic sites dominated by *Q. rubra* (red oak). The INAI recognized 8 ha. (20 acres) of high quality dry-mesic upland forest within the Lowden-Miller Natural Area. Typical structure and composition of upland forest communities associated with sandstone are summarized in Table 10.

Table 10. Compiled list of vascular plant species of mesic, dry-mesic, and dry upland forest associated with sandstone within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

canopy dominants - *Quercus velutina* (black oak), *Q. alba* (white oak), *Q. rubra* (red oak)

occasional canopy - *Quercus velutina* (black oak), *Q. alba* (white oak), *Q. rubra* (red oak), *Populus grandidentata* (big-tooth aspen), *Pinus strobus* (white pine), ***Betula allegheniense*** **SE (yellow birch)**

common subcanopy - *Hamamelis virginiana* (witch hazel), *Amelanchier laevis* (shadbush), *Amelanchier arborea* (shadbush), *Ulmus rubra* (slippery elm)

occasional subcanopy - *Acer saccharum* (sugar maple), *Viburnum prunifolium* (black haw), *V. lentago* (nannyberry), *Carpinus carolinianus* (American hornbeam), *Amelanchier laevis* (shadbush), *A. arborea* (shadbush), *Populus grandidentata* (big-tooth aspen), *Fraxinus americana* (white ash), *Pinus strobus* (white pine), *Juniperus virginiana* (red cedar), *Carya ovata* (shagbark hickory), *Cornus racemosas* (gray dogwood), *Robinia pseudoacacia** (black locust),

shrubs/vines -***Vaccinium myrtilloides*** **SW (Canada blueberry)**, *V. pallidum* (low-bush blueberry), *Diervilla lonicera* (bush honeysuckle), *Gaylussacia baccata* (huckleberry), *Cornus racemosa* (gray dogwood), *Corylus americana* (hazelnut), *Rosa carolina* (Carolina rose), *Prunus virginiana* (choke cherry), *Aronia melanocarpa* (black chokecherry), *Viburnum rafinesquianum* (downy arrowwood), *Lonicera prolifera* (yellow honeysuckle), *Parthenocissus quinquefolia* (Virginia creeper), *Cornus alternifolia* (alternate-leaved dogwood), *Taxus canadensis* (Canada yew), *Viburnum lentago* (nannyberry), *Ribes missouriense* (Missouri gooseberry), *Toxicodendron radicans* (poison ivy), *Amorpha canescens* (lead plant), *Sambucus canadensis* (elderberry), *Zanthoxylum americanum* (prickly ash), *Symphoricarpos orbiculatus* (coralberry), *Rubus pensylvanicus* (blackberry), *R. occidentalis* (black raspberry), *Euonymus obovatus* (running strawberry bush), *Rhus glabra* (smooth sumac), ***Sorbus americanus*** **SE (American mountain ash)**, ***Arctostaphylos uva-ursi*** **ST (bearberry)**

herbaceous species (cliff species are listed separately - see **Primary**) -

Acalypha gracilens	Slender three-seeded mercury
Actaea rubra	Red baneberry
Adiantum pedatum	Maidenhair fern
Agrimonia gryposepala	Tall agrimony
Agrostis hyemalis	Winter bent grass
*Alliaria petiolata**	Garlic mustard
Amphicarpa bracteata	Hog peanut
Anemone quinquefolia+	Wood anenome
Antennaria neglecta	Pussytoes
Antennaria plantaginifolia	Plantainleaf pussytoes
Apocynum androsaemifolium+	Spreading dogbane
Aquilegia canadensis	Columbine
Arabis canadensis	Sickle pod
Aralia nudicaulis+	Wild sarsaparilla
Asclepias purpurescens	Purple milkweed
Asplenium platyneuron	Eebony spleenwort
Athyrium angustum	Lady fern

Table 10 continued

Aureolaria grandiflora	Yellow false foxglove
Besseya bullii	**Kitten tails ST**
Botrychium dissectum var. *obliquum*	Bronze fern
Botrychium virginianum	Rattlesnake fern
Cacalia atriplicifolia+	Pale indian plantain
Campanula americana	Tall bellflower
Campanula rotundifolia	Harebell
Carex blanda	Woodland sedge
Carex gracillima	Sedge
Carex muhlenbergii	Sand sedge
Carex pensylvanica#+	Pennsylvania sedge
Carex rosea	Sedge
Circaea lutetiana	Enchanter's nightshade
Claytonia virginica	Spring beauty
Coeloglossum viride	Bracted green orchid
Comandra umbellata	Bastard toadflax
Coreopsis tripteris	Tall tickseed
Cornus canadensis	**Bunchberry SE**
Cypripedium pubescens	**Yellow lady's slipper orchid SW**
Cystopteris protrusa+	Fragile fern
Danthonia spicata+	Poverty oat grass
Dasistoma macrophylla	Mullein foxglove
Desmodium glutinosum+	Pointed tick trefoil
Dichanthelium villosissimum	Panic grass
Dioscorea villosa	Wild yam
Dodecatheon meadia	Shooting star
Dryopteris carthusiana	Spinulose woodfern
Ellisia nyctellia	Waterpod
Elymus hystrix	Bottlebrush grass
Equisetum pratense	**Meadow horsetail SE**
Eupatorium purpureum	Sweet joe-pye weed
Euphorbia corollata	Flowering spurge
Festuca obtusa	Nodding fescue
Fragaria virginiana	Wild strawberry
Galearis spectabilis	Showy orchis
Galium aparine	Annual bedstraw
Galium circaezans	Wld licorice
Galium triflorum	Bedstraw
Geranium maculatum	Wld geranium
Goodyera pubescens+	Rattlesnake plantain
Helianthemum bicknellii	Rock rose
Helianthemum canadense	Rock rose
Heuchera americana	Tall alum root
Hieracium scabrum	Rough hawkweed
Hypoxis hirsuta	Yellow stargrass
Juncus tenuis	Path rush
Koeleria macrantha	June grass
Krigia biflora	False dandelion
Krigia virginica	False dandelion
Lactuca floridana	Blue lettuce
Lathyrus ochroleucus	**Pale vetchling ST**
Lilium michiganense	Turk's-cap lily
Liparis lilifolia	Purple twayblade
Lupinus perennis	Wld lupine
Luzula acuminata	**Hairy wood rush SE**
Luzula multiflora var. *echinata*	Wood rush

Table 10 continued

Lycopodium dendroideum	**Ground pine SE**
Lycopodium digitatum	Ground pine
Lycopodium lucidulum+	Shining clubmoss
Maianthemum canadense+	Wild lily-of-the-valley
Muhlenbergia frondosa var. *commutata*	Muhly
Onoclea sensibilis	Sensitive fern
Osmorhiza claytoniana	Sweet cicely
Osmunda cinnamomea	Cinnamon fern
Osmunda claytonii+	Interrupted fern
Oxalis violacea	Violet wood sorrel
Paronychia canadensis	Forked chickweed
Pedicularis canadensis	Wood betony
Penstemon hirsutus	Hairy beardstongue
Penstemon pallidus+	Pale beardstongue
Podophyllum peltatum	May apple
Polypodium virginianum	Common polypody
Potentilla simplex	Common cinquefoil
Pteridium aquilinum	Bracken fern
Pyrola elliptica+	Shinleaf
Ranunculus abortivus	Small-flowered buttercup
Ranunculus fascicularis	Early buttercup
Ranunculus recurvatus	Hooked buttercup
Silene stellata	Starry campion
Smilacina racemosa	False Solomon's seal
Solidago hispida	Hispid goldenrod
Solidago speciosa var. *jejunifolia*	Showy goldenrod
Tephrosia virginiana	Goat's rue
Thalictrum thalictroides	Rue anemone
Tradescantia ohiensis	Spiderwort
Tradescantia virginiana	Spiderwort
Trillium recurvatum	Prairie trillium
Triosteum perfoliatum	Horse-gentian
Urtica dioica	Stinging nettle
Uvularia grandiflora	Bellwort
Viola cf. striata	Cream violet
Viola pedata	Brdfoot violet
Viola sororia	Hairy wood violet
Vulpia octoflora	Six-weeks fescue
Woodsia obtusa	Common woodsia

Disturbed Forests/Woodlands

As previously noted, only about 40 ha. (100 acres) of original forest remaining within the RRAW were recognized by the INAI to be of category I, grade A or B natural-area quality. Much of the remainder has been degraded by logging, grazing, and exotic species invasions. Although high-quality forests and woodlands of local or regional significance remain that have not been strongly degraded by grazing, excessive logging, or exotic species invasions, most did not meet the age requirements of the INAI (>90 years) at the time of that inventory (mid 1970's). Many of the remaining forests can be characterized by an abundance of grazing increasers such as the thorn-bearing shrubs *Ribes missouriense* (Missouri gooseberry), *Rubus* spp. (blackberry), *Rosa multiflora** (multiflora rose), *Zanthoxylem americanum* (prickly ash), *Crataegus* spp. (hawthorne), *Rhamnus cathartica** (common buckthorn), and trees *Gleditsia triacanthos* (honey locust), *Robinia pseudoacacia** (black locust), and *Maclura pomifera** (osage orange). Habitat suitability for *Alliaria petiolata** (garlic mustard), an aggressive exotic biennial herb, appears to be enhanced with grazing since this species is often abundant in woodlands with a grazing history and it also appears to become established in relatively undisturbed woods along deer paths.

The suppression of fire, originally a critically important ecological force throughout Illinois (Sauer, 1950; Anderson, 1970; McClain, 1986; Taft, et al., 1995), including the Rock River Hills Country, has resulted in the closure of what were typically much more open-canopy woodlands throughout area. This increased density of woody plants has produced shading effects which, like grazing, diminished the native species richness of the herbaceous components of most of the region.

Woodland Fauna

The Illinois Fish and Wildlife Information System (IFWIS-Illinois Department of Natural Resources/Illinois Natural History Survey) lists more than 420 vertebrate species for the state (Iverson and Schwartz, 1994). Of these, 63% of the birds, 80% of the reptiles and amphibians, and 82% of the mammals require forest habitat for some portion of their life cycle (Iverson and Schwartz, 1994). Of the 198 native vertebrates reported for the RRAW, 76% of the birds, 60% of the reptiles and amphibians, and 64% of the mammals use forested habitat during part of their life cycle.

Forest Birds

References in italics in the following section refer to tables in Appendix B

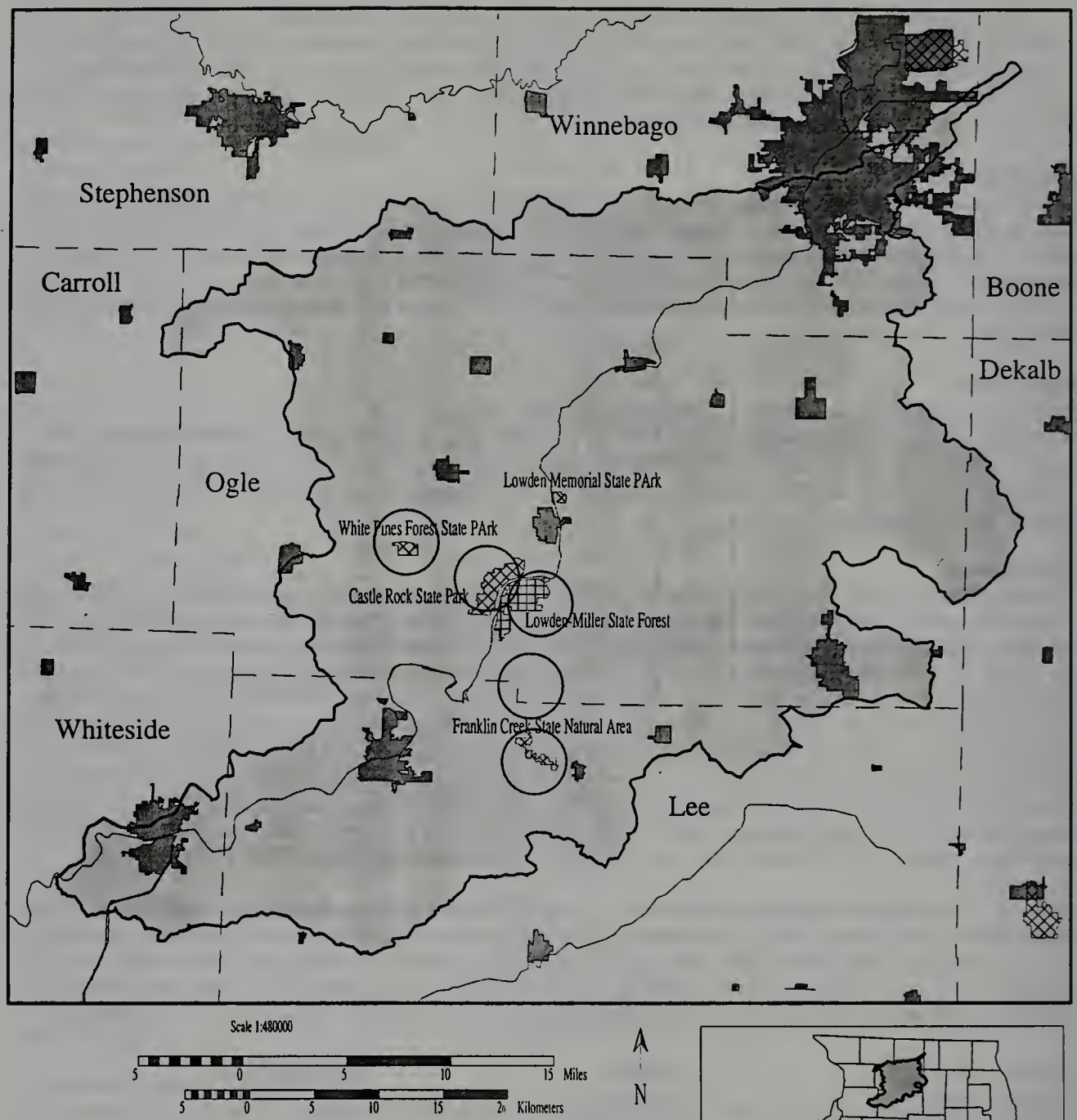
Information included in this section reflects field survey work done during May-August, 1994 (Robinson, 1995) at the following locations: Lowden-Miller State Forest, Castle Rock State Park (George B. Fell Nature Preserve), White Pines Forest State Park, and Franklin Creek Nature Preserve (within the Franklin Creek State Natural Area) (Figure 13).

Introduction

The Rock River area has the richest (largest number of species) breeding forest bird community in the state with 85 native species (Table 11) (Robinson, 1995: *Table 2.5*). The location of the RRAW at the northern end of the breeding ranges of many southern species and the southern end of many northern species enriches the species list (Table 12). Northern species (e.g., Canada, mourning, and golden-winged warblers) mix with southern species (e.g., summer tanager, Kentucky, worm-eating, and hooded warblers). Similarly, the presence of pine plantations adds several species (e.g., black-throated green warbler, brown creeper, solitary vireo), as do many clearcuts that create early successional habitat in the Lowden-Miller State Forest (Robinson, 1995: *Table 2.8*) for species such as the white-eyed vireo, yellow-breasted chat, and blue-winged and chestnut-sided warblers. Floodplain forests provide additional habitat for Acadian flycatchers, American redstarts, Baltimore orioles, prothonotary warblers, warbling vireos, and green herons. One of the state's largest populations of cerulean warblers nests in the George B. Fell Nature Preserve in Castle Rock State Park (Robinson, 1995: *Table 2.5*).

Table 11. Breeding forest birds recorded from survey locations within the Rock River Assessment Watersheds. *Source*: Robinson (1995). Common names are given following the American Ornithologists' Union (A.O.U) Checklist (6th edition, 1983 and Supplement of July 1985). See Appendix A for scientific nomenclature. Bold type indicates a state listed species: SE = state endangered, ST = state threatened. An asterick * indicates an introduced species. Breeding status: L = likely, P = possible, CO = confirmed.

Species (Status)	Habitat	Breeding Status
Turkey vulture	hab. gen.	L
Cooper's hawk SE	decid. woods	CO
Broad-winged hawk	woodland	L
Red-tailed hawk	wood/grass/open land	CO
Red-shouldered hawk SE	riparian woods	P
Wood duck	forested wetland	CO
Wild turkey	woodland	L
American woodcock	woodland	L
Mourning dove	grass/gen	CO
Black-billed cuckoo	wood/edge	CO
Yellow-billed cuckoo	open woods	CO
Great horned owl	hab. gen.	CO
Barred owl	woodland	CO
Whip-poor-will	wood/edge	L
Common nighthawk	open woods/towns	L
Chimney swift	hab. gen./woods	L



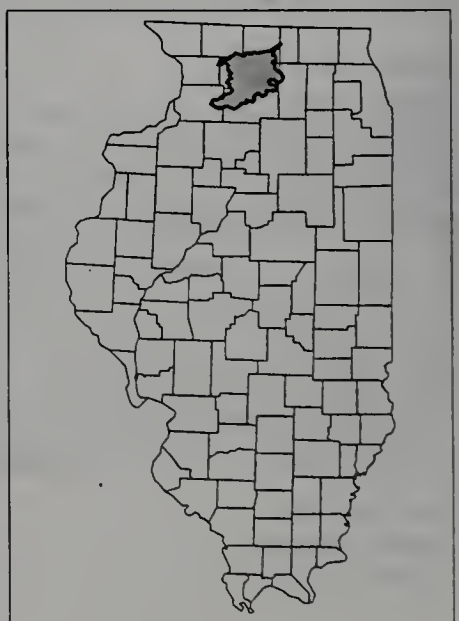


Figure 13. Terrestrial Communities: Fauna. Bird survey locations for Illinois Natural History Survey, Endangered Species Protection Board, and The Nature Conservancy staff (1990-1995).

Table 11 continued

Ruby-throat hummingbird	garden/wood/edge	CO
Belted kingfisher	wetland	L
Red-bellied woodpecker	woodland/gen.	CO
Red-headed woodpecker	open woods/bottoms	CO
Northern flicker	open woods/gen.	CO
Downy woodpecker	woodland/gen.	CO
Hairy woodpecker	woodland	CO
Pileated woodpecker	woodland	CO
Northern flicker	open woods/gen.	CO
Eastern kingbird	open lands	CO
Eastern wood-pewee	woodland	CO
Least flycatcher	open decid./conif. woods	CO
Acadian flycatcher	woods/wet.	CO
Eastern phoebe	wood/gen.	CO
Great crested flycatcher	woodlands	CO
Blue jay	hab. gen.	CO
American crow	hab. gen.	CO
Black-capped chickadee	woods/gen	CO
Tufted titmouse	decid. woods/gen.	CO
White-breasted nuthatch	woodlands	CO
Brown creeper ST	wet wood/conif.	CO
House wren	thickets/gen.	CO
Golden-crowned kinglet	conif. woods	P
Blue-gray gnatcatcher	woodlands	CO
Wood thrush	wet/mixed woods	CO
Veery ST	moist woods/thickets	CO
American robin	hab. gen.	CO
Eastern bluebird	open woods/orchards	CO
Gray catbird	thicket/decid. wood edges	CO
Brown thrasher	thicket/wood edges	CO
Cedar waxwing	open wood/thickets	CO
European starling *	hab. gen.	CO
White-eyed vireo	thicket/shrubland	L
Yellow-throated vireo	woodlands	CO
Solitary vireo	conif. woods	L
Red-eyed vireo	woodland	CO
Warbling vireo	open decid. woods	CO
Prothonotary warbler	wet forest	L
Blue-winged warbler	shrubland/acid seep	L
Golden-winged warbler	shrubland	CO
Black-and-white warbler	woodland	L
Cerulean warbler	woodland (oak)	CO
Black-throat. green warbler	conif./mixed woods	CO
Yellow-throated warbler	conif./bottom woods	CO
Mourning warbler	thickets/wet woods	CO
Kentucky warbler	woodland	CO
Canada warbler	woods/acid seeps	CO
Hooded warbler	shrubby woods	CO
Worm-eating warbler	steep ravines/woods	L
Yellow warbler	wet/open/shrubland	CO
Chestnut-sided warbler	shrublands	CO
American redstart	wood/wet woods/floodplain	CO
Ovenbird	woodlands	CO
Louisiana waterthrush	wet woodlands	CO
Common yellowthroat	grass/marsh	CO
Yellow-breasted chat	thickets	CO

Table 11 continued

Rose-breasted grosbeak	woodlands	CO
Northern cardinal	hab. gen.	CO
Indigo bunting	wood edges/shrubland	CO
Rufous-sided towhee	open woods/streams	CO
Chipping sparrow	grass/wood edges/conif.	CO
Lark sparrow	grass/open wood/sandy	L
Song sparrow	stream/thickets	CO
Northern oriole	open woods/streams	CO
Scarlet tanager	decid. woods	CO
Summer tanager	mixed wood/edges	L
Common grackle	field/marsh/gen.	CO
Brown-headed cowbird	open wood/farmland/gen.	CO
Pine siskin	coniferous woods	CO
American goldfinch	shrubby field/open woods	CO

Table 12. Breeding birds recorded for the Rock River Assessment Watersheds. Sources: Scott Robinson of the Illinois Natural History Survey, Jim Herkert of the Endangered Species Protection Board, Ann Haverstock of The Nature Conservancy; Illinois Natural Heritage Database, 1995. Common names are given following the American Ornithologists' Union (A.O.U) Checklist (6th edition, 1983 and Supplement of July 1985). See Appendix A for scientific nomenclature. Bold type indicates a state listed species: SE = state endangered, ST = state threatened. An asterick * indicates an introduced species. Breeding status: L = likely, P = possible, CO = confirmed.

Species (Status)	Habitat	Breeding Status
Great blue heron	wetland	L
Great egret SE	wetland	P
Green-backed heron	wetland	L
Canada goose	wetland	L
Wood duck	forested wetland	CO
Mallard	wetland	L
Osprey ST	woods along rivers	CO
Turkey vulture	hab. gen.	L
Northern harrier SE	grassland	L
Cooper's hawk SE	decid. woods	CO
Broad-winged hawk	woodland	L
Red-tailed hawk	wood/grass/open land	CO
Red-shouldered hawk SE	riparian woods	P
American kestrel	grassland	CO
Ring-necked pheasant*	grassland	CO
Wild turkey	woodland	L
Northern bobwhite	open wood/shrubland	L
Sandhill crane ST	grassland	L
Killdeer	grass/wetland	CO
Spotted sandpiper	wetland	P
Upland sandpiper SE	grassland	CO
American woodcock	woodland	L
Rock dove*	towns	L
Mourning dove	grass/gen.	CO
Black-billed cuckoo	wood/edge	CO
Yellow-billed cuckoo	open woods	CO
Great horned owl	hab. gen.	CO
Barred owl	woodland	CO
Long-eared owl SE	open woodland	CO
Short-eared owl SE	grassland	P
Common nighthawk	open woods/towns	L
Whip-poor-will	wood/edge	L
Chimney swift	hab. gen./woods	L

Table 12 continued

Ruby-throat. hummingbird	garden/wood/edge	CO
Belted kingfisher	wetland	L
Red-bellied woodpecker	woodland/gen.	CO
Red-headed woodpecker	open woods/bottoms	CO
Yellow-bellied sapsucker	conif. woods	L
Downy woodpecker	woodland/gen.	CO
Hairy woodpecker	woodland	CO
Northern flicker	open woods/gen.	CO
Eastern wood-pewee	woodland	CO
Willow flycatcher	stream/thickets	CO
Least flycatcher	open decid./conif. woods	CO
Acadian flycatcher	woods/wet.	CO
Eastern Phoebe	wood/gen.	CO
Great crested flycatcher	woodlands	CO
Eastern kingbird	open lands	CO
Horned lark	bare ground	L
Tree swallow	wood/water	CO
Rough-winged swallow	stream/edges	CO
Barn swallow	hab. gen./buildings	CO
Blue jay	hab. gen.	CO
American crow	hab. gen.	CO
Black-capped chickadee	woods/gen.	CO
Tufted titmouse	decid. woods/gen.	CO
White-breasted nuthatch	woodlands	CO
Brown creeper ST	wet. wood/conif.	CO
House wren	thickets/gen.	CO
Sedge wren	wet./grassland	CO
Golden-crowned kinglet	conif. woods	P
Blue-gray gnatcatcher	woodlands	CO
Eastern bluebird	open woods/orchards	CO
Veery ST	moist woods/thickets	CO
Wood thrush	wet./mixed woods	CO
American robin	hab. gen.	CO
Gray catbird	thicket/decid. wood edges	CO
Northern mockingbird	thicket/open areas	CO
Brown thrasher	thicket/wood edges	CO
Cedar waxwing	open wood/thickets	CO
Loggerhead shrike ST	grass/open shrub.	CO
European starling*	hab. gen.	CO
White-eyed vireo	thicket/shrubland	L
Bell's vireo	open shrub/grass mix	CO
Yellow-throated vireo	woodlands	CO
Solitary vireo	conif. woods	L
Warbling vireo	open decid. woods	CO
Red-eyed vireo	woodland	CO
Prothonotary warbler	wet forest	L
Blue-winged warbler	shrubland/acid seep	L
Golden-winged warbler	shrubland	CO
Black-and-white warbler	woodland	L
Cerulean warbler	woodland (oak)	CO
Black-throat. green warbler	conif./mixed woods	CO
Yellow-throated warbler	conif./bottom woods	CO
Mourning warbler	thickets/wet woods	CO
Kentucky warbler	woodland	CO
Canada warbler	woods/acid seeps	CO
Hooded warbler	shrubby woods	CO

Table 12 continued

Worm-eating warbler	steep ravines/woods	L
Yellow warbler	wet/open shrubland	CO
Chestnut-sided warbler	shrublands	CO
American redstart	wood/wet wood/floodplain	CO
Ovenbird	woodlands	CO
Louisiana waterthrush	wet woodlands	CO
Common yellowthroat	grass/marsh	CO
Yellow-breasted chat	thickets	CO
Northern cardinal	hab. gen.	CO
Rose-breasted grosbeak	woodlands	CO
Indigo bunting	wood edges/shrubland	CO
Dickcissel	grassland	CO
Rufous-sided towhee	open woods/streams	CO
Chipping sparrow	grass/wood edges/conif.	CO
Field sparrow	shrubby grassland	CO
Vesper sparrow	grassland/crops	CO
Lark sparrow	grass/open wood/sandy	L
Savannah sparrow	grass/marsh	CO
Grasshopper sparrow	grasssland	CO
Henslow's sparrow ST	grassland	P
Song sparrow	stream/thickets	CO
Swamp sparrow	wet thickets/marshes	CO
Clay-colored sparrow	shrubby field/stream thicket	P
Orchard oriole	shrub/grass mix	CO
Northern oriole	open woods/streams	CO
Scarlet tanager	decid. woods	CO
Summer tanager	mixed wood/edges	L
Bobolink	grassland	CO
Red-winged blackbird	wet./marsh/field	CO
Eastern meadowlark	grassland	CO
Western meadowlark	dry grassland	L
Common grackle	field/marsh/gen.	CO
Brown-headed cowbird	open wood/farmland/gen.	CO
Pine siskin	coniferous woods	CO
House finch	hab. gen./human	CO
American goldfinch	shrubby field/open woods	CO
House sparrow *	hab. gen.	CO

Typical Species

Typical upland oak/hickory forest species include barred owl, whip-poor-will, ruby-throated hummingbird, red-bellied woodpecker, downy and hairy woodpeckers, eastern wood-pewee, great crested flycatcher, blue jay, tufted titmouse, black-capped chickadee, white-breasted nuthatch, house wren, blue-gray gnatcatcher, wood thrush, veery, yellow-throated and red-eyed vireos, ovenbird, rose-breasted grosbeak, and scarlet tanager. All of these species nest in White Pines Forest State Park, Franklin Creek Nature Preserve, George B. Fell Nature Preserve and the adjacent Castle Rock State Park, and the Lowden-Miller State Forest. The populations of ovenbirds and veeries are the largest documented in the state. Exotics such as starlings were rare in the forests of the RRAW.

Unique and Rare Species

The diversity represented here by 20 breeding species of warblers is greater than any other comparably wooded area in the state, including the Shawnee National Forest (19 species). Three state listed species are found in the area. Cooper's hawks (endangered) nest in all sites as do veeries (threatened). Brown creepers (threatened) show evidence of breeding at Lowden-Miller State Forest (Robinson, 1995: *Tables 2.5, 2.7, 3.3, 3.6*). Species that are rare statewide, but were found defending territories (Robinson, 1995: *Table 2.7*) included broad-winged hawk (Lowden-Miller), black-billed cuckoo (Lowden-Miller), least flycatcher (Lowden-Miller and Castle Rock), black-and-white warbler (Lowden-Miller and George B. Fell Nature Preserve), cerulean warbler (George B. Fell Nature Preserve: 15-25 pairs), chestnut-sided warbler (25-50 pairs in clearcuts), yellow-bellied sapsucker (Lowden-

Miller), golden-winged warbler (Castle Rock and Lowden-Miller), and hooded warbler (Castle Rock and Lowden-Miller).

Unusual occurrences in pines include the only known nesting population of black-throated green warblers in the state, nesting yellow-throated warblers, and territorial solitary vireos and golden-crowned kinglets (Robinson, 1995: *Table 2.8*). Unusual occurrences in acid seeps and other scrubby habitats include Canada and mourning warblers (Robinson, 1995: *Table 2.8*).

Population Distribution, Abundance and Trends

Tables 2.5 and 2.7 in Robinson (1995) detail the abundances and distribution of habitat use by breeding birds of the four largest forest tracts in the RRAW. Population trend analysis is hampered by the lack of historical data from this region. All of these census results, however, can be used for future monitoring.

Habitat Notes

Suitability of present habitat

Migrating birds were abundant in all sites; it is likely that these forests provide excellent breeding habitat for most migrants en route north or south. Suitability of habitat for breeding species has two components: (1) presence of breeding populations and (2) nesting success. Breeding populations of many species are extremely area-sensitive, i.e., they are absent from small forest patches even when the forests contain suitable habitat and sufficient area for many pairs to breed (*Table 2.10 in* Robinson, 1995). Area-sensitive species included broad-winged hawk, pileated woodpecker, cerulean warbler, Kentucky warbler and American redstart. The largest tracts had far more species than the smallest tracts (Robinson, 1995: *Table 2.9*, see also Robinson et al., ms.). This was true of neotropical migratory birds and for all species combined (*Table 2.9*). The largest tracts (Castle Rock and Lowden-Miller) contained all of the forest birds that breed in the RRAW. Species that were less abundant in large tracts included potentially harmful species such as cowbirds (*Table 2.11*) and species that require disturbed forests (*Table 2.10*). Smaller tracts such as Franklin Creek and White Pines Forest State Park contained fewer breeding species than the larger tracts (*Table 2.5*).

Nesting Success

Nesting success of forest birds, however, was low for many species nesting in these sites as a result of high (>50%) frequencies of cowbird brood parasitism and nest predation (Robinson 1995). Cowbird parasitism severely reduces the nesting success of host species (*Tables 3.1 and 3.2*), especially for small species. Foraging conditions appeared to be adequate for successful nesting (*Table 3.2*: most eggs that hatch and escape predation successfully produce fledglings). Species suffering the most from parasitism (*Table 3.6*), included the wood thrush (>70% of nests parasitized), red-eyed vireo (100%), and rufous-sided towhee. Encouragingly, however, brood parasitism levels were among the lowest I have recorded in the state for some species in Castle Rock (e.g., wood thrush, American redstart, rose-breasted grosbeak) and Lowden-Miller (e.g., wood thrush, veery, northern cardinal) (*Table 3.6*). In these large forested tracts, parasitism is less of a problem than in smaller tracts in other similarly wooded areas in the state (e.g., *Tables 3.3, 3.4, 3.5*). Parasitism levels declined significantly with area for veery, cerulean warbler, and rose-breasted grosbeak. Parasitism levels were still high enough in all sites to pose potential population-level problems.

Nest predation levels were probably a greater source of problems for birds in the RRAW than cowbird parasitism (Robinson, 1995: *Table 3.20*). Veeries suffered very high predation rates even in the middle of the largest tracts, as did cardinals, rufous-sided towhees, and indigo buntings. Several other species, however, suffered lower predation rates in Castle Rock and Lowden-Miller than in White Pines Forest State Park (*Table 3.20*: wood thrush, Am. robin, n. cardinal).

Positive and negative aspects of current habitat

Positive aspects include the presence of sufficiently large tracts to contain all of the major forest breeding species and for parasitism and predation levels to be relatively low for at least a few species. Negative aspects include the small size and low nesting success of birds in small tracts (e.g., White Pines Forest State Park). Within the Lowden-Miller State Forest, clearcut edges had higher predation and parasitism levels for some species (Robinson, 1995: *Table 3.13*), roads had higher predation rates for some species in Castle Rock (*Table 3.14*), and recreational edges had higher predation and parasitism levels in White Pines State Park. All of these negative effects would be reduced by increasing tract size and minimizing internal disturbances.

White Pine plantations in Lowden-Miller create an unusual habitat that attracts many birds that are not characteristic of Illinois. The pines, however, do create a good surrogate habitat for many forest birds (*Table 2.7* in Robinson, 1995). The acid seeps contain "native" populations of birds that are otherwise restricted to logged areas (e.g., Canada, blue-winged, and golden-winged warblers).

Woodland Reptiles and Amphibians

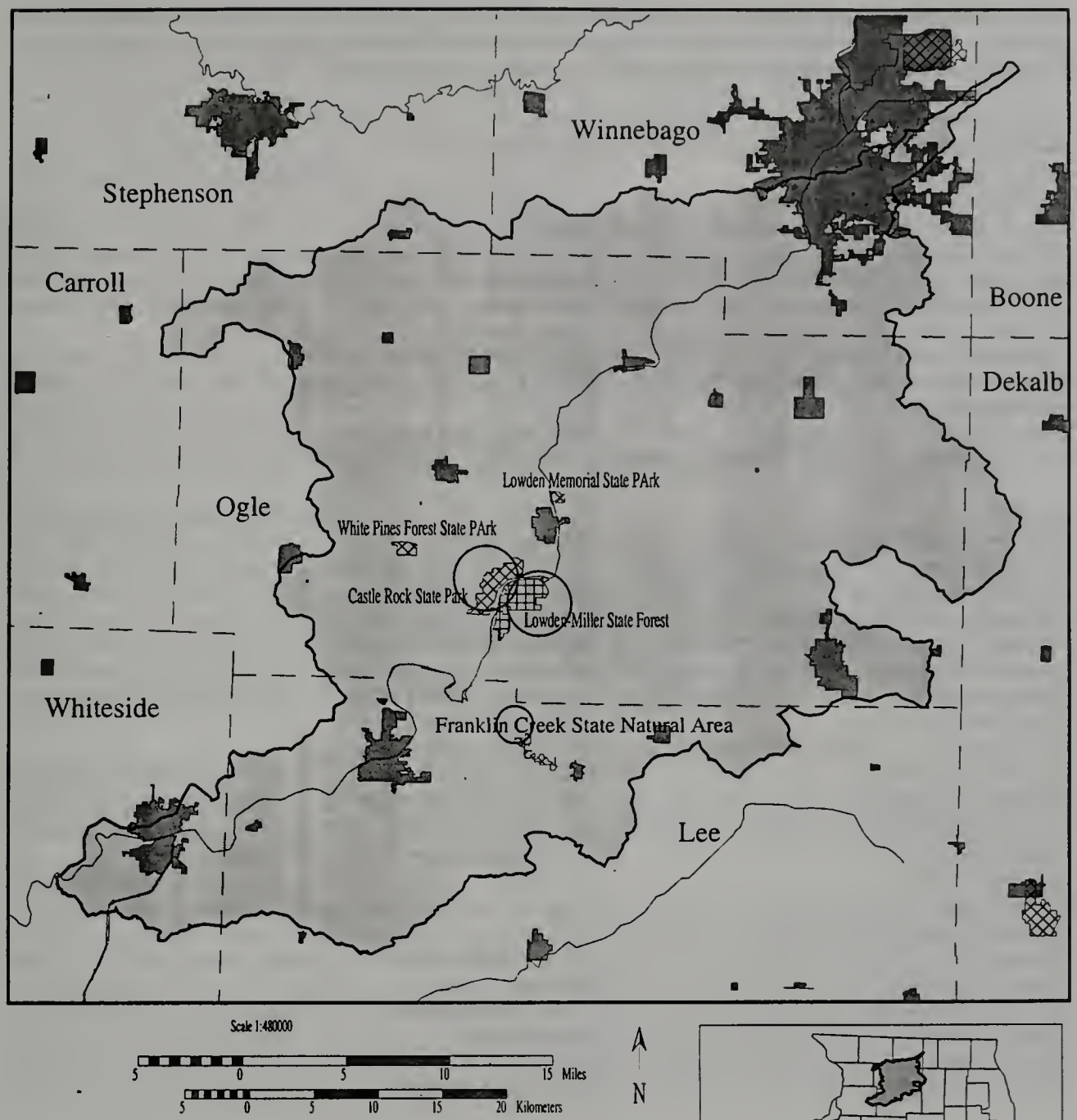
Information presented in this section represents field survey work conducted by Phil Smith, herpetologist and ichthyologist at INHS from 1942 to 1979 and more recently, surveys conducted from 1980 to 1995 by Randy Nÿboer, Natural Heritage biologist and regional administrator for DNR (Figure 14).

Typical Species

Species characteristic of the Western Forest Division include: four-toed salamander, northern leopard frog, green frog, gray treefrog, milk snake, and the common garter snake (Table 13). Due to the high sand content of many of the soils within the RRAW, several Sand Area associates are found in the sandy areas of woodlands. The eastern hognose snake is associated with sandy habitat of open woodland and forest edges typical of the Castle Rock State Park/Lowden-Miller State Forest area. Additional species typically found in woodlands are the habitat generalists listed in Table 14.

Table 13. Amphibians and reptiles characteristic of each of the three Herpetofaunal Divisions (Smith, 1961) occurring in the Rock River Assessment Watersheds. Nomenclature follows Collins (1990). Bold type indicates an Illinois threatened species (ST). Other species from Table 14 can be considered habitat generalists.

Sand Areas	
Terrapene ornata	Ornate box turtle
Ophisaurus attenuatus	Slender glass lizard
Heterodon platirhinos	Eastern hognose snake
Heterodon nasicus	**Western hognose snake ST**
Pituophis catenifer	Bullsnake
Prairie	
Ambystoma tigrinum	Tiger salamander
Opheodrys vernalis	Smooth green snake
Elaphe vulpina	Fox snake
Thamnophis radix	Plains garter snake
Western Forest Division	
Hemidactylium scutatum	**Four-toed salamander ST**
Rana pipiens	Northern leopard frog
Rana clamitans	Green frog
Hyla versicolor	Gray treefrog
Lampropeltis triangulum	Milk snake
Thamnophis sirtalis	Common garter snake



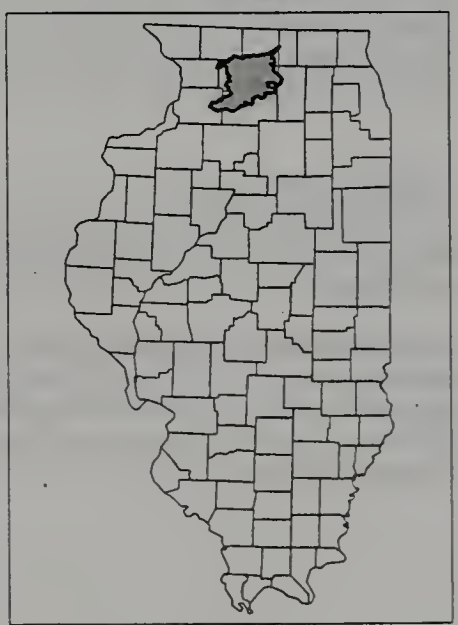


Figure 14. Terrestrial Communities: Fauna. Amphibian and reptile locations for Illinois Natural History Survey and Illinois Department of Natural Resources, Division of Natural Heritage staff (1953-1995).

Table 14. Amphibians and reptiles known or thought to occur in the Rock River Assessment Watersheds. *Sources*: Smith, 1961; Illinois Natural Heritage Database, 1995. Nomenclature follows Collins (1990). Bold type indicates an Illinois threatened (ST) or watch list species (SW).

Amphibians	
Ambystoma tigrinum	Tiger salamander
Notophthalmus viridescens	Eastern newt
Hemidactylium scutatum	**Four-toed salamander ST**
Necturus maculosus	Mudpuppy
Bufo americanus	American toad
Acris crepitans	Cricket frog
Pseudacris triseriata	Chorus frog
Pseudacris crucifer	Spring peeper
Hyla versicolor/chrysocelis	Gray treefrog complex
Rana catesbeiana	Bullfrog
Rana clamitans	Green frog
Rana pipiens	Northern leopard frog
Rana palustris	Pickerel frog
Reptiles	
Chelydra serpentina	Snapping turtle
Chrysemys picta	Painted turtle
Emydoidea blandingii	**Blanding's turtle SW**
Graptemys geographica	Map turtle
Graptemys pseudogeographica	False map turtle
Apalone spinifer	Spiny softshell turtle
Terrapene ornata	Ornate box turtle
Ophisaurus attenuatus	Slender glass lizard
Cnemidophorus sexlineatus sexlineatus	Six-lined racerunner
Heterodon platirhinos	Eastern hognose snake
Heterodon nasicus	**Western hognose snake ST**
Coluber constrictor	Racer
Opheodrys vernalis	Smooth green snake
Pituophis catenifer	Bullsnake
Elaphe vulpina	Fox snake
Lampropeltis triangulum	Milk snake
Thamnophis proximus	Western ribbon snake
Thamnophis radix	Plains garter snake
Thamnophis sirtalis	Common garter snake
Storeria dekayi	Brown snake
Regina septemvittata	Queen snake
Nerodia sipedon	Northern water snake

Unique or Rare Species

Two Illinois threatened species, the four-toed salamander and the western hognose snake, and one state watch list species, the Blanding's turtle, are associated with the forest habitat types present in the RRAW. Habitat requirements for these species are described below.

Habitat Requirements & Historical Records For Listed Species

Historical records for the three listed species were taken from the following sources: 1) specimens from museum, university, and private collections (referred to as vouchered records), 2) unvouchered records from the literature, 3) unvouchered records taken from reliable biologists and naturalists, and 4) the Illinois Natural Heritage Database (1995).

Four-toed salamander (ST)--This primarily terrestrial salamander is associated with undisturbed forests containing seeps or bogs. .Recently, however, Illinois specimens have been taken in wooded ravines near rocky, spring-fed creeks. In the RRAW, three specimens are known from the Castle Rock State Park. This population was discovered by John Lynch in 1964 but repeated efforts by Ron Brandon and Randy Nÿboer (Brandon & Ballard, 1991; Nÿboer, pers. com.) have failed to document its continued presence in the area. However, based on the suitability of the habitat, both Brandon and Nÿboer (pers. com.) believe that this population still exists. This population is in a protected area.

Western hognose snake (ST)-- This slow moving snake is restricted to sand areas and adjacent woodlots. The IDNR Natural Heritage Database lists two occurrences in the RRAW; near Lowden-Miller State Forest (1987), and near Castle Rock State Park (1995). Both records are believed valid. Both populations are in protected areas. These occurrences are unique because they represent the eastern limit to this species' distribution.

Blanding's Turtle (SW)— 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. There are two sight records for Blanding's turtle in the RRAW by Randy Nÿboer; near a creek in the vicinity of Lowden-Miller State Forest (1982) and in the area of the Nachusa Grassland INAI site (1987).

Unique Occurrences/Distributions

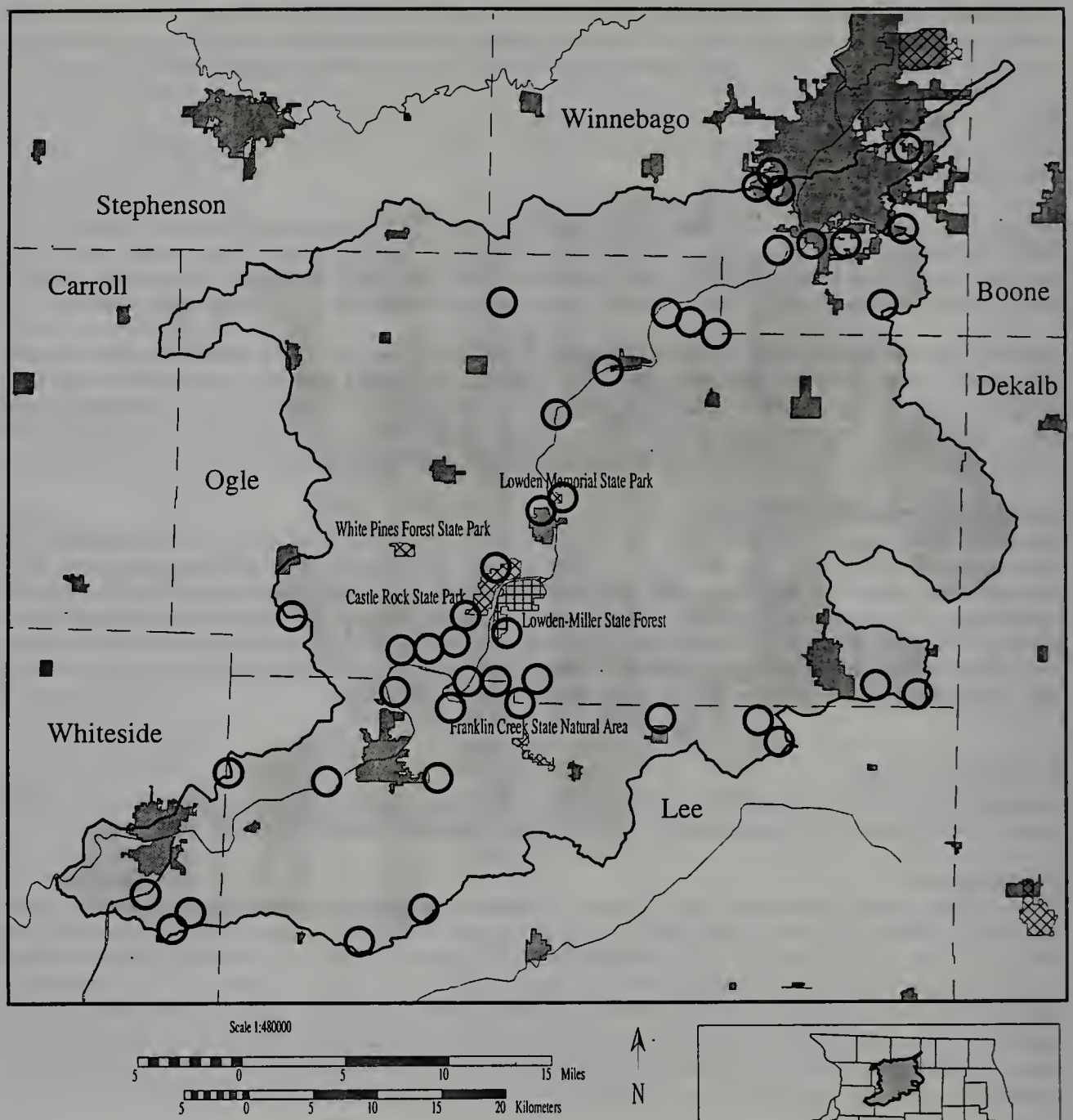
In addition to the species discussed above, one forest associated species can be considered unique because of its relict or disjunct distribution. The slender glass lizard occurs in highly fragmented populations whose distributions are determined, to a large degree, by the presence of sandy soils. Like the western hognose snake, this species may be found in the sandy soils of dry, open woodlands. The sandstone-derived soils of the Oregon Section of the Rock River Hill Country Natural Division provide isolated pockets of habitat for both species. The isolated populations of this species represent relicts of formerly more widespread ranges during the warmer, drier, Hypsithermal Interval, from about 5,000 to 8,000 years before present.

Woodland Mammals

Species information in this section has been compiled from range maps and known records through 1989, reported in Hoffmeister (1989) and Illinois Natural Heritage Database records (1980-1995) (Figure 15).

Typical Species

Typical species for the RRAW are listed in Table 15. Species restricted to forested habitats include: the pine vole, bobcat, red bat, hoary bat, eastern chipmunk, gray squirrel, fox squirrel, southern flying squirrel, and gray fox. Other species that primarily use woodland habitat in addition to select other habitats include: the little brown bat, Keen's bat, silver-haired bat, eastern pipistrelle, big brown bat, raccoon, and white-footed mouse. An unpublished survey conducted by Division of Natural Heritage staff also reported captures of the meadow jumping mouse, short-tailed shrew, and masked shrew from the forest of Castle Rock State Park (R.W. Nÿboer, pers. comm.). Many species also require wooded habitat seasonally or specialize in forest edges, such as woodchuck, eastern cottontail, and white-tailed deer. Additional habitat generalists are also listed in Table 15.



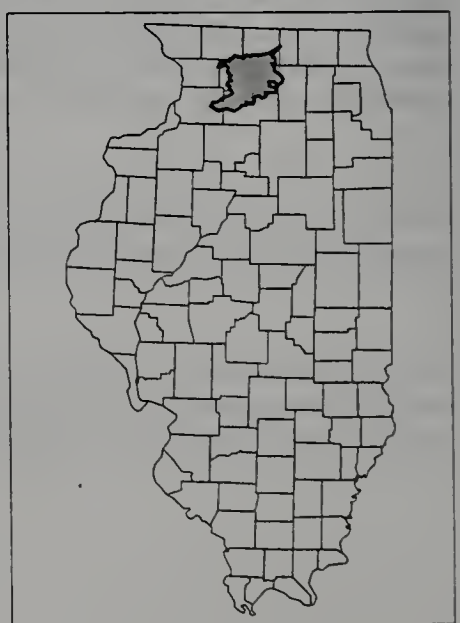


Figure 15. Terrestrial Communities: Fauna. Mammal survey record locations for Illinois Natural History Survey staff and Illinois Natural Heritage Database occurrences (1985-1995).

Table 15. Compiled list of mammal species for Rock River Assessment Watersheds (compiled from range maps and known records reported in Hoffmeister, 1989; Illinois Natural Heritage Database, 1995) Bold type indicates an Illinois endangered (SE) or threatened (ST) species. Notes: [ ] = species that might occur in Rock River RRA, but for which there are no records within the past decade; + = species that is probably extirpated from Illinois. Habitats: W = wetland, G = grassland or prairie, F = forest

Species name	Common name	Habitat
Didelphimorphia	Marsupials	
Didelphis virginiana	Virginia opossum	W, G, F
Insectivora	Insectivores	
Sorex cinereus	Masked shrew	W, G, F (mesic)
Blarina brevicauda	Northern short-tailed shrew	G, F
Cryptotis parva	Least shrew	G
Scalopus aquaticus	Eastern mole	G, F
Chiroptera	Bats	
Myotis lucifugus	Little brown bat	F, caves, buildings
[***Myotis sodalis***	**Indiana bat SE]**	F, caves
Myotis keenii	Keen's bat	F, caves, buildings
Lasionycteris noctivagans	Silver-haired bat	F, caves
Pipistrellus subflavus	Eastern pipistrelle	F, caves, buildings
Eptesicus fuscus	Big brown bat	F, caves, buildings
Lasiurus borealis	Red bat	F
Lasiurus cinereus	Hoary bat	F
[*Nycticeius humeralis*	Evening bat]	F, buildings
Lagomorpha	Rabbits	
Sylvilagus floridanus	Eastern cottontail	G, F
[***Lepus townsendii***]	**White-tailed jackrabbit SE+]**	G
Rodentia	Rodent	
Tamias striatus	Eastern chipmunk	F
Marmota monax	Woodchuck	G, F (edges)
Spermophilus tridecemlineatus	Thirteen-lined ground squirrel	G
Spermophilus franklinii	Franklin's ground squirrel	G
Sciurus carolinensis	Gray squirrel	F
Sciurus niger	Fox squirrel	F
Glaucomys volans	Southern flying squirrel	F
Castor canadensis	Beaver	W
Reithrodontomys megalotis	Western harvest mouse	G
Peromyscus maniculatus	Deer mouse	G
Peromyscus leucopus	White-footed mouse	W, G, F (mostly F)
Microtus pennsylvanicus	Meadow vole	W, G
Microtus ochrogaster	Prairie vole	G
[*Microtus pinetorum*	Pine vole]	F
Ondatra zibethicus	Muskrat	W
[*Synaptomys cooperi*	Southern bog lemming]	W, G
Rattus norvegicus	Norway rat *	W, buildings
Mus musculus	House mouse *	W, buildings
Zapus hudsonius	Meadow jumping mouse	W, G
Carnivora	Carnivores	
Canis latrans	Coyote	W, G, F
Vulpes vulpes	Red fox	W, G, F
Urocyon cinereoargenteus	gray fox	F
Procyon lotor	raccoon	W, G, F
Mustela nivalis	least weasel	G
Mustela frenata	long-tailed weasel	W, G, F
Mustela vison	mink	W, G (mostly W)
Taxidea taxus	badger	G

Table 15 continued

Mephitis mephitis	striped skunk	W, G, F
Lutra canadensis	**river otter SE**	W
[*Felis rufus*	**bobcat ST]**	F
Artiodactyla	Even-toed ungulates	
Odocoileus virginianus	white-tailed deer	W, G, F

* The house mouse and Norway rat are the only known exotic mammal species in the area. Norway rats, in particular, will be primarily associated with human structures. House mice also occur in many natural habitats, however. Both species can be found in woodlots in close proximity to human structures, but are not generally forest species. These species are now so widespread that they are part of the mammalian fauna across the United States. There is not much that can be done to rectify this situation, and it is not one for concern.

Unique and Rare Species

There are two recent records (Illinois Natural Heritage Database, 1995) of the state endangered river otter reported for this area, one along the Rock River and one on a tributary, Leaf Creek. Additional occurrences have been reported along the Rock in the last few years, but have not been recorded into the Natural Heritage Database (Randy Nÿboer, pers. comm.). Although the river otter is a riverine species, it also utilizes the habitat provided by floodplain forests and associated wetlands. There are no confirmed records of Indiana bats for this area, but RRAW is within the geographic range of this species and more thorough surveys could find it. Bobcats occurred in the Rock River area historically, and specimens were recorded from there as recently as 20 years ago. Bobcat may still occur in the area, and protection of forested habitat could promote recovery of this species. The area of the RRAW could also provide important habitat for river otters and bobcats, which no longer can occur statewide because of loss of habitat or human disturbance.

COMMUNITY DESCRIPTIONS: PRAIRIE

Characteristics of Prairie Vegetation

Introduction

As with forests, prairies occurred on all parent material types in the region. The remaining prairie vegetation is primarily on sites that are not conducive to most agricultural activities because of topographic or moisture limitations. Most commonly represented now is sand prairie, which is found locally in the region where the St. Peter sandstone is weathered into a sandy residuum and/or some wind-blown deposits. Approximately 19 ha. (48 acres) of INAI Category I, Grades A and B prairie remain in the RRAW (White, 1978; Natural Heritage Database, 1995). This includes acreage of sand, gravel, dolomite, and loess prairie. Of additional significance is the approximately 324 ha. (partly INAI Category II, Grade C) Nachusa Grassland restoration and reconstruction owned by The Nature Conservancy. This parcel is part of the larger Nachusa Grasslands INAI site (see #685, Figure 9). Eight threatened and endangered plants are known from this INAI site (*Castilleja sessiliflora* [downy yellow painted cup], *Aster furcatus* [forked aster], *Cirsium hillii* [Hill's thistle], *Besseya bullii* [kitten tails], *Lespedeza leptostachya* [prairie bush clover], *Nothocalais cuspidata* [prairie dandelion], and *Woodsia ilvensis* [rusty woodsia] see Table 7 for species status notes).

The sum of these INAI remnants suggests that about 0.05% of the land area of the RRAW is currently prairie. Not included in this figure are additional small remnants of somewhat degraded prairie on loess, glacial drift, gravel deposits, and dolomite, within the RRAW that are also important examples of these community types. Characteristic species are listed for each community type are listed in the following descriptions.

The Land Cover Database of Illinois (IDNR [CTAP] , 1995) reports that 59,262 ha. (146,438 acres [23%]) of the RRAW is in grassland cover (grassland, pastureland, prairie, rights-of-way, and strip mine reclamations). Very little of this classification resembles the vegetational characteristics (species composition and structure) of native prairie. However, from a wildlife perspective, the structure of these communities can provide suitable nesting and cover habitat for a variety of species. According to the Illinois Plant Information Network (ILPIN), 29% of the native vascular flora of the state are prairie associates (Robertson and Schwartz, 1994). Of the 795 native taxa recorded for the area, approximately 44% are prairie/grassland-associated species.

Wet to Wet-Mesic Prairie
Wet prairie areas have been mostly eliminated from the region. A small, somewhat disturbed wet-mesic sand prairie occurs at Pine Rock Nature Preserve, but no descriptive information is available.

Mesic Prairie
Included in Table 16 are species on loamy soils derived from loess /and or outwash materials.

Table 16. Compiled list of vascular plant species of mesic prairie within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species,(+) denote characteristic species.

Andropogon gerardii #+	Big bluestem
Apocynum androsaemifolium	Spreading dogbane
Aster laevis	Smooth blue aster
Carex brevior	Sedge
Carex stipata	Prickly sedge
Desmodium illinoense	Tick trefoil
Dichanthelium oligosanthes	Panic grass
Echinacea pallida	Pale purple coneflower
Euphorbia corollata	Flowering spurge
Helianthus grosseserratus	Sawtooth sunflower
Heliopsis helianthoides	False sunflower
Lespedeza capitata	Round-headed bush clover.
Liatris aspera +	Rough blazing star
Liatris pycnostachya +	Gay feather
Monarda fistulosa	Bergamont
Poa pratensis *	Kentucky bluegrass
Ratibida pinnata +	Gray-headed coneflower
Rosa carolina	Carolina rose
Silphium integrifolium +	Rosin weed
Solidago missouriensis	Goldenrod
Solidago rigida +	Stiff goldenrod
Sorghastrum nutans +	Indian grass
Tradescantia ohiensis	Spiderwort

Dry to Dry-Mesic Prairies
The drier prairie communities occur on soils derived from sandstone, dolomite, gravelly glacial till, and glacial drift. Some overlap exists among dominant species on these different prairies. However, comprehensive species lists reveal their distinction.

Sand Prairie
The most extensive examples of sand prairie and dry sand prairie are found within The Nature Conservancy's Nachusa Grassland portion of the Nachusa Grassland INAI site.

Table 17. Compiled list of vascular plant species of sand prairie within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

Dominant species include *Schizachyrium scoparium* (little bluestem), *Carex pensylvanica* (Pennsylvania sedge), *C. muhlenbergii* (sand sedge), *Cyperus filiculmis* (fern flatsedge), *Tephrosia virginiana* (goat's rue), *Amorpha canescens* (lead plant), and *Lithospermum caroliniense* (hairy puccoon)

Characteristic species include *Selaginella rupestris* (sand club moss) and *Talinum rugospermum* (prairie fameflower)

Other species:

*Achillea millefolia**	Yarrow
Agrostis scabra	Tckle grass
Ambrosia artemisiifolia	Common ragweed
Amelanchier laevis	Shadbush
Amorpha canescens #	Lead plant
Andropogon gerardii	Big bluestem
Anemone cylindrica	Thimbleweed
Anemone virginiana	Tall anemone
Antennaria plantaginifolia	Plantainleaf pussytoes
Aronia melanocarpa	Black chokecherry
Artemisia campestris	Beach wormwood
Asclepias amplexicaulis +	Sand milkweed
Asclepias tuberosa	Butterfly weed
Asclepias verticillata	Whorled milkweed
Aster linariifolius+	Stiff-leaved aster
Brickellia eupatorioides	False boneset
Callirhoë triangulata+	Poppy mallow
Calystegia spithamaea	Dwarf bindweed
Campanula rotundifolia	Harebell
Carex cephaloidea	Sedge
Carex meadia	Sedge
Carex muhlenbergii #+	Sand sedge
Carex pensylvanica #	Pennsylvania sedge
Comandra umbellata	False toadflax
Conyza canadensis	Dwarf fleabane
Coreopsis palmata	Tickseed
Coreopsis tripteris	Tall tickseed
Cyperus filiculmis #+	Fern flatsedge
Cyperus schweinitzii +	Schweinitz sedge
Dalea candida	White prairie-clover
Dalea purpurea	Purple prairie-clover
Danthonia spicata	Poverty oat grass
Dasistoma macrophylla	Mullein foxglove
Desmodium glutinosum	Pointed tick trefoil
Desmodium sessilifolia	Tick trefoil
Dichanthelium acuminatum var. *linheimeri*	Panic grass
Dichanthelium depauperatum	Starved panic grass
Dichanthelium oligosanthes	Panic grass
Dichanthelium villosissimum	Hairy panic grass
Dodecatheon meadia	Shooting star
Echinacea pallida	Pale purple coneflower
Equisetum fluviatile	Water horsetail
Equisetum laevigatum	Smooth scouring rush
Erigeron strigosus	Whitetop fleabane
Euphorbia corollata	Flowering spurge

Table 17 continued

Fragaria virginiana	Wild strawberry
Gaylussacia baccata	Huckleberry
Gnaphalium obtusifolium	Sweet everlasting
Goodyera pubescens	Rattlesnake plantain
Hedeoma hispida	Rough pennyroyal
Helianthemum bicknellii+	Rock rose
Helianthus divaricatus	Woodland sunflower
Helianthus hirsuta	Oblong sunflower
Hieracium longipilum	Long-bearded hawkweed
Hieracium scabrum	Rough hawkweed
Hypericum punctatum	Spotted St. Johns-wort
Hypoxis hirsuta	Yellow star-grass
Juniperus virginiana	Red cedar
Koeleria macrantha	June grass
Krigia virginica	False dandelion
Lechea tenuifolia +	Narrow-leaved pinweed
Lechea villosa+	Hairy pinweed
Lespedeza capitata	Round-headed clover
Liatris aspera	Rough blazing star
Liatris cylindracea	Blazing star
Linaria canadensis+	Blue toadflax
Lithospermum canescens	Hoary puccoon
Lithospermum caroliniense #+	Hairy puccoon
Lithospermum incisum	Yellow puccoon
Lobelia inflata	Indian tobacco
Lupinus perennis+	Wild lupine
Luzula multiflora var. *echinata*	Wood rush
Monarda fistulosa	Bergamont
Oenothera rhombipetala+	Sand primrose
Oxalis violacea	Violet wood sorrel
Panicum capillare	Witch grass
Panicum virgatum	Prairie switchgrass
Paronychia canadensis	Forked chickweed
Paspalum ciliatifolium+	Hairy lens grass
Penstemon pallidus	Pale beardstongue
Physalis virginiana	Ground cherry
Plantago aristata	Bracted plantain
*Plantago lanceolata**	English plantain
*Poa compressa**	Canadian bluegrass
*Poa pratensis**	Kentucky bluegrass
Polygala polygama	Purple milkwort
Polygonum tenue	Slender knotweed
Polypodium virginianum	Common polypody
*Potentilla recta**	Sulphur cinquefoil
Potentilla simplex	Common cinquefoil
Pteridium aquilinum	Bracken fern
Ranunculus fascicularis	Early buttercup
Ratibida pinnata	Gray-headed coneflower
Rosa carolina	Wild rose
Rubus flagellaris	Dewberry
Rubus pensylvanicus	Blackberry
Rudbeckia hirta	Black-eyed Susan
Ruellia humilis	Wild petunia
*Rumex acetosella**	Sour dock
Schizachyrium scoparium #	Little bluestem
Scutellaria leonardii	Small skullcap

Table 17 continued

Selaginella rupestris	Sand club moss
Senecio plattensis	Prairie ragwort
Silphium integrifolium	Rosinweed
Sisyrinchium campestre	Prairie blue-eyed grass
Solidago nemoralis	Old-field goldenrod
Solidago speciosa var. *jujunifolia* +	Showy goldenrod
Specularia perfoliata	Venus' looking-glass
Sporobolus asper	Dropseed
Sporobolus heterolepis	Prairie dropseed
Stipa spartea '	Porcupine grass
Talinum rugospermum	**Prairie fame-flower SW**
Tephrosia virginiana #+	Goat's rue
Tradescantia ohiensis	Spiderwort
Tradescantia virginiana	Spiderwort
Viola pedata+	Birdfoot violet
Vitis riparia	Riverbank grape
Vulpia octoflora	Six-weeks fescue
Woodsia obtusa	Common woodsia

Gravel Prairie

Gravel prairies form where gravelly glacial outwash or till are exposed, usually on slopes. Gravels are usually of limestone or dolomite materials and thus impart a calcareous quality to the soils. Table 18 lists species typical of gravel prairie in the RRAW. Statewide, about one-third (11 acres) of all the gravel prairie (Category I, grade A or B) recognized by the INAI occurs at the Douglas E. Wade Nature Preserve within the RRAW; six other dry to dry-mesic gravel prairies (called dry or dry-mesic prairie on some INAI forms) are present within the RRAW (see Table 5). In some areas, pockets of aeolian sand provide habitat for species more typical of sand prairies.

Table 18. Compiled list of vascular plant species of gravel prairie within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

Characteristic plant species include: *Schizachyrium scoparium* (little bluestem), *Sporobolus heterolepis* (prairie dropseed), *Stipa spartea* (needle grass), *Bouteloua curtipendula* (sideoats grama), *Anemone patens* (pasque flower), *Aster ptarmicoides* (stiff aster), and *Scutellaria leonardii* (small skullcap).

Other species:

*Achillea millefolium**	Yarrow
Agrostis hyemalis	Winter bent grass
Agrostis scabra	Tickle grass
Ambrosia artemisiifolia	Common ragweed
Amorpha canescens	Lead plant
Andropogon gerardii	Big bluestem
Anemone canadensis	Canada anemone
Anemone cylindracea	Thimbleweed
Anemone patens +	Pasque flower
Antennaria neglecta	Pussytoes
Antennaria plantaginifolia	Plantainleaf pussytoes
Apocynum cannabinum	Indian hemp
Arenaria stricta +	Sandwort
Artemesia campestris	Beach wormwood
Asclepias amplexicaulis	Sand milkweed
Asclepias hirtella	Green milkweed
Asclepias ontarioides +	**Wooly milkweed SE**
Asclepias syriaca	Common milkweed
Asclepias verticillata	Whorled milkweed
Asclepias viridiflora +	Short green milkweed

Table 18 continued

Aster azureus +	Sky-blue aster
Aster ericoides	Heath aster
Aster laevis	Smooth blue aster
Aster linariifolius	Stiff-leaved aster
Aster oblongifolius	Aromatic aster
Aster sericeus	Silky aster
Baptisia leucophaea	Cream wild indigo
Bouteloua curtipendula #	Sideoats grama
Brickellia eupatorioides	False boneset
Campanula rotundifolia	Harebell
Castilleja sessiliflora +	**Downy yellow painted cup ST**
Ceanothus americanus	New Jersey tea
Ceonothus herbaceous	**Redroot SE**
Circium discolor	Pasture thistle
Cirsium hillii	**Hill's thistle ST**
Comandra umbellata	False toadflax
Coreopsis palmata	Tickseed
Dalea candida	White prairie-clover
Dalea purpurea	Purple prairie-clover
Desmodium canadense	Showy tick trefoil
Desmodium illinoense	Tick trefoil
Dichanthelium acuminatum var. *lindheimeri*	Panic grass
Dichanthelium leibergii	Panic grass
Dichanthelium oligosanthes var. *scribner*	Panic grass
Dodecatheon meadia	Shooting star
Echinacea pallida	Pale purple coneflower
Elymus canadensis	Canada wild rye
Equisetum arvense	Field horsetail
Eragrostis spectabilis	Purple love grass
Erigeron strigosus	Whitetop fleabane
Eryngium yuccifolium	Rattlesnake master
Eupatorium altissimum	Tall boneset
Euphorbia corollata	Flowering spurge
Euthamia graminifolia	Grass-leaved goldenrod
Fragaria virginiana	Wild strawberry
Gaura biennis	Gaura
Gentiana puberula	Downy gentian
Geum triflorum +	Prairie smoke
Hedeoma hispida	Rough pennyroyal
Hedyotis longifolia	Long-leaved bluets
Helianthemum canadense	Rock rose
Helianthus occidentalis +	Western sunflower
Heliopsis helianthoides	False sunflower
Heuchera richardsonii	Prairie alum root
Hieracium longipilum	Long-bearded hawkweed
Hypoxis hirsuta	Yellow star-grass
Koeleria macrantha	June grass
Krigia biflora	False dandelion
Krigia virginica	False dandelion
Lespedeza capitata	Round-headed clover
Lespedeza leptostachya +	**Prairie bush clover SE**
Liatris aspera	Rough blazing star
Liatris cylindracea	Blazing star
Linum sulcatum	Grooved yellow flax
Lithospermum canescens	Hoary puccoon
Lithospermum caroliniense	Hairy puccoon
Lithospermum incisum +	Yellow puccoon

Table 18 continued

Monarda fistulosa	Bergamont
Muhlenbergia cuspidata +	Prairie satin grass
Muhlenbergia racemosa	Green muhly
Nothocalais cuspidata +	**Prairie dandelion SE**
Oenothera biennis	Evening primrose
Onosmodium hispidissium	Marbleseed
Oxalis violacea	Violet wood sorrel
Panicum virgatum	Prairie switchgrass
Parthenium integrifolium	Wild quinine
Pedicularis canadensis	Wood betony
Penstemon pallidus	Pale beardstongue
Phlox pilosa	Prairie phlox
Physalis virginiana	Ground cherry
Polygala sanguinea	Field milkwort
Potentilla arguta	Prairie cinquefoil
Prenanthes aspera	Rough white lettuce
Pycnanthemum tenuifolium	Slender mountain mint
Ratibida pinnata	Gray-headed coneflower
Ruellia humilus	Wild petunia
Salix humilus	Prairie willow
Schizachyrium scoparium #	Little bluestem
Scutellaria leonardii +	Small skullcap
Senecio plattensis	Prairie ragwort
Silphium integrifolium	Rosinweed
Silphium laciniatum	Prickly lettuce
Sisyrinchium albidum	Blue-eyed grass
Solidago juncea	Early goldenrod
Solidago missouriensis	Missouri goldenrod
Solidago nemoralis	Old-field goldenrod
Solidago ptarmicoides	Stiff aster
Solidago rigida	Stiff goldenrod
Solidago speciosa	Showy goldenrod
Sorghastrum nutans	Indian grass
Sporobolus asper	Dropseed
Sporobolus heterolepis #	Prairie dropseed
Stipa spartea #	Porcupine grass
Tephrosia virginiana	Goat's rue
Tradescantia ohiensis	Spiderwort
Trichostema brachiatum +	False pennyroyal
Verbena stricta	Hoary vervain
Viola pedatifida	Prairie violet
Zizia aptera +	Heart-leaved meadow parsnip

Dolomite Prairie

Dolomite prairies form where dolomite bedrock is at or near the surface and strongly influences soil chemistry, permeability, and drainage. Dolomite prairie is local in the RRAW and associated with dry to dry-mesic gravel prairies. The INAI documented a three-acre, high-quality dry dolomite prairie within the RRAW (White, 1978; Illinois Natural Heritage Database, 1995). Numerous calciphiles are typically present including some of the threatened and endangered species from gravel prairie. Table 19 lists species typical of dolomite prairie in the RRAW.

Table 19. Compiled list of vascular plant species of dolomite prairie within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

Amorpha canescens	Lead plant
Andropogon gerardii	Big bluestem
Anemone cylindracea	Thimbleweed
Anemone patens +	Pasque flower
Antennaria neglecta	Pussytoes
Antennaria plantaginifolia	Plantainleaf pussytoes
Arenaria stricta +	Sandwort
Asclepias ontarioides +	**Wooly milkweed SE**
Asclepias syriaca	Common milkweed
Asclepias tuberosa	Butterfly weed
Asclepias verticillata	Whorled milkweed
Asclepias viridiflora	Short green milkweed
Aster azureus +	Sky-blue aster
Aster ericoides	Heath aster
Aster laevis	Smooth blue aster
Aster oblongifolius	Aromatic aster
Aster sericeus	Silky aster
Baptisia leucophaea	Cream wild indigo
Brickellia eupatorioides	False boneset
Carex meadia	Mead sedge
Castilleja sessiliflora +	**Downy yellow painted cup ST**
Ceonothus americanus	New Jersey tea
Cirsium discolor	Field thistle
Comandra umbellata	False toadflax
Coreopsis palmata	Tickseed
Dalea candida	White prairie-clover
Dalea purpurea	Purple prairie-clover
Desmodium canadensis	Showy tick trefoil
Desmodium illinoiense	Tick trefoil
Dichanthelium leibergii	Panic grass
Dichanthelium oligosanthes var. *scrib.*	Panic grass
Dodecatheon meadia	Shooting star
Echinacea pallida	Pale purple coneflower
Elymus canadensis	Canada wild rye
Equisetum arvense	Field horsetail
Eryngium yuccifolium	Rattlesnake master
Eupatorium altissimum	Tall boneset
Euphorbia corollata	Flowering spurge
Fragaria virginiana	Wild strawberry
Gentiana puberula	Downy gentian
Geum triflorum +	Bedstraw
Helianthus occidentalis	Western sunflower
Helianthus rigidus	Stiff sunflower
Heliopsis helianthoides	False sunflower
Heuchera richardsonii	Prairie alum root
Hypoxis hirsuta	Yellow star grass
Lespedeza capitata	Round-headed clover
Liatris aspera	Rough blazing star
Liatris cylindracea +	Blazing star
Lithospermum canescens	Hoary puccoon
Lithospermum incisum	Yellow puccoon
Monarda fistulosa	Bergamont

Table 19 continued

Nothocalais cuspidata	**Prairie dandelion SE**
Oxalis violacea	Violet wood sorrel
Panicum virgatum	Prairie switchgrass
Parthenium integrifolium	Wild quinine
Pastinaca sativa *	Wild parsnip
Pedicularis canadensis	Wood betony
Penstemon hirsutus +	Hairy beardstongue
Phlox pilosa +	Prairie phlox
Potentilla arguta	Prairie cinquefoil
Ratibida pinnata	Gray-headed coneflower
Rosa carolina	Wild rose
Rudbeckia hirta	Black-eyed Susan
Ruellia humilis	Wild petunia
Schizachyrium scoparium #	Little bluestem
Silphium integrifolium	Rosinweed
Silphium laciniatum	Prickly lettuce
Sisyrinchium albidum	Blue-eyed grass
Solidago juncea	Early goldenrod
Solidago nemoralis	Old-field goldenrod
Solidago ptarmicoides	Stiff aster
Solidago rigida	Stiff goldenmrod
Solidago speciosa	Showy goldenrod
Sorghastrum nutans	Indian grass
Sporobolus asper	Dropseed
Sporobolus heterolepis #	Prairie dropseed
Stipa spartea	Porcupine grass
Tradescantia ohiensis	Spiderwort
Triosteum perfoliatum	Horse-gentian
Verbena stricta	Hoary vervain
Viola pedata	Birdfoot violet
Viola pedatifida +	Prairie violet
Zizia aptera +	Heart-leaved meadow parsnip

Glacial Drift Hill Prairie

This prairie type typically occurs in south and southwest exposed openings of forested slopes over a substrate of eroded glacial drift. Hill prairies were often spared from agricultural conversion due to their inaccessibility. These are usually very well drained sites along major river valleys and ravines, and those of their tributaries. The INAI recognized 0.12 ha (0.3 acres) category I, grade A (White, 1978; Illinois Natural Heritage Database, 1995) from a single site within the RRAW where the Rock River has cut through the edge of a Wisconsinan-aged moraine (Fell and Fell, 1956; Willman, et al., 1975). Plant species typical of glacial drift hill prairie in the RRAW are listed in Table 20.

Table 20. Compiled list of vascular plant species of glacial drift hill prairie within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

Amorpha canescens	Lead plant
Andropogon gerardii	Big bluestem
Anemone cylindracea	Thimbleweed
Anemone patens +	Pasque flower
Anemone virginiana	Tall anenome
Apocynum androsaemifolium	Spreading dogbane
Asclepias verticillata	Whorled milkweed
Aster azureus	Sky-blue aster
Aster ericoides	Heath aster
Aster oblongifolius	Aromatic aster

Table 20 continued

Aster sericeus +	Silky aster
Bouteloua curtipendula #	Sideoats grama
Brickellia eupatorioides	False boneset
Cacalia atriplicifolia	Pale Indian plantain
Carex meadia	Sedge
Coreopsis palmata	Tickseed
Dalea purpurea #	Purple prairie-clover
Desmodium nudiflorum	Bare-stemmed tick trefoil
Dichanthelium oligosanthes var. *scrib.*	Panic grass
Echinacea pallida #	Pale purple coneflower
Erigeron strigosus	Whitetop fleabane
Euphorbia corollata	Flowering spurge
Helianthus divaricatus	Woodland sunflower
Helianthus occidentalis	Western sunflower
Liatris aspera	Rough blazing star
Linum sulcatum	Grooved yellow flax
Lithospermum canescens	Hoary puccoon
Lithospermum incisum +	Yellow puccoon
Lobelia spicata	Lobelia
Poa compressa *	Canadian bluegrass
Polygala verticillata	Whorled milkwort
Potentilla arguta	Prairie cinquefoil
Quercus macrocarpa	Bur oak
Quercus velutina	Black oak
Rhus glabra	Smooth sumac
Rosa carolina	Wild rose
Ruellia humilis	Wild petunia
Schizachyrium scoparium #	Little bluestem
Scutellaria leonardii	Small skullcap
Sisyrinchium albidium	Blue-eyed grass
Solidago nemoralis	Old-field goldenrod
Sorghastrum nutans	Indian grass
Sporobolus heterolepis #	Prairie dropseed
Tradescantia ohiensis	Spiderwort

Nachusa Grasslands

The Nature Conservancy's (TNC) Nachusa Grassland Preserve is located in the southern part of the RRAW (almost entirely within the Franklin Creek watershed). The 413 ha. (1,020 acre) TNC site was incorporated as part of the recently designated 635 ha. (1,569.46 acre) Nachusa Grassland Illinois Natural Areas Inventory site, which also included 3 existing INAI sites. This new INAI site contains high quality (Category I, Grade B) examples of a marsh and seep, within a complex of forest, grassland, wetland, and stream/riparian communities that have suffered varying levels of past disturbance. The Nature Conservancy's parcel is 60% grassland, 30% woodland, and 10% wetland/stream habitat, and although most of this was similarly degraded, it has been managed under a restoration program for nearly a decade. As discussed in the following **Grassland Birds** section, this management appears to have had positive effects for avifaunal habitat. The TNC site represents examples of degraded and restored dry-mesic sand, mesic sand, and gravel prairies and is designated as a protected natural area. The habitats present in the entire INAI complex support eight state endangered and threatened plant species, three state listed bird species, and one-each federal candidate plant and reptile species.

Grassland Fauna

The Illinois Fish and Wildlife Information System (IFWIS-Illinois Department of Natural Resources/Illinois Natural History Survey) lists more than 420 vertebrate species for the state (Iverson and Schwartz, 1994). Of these, 35% of the birds (J. Herkert, Illinois Endangered Species Protection Board, pers. com.), 10.0% of the reptiles and amphibians (C. Phillips, Illinois Natural History Survey, pers. com), and 47% of the mammals (E. Heske, Illinois Natural History Survey, pers. com.) require grassland habitat for some portion of their life cycle.

Of the 198 native vertebrates reported for the RRAW, 29% of the birds, 63% of the reptiles and amphibians, and 61% of the mammals use grassland habitat during part of their life cycle.

Grassland Birds

References in italics in the following section refer to tables in Appendices C and D.

The following information represents data collected from the field surveys: Ann Haverstock of The Nature Conservancy, approximately 10 visits/year for 5 years; Scott Robinson of the Natural History Survey and Jim Herkert of the Endangered Species Protection Board, censuses conducted on 19 June 1995 and additional census visits on 10 June and 5 July 1995; additional full-time nest searches from 5 June to 26 July 1995 (work supervised by Scott Robinson and Jim Herkert) (see Figure 13).

Introduction

Currently, the Rock River Assessment Watersheds contain only one significant grassland habitat for avifauna, The Nature Conservancy's Nachusa Grassland, plus a scattering of pastures and hayfields on private land. The Nachusa Grassland itself is of particular interest because the extensive efforts to restore grasslands appear to be working for birds.

Typical Species

Table 12 lists breeding bird species known for the area. Habitat associations are indicated for each species; typical grassland/prairie and adjacent shrubland species are noted. Other than a few European starlings and house sparrows, the only significant exotic is the ring-necked pheasant, which is abundant in all grassland sites. Typical species for several grassland associated habitats within the Rock River Assessment Watersheds are also listed below, in Table 21.

Table 21. Typical grassland and shrub associated bird species in the Rock River Assessment Watersheds. Nomenclature follows the American Ornithologists' Union (A.O.U.) Checklist (6th edition, 1983 and Supplement of July, 1985). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW).

Typical grassland species include: Upland Sandpiper (SE), ring-necked pheasant, red-tailed hawk, northern harrier (SE), American kestrel, great horned owl, horned lark, sedge wren, common yellowthroat, dickcissel, lark sparrow, grasshopper sparrow, vesper sparrow, savannah sparrow, bobolink and eastern meadowlark.

Species typical of shrub thickets that invade unburned and unmowed grassland include: bobwhite, mourning dove, black-billed cuckoo, northern flicker, willow flycatcher, eastern kingbird, black-capped chickadee, house wren, eastern bluebird, American robin, gray catbird, northern mockingbird, brown thrasher, cedar waxwing, loggerhead shrike (ST), white-eyed vireo, Bell's vireo, blue-winged warbler, yellow warbler, yellow-breasted chat, indigo bunting, rufous-sided towhee, chipping sparrow, field sparrow, song sparrow, orchard oriole, Baltimore oriole, and American oldfinch.

Agricultural land in the RRAW typically has horned larks, vesper sparrows, eastern and western meadowlarks and a few savannah sparrows, grasshopper sparrows, and bobolinks.

Unique or Rare Species

Illinois endangered upland sandpipers and northern harriers nest on or near Nachusa. Cooper's hawks nest in the pines and, possibly, adjacent forests. Veeries (ST) nest in adjacent forests. Loggerhead shrikes (ST) nest in shrubby areas. Henslow's sparrows (ST) and short-eared qwls (SE) are not known to breed. The nesting population of Bell's vireo in shrubs is one of the only ones in the region. Clay colored sparrows have been present during some summers, but have not been confirmed as breeders.

Population Distribution, Abundances, and Trends

Appendix C lists the relative abundances of species recorded on 39 census points in the grassland habitats of Nachusa. Abundances of several species are among the highest yet recorded in the state, including grasshopper sparrow, willow flycatcher and Bell's vireo. Because the latter two species depend upon shrubs, and shrubs are gradually being removed, their populations will undoubtedly begin to decline. Grasshopper sparrows, on the other hand, respond very well to the little bluestem restoration and burns; their population will likely increase. Many other shrub-dependent species, however, will also likely decrease, including house wrens, blue jays, and gray catbirds, which often depredate the nests of other birds, bobwhite, mourning doves, black-billed cuckoos, red-bellied and downy woodpeckers, willow flycatchers, eastern kingbirds, black-capped chickadees, eastern

bluebirds, robins, brown thrashers, cedar waxwings, yellow warblers, warbling vireos, cardinals, indigo buntings, rufous-sided towhees, and chipping and field sparrows. Further restoration should enhance populations of bobolinks, sedge wrens, meadowlarks, savannah sparrows, yellowthroats, and upland sandpipers. Restoration may also attract Henslow's sparrows (ST), short-eared owls (SE), and northern harriers (SE).

Habitat Notes

Suitability for Breeding Requirements

Nesting success of all but a few species on Nachusa was low, largely as a result of high rates of nest predation (*Appendix D*). Cowbird parasitism was only a problem for a few shrub-nesting species, all of which were represented by only a small sample of nests. Overall, only 8.2% of 97 nests were parasitized. This is consistent with data from other grassland habitats in Illinois (J. Herkert and S.K. Robinson, unpubl. data). Notably, cowbirds were regularly recorded in the Nachusa Grasslands (*Appendix C*), which implies that grassland birds may escape parasitism through superior defenses against parasitism.

Nest predation rates were especially severe for the shrub-nesting species that use the woody vegetation that invades unburned and unmowed fields. gray catbirds, brown thrashers, northern cardinals, rufous-sided towhees, indigo buntings, field sparrows, song sparrows, lark sparrows, and American goldfinches all lost essentially all of their nests to predators. Among the shrub nesters, only the eastern kingbird, American robin, and willow flycatcher had predation rates low enough to allow some reproduction. All of these species defend their nests aggressively against predators. Losing the shrubby vegetation therefore will only be reducing productive populations of a few of the many shrub species that have invaded the grassland.

Grassland birds generally suffered much lower predation rates than shrub-nesting birds. red-winged blackbirds and dickcissels suffered high predation rates, but many dickcissel nests fledged young, which suggest that predation estimates may be too high. Grasshopper sparrow predation rates were high (76%), but with renesting, most grasshopper sparrows probably fledged young. Vesper sparrows and eastern. meadowlarks both had low enough predation rates that they may be nesting successfully.

Positive and Negative Aspects of Habitat

The breeding bird community of the Nachusa Grasslands already contains most of the typical grassland species found in the RRAW. Restoration efforts have been successful in attracting several key species and populations of most (or all) will increase substantially as more and more fields are acquired.

Currently, there are too many shrubs mixed with the grasses, which enables predators to search for nests in the grasslands. Removal of shrubby hedgerows, snags, and isolated trees (this removal is proceeding now) should benefit grassland species. Most of the shrubland species are nesting so unsuccessfully that their population declines may actually benefit local populations of grassland birds. Retention of a few shrubby areas, however, would benefit Bell's vireo and willow flycatcher, which are species of special concern.

Grassland Amphibians and Reptiles

The following information reflects field survey work conducted by Phil Smith, herpetologist and ichthyologist at INHS from 1953 to 1983 and more recently, surveys conducted from 1980 to 1995 by Randy Nÿboer, Natural Heritage biologist and regional administrator for the DNR (see Figure 14).

Typical Species

Some of the grassland species are characteristic of more western associations, and these northern Illinois populations represent relictual ranges from several thousand (4,000-8,000) years ago. Table 14 lists the reptile and amphibian species that are known or thought to occur in the Rock River Assessment Watersheds. There are museum or literature records of the RRAW for all but one of these species, the false map turtle. The amphibians and reptiles restricted to the Prairie Division include: tiger salamander, smooth green snake, fox snake, and plains garter snake. The ornate box turtle, slender glass lizard, six-lined racerunner, racer, and bullsnake are found in portions of the Sand Areas Division prairie/grassland areas (Table 13). The six-lined racerunner and slender glass lizard can may also be found in hill prairie remnants. Additional species typical of grasslands are the habitat generalists are also listed in Table 14. No exotic amphibians or reptiles are known from the RRAW at the present time.

Unique or Rare Species

As discussed in the previous section, several species can be considered unique because of their relictual or disjunct distribution. The ornate box turtle, six-lined racerunner, and slender glass lizard occur in highly fragmented populations whose distribution is determined to a large degree by the presence of sandy soils. In addition, the ornate box turtle is unique because it reaches the eastern limits of its distribution in the RRAW and other Sand Areas of Illinois. The state threatened western hognose snake is known from the sandy grassland/prairie remnants of the area.

Grassland Mammals

Species information in this section has been compiled from range maps and known records through 1989, reported in Hoffmeister (1989) and Illinois Natural Heritage Database records (1980-1995) (see Figure 15).

Introduction

Most of the grassland species discussed below are not restricted to "native" or undisturbed habitat. Rather, the structure of rights-of-way buffers, small-grain fields and other agricultural field edges, and other similarly constructed or disturbed sites provides suitable habitat for many of these species. While the small size of most of these habitats may restrict their suitability for species that have large home ranges (ie. white-tailed jackrabbit [SE] and badger), they often act as travel corridors for these and numerous other species.

Typical Species

Typical species for the RRAW are listed in Table 15. Species restricted to grassland habitat include: least shrew, thirteen-lined ground squirrel, Franklin's ground squirrel, western harvest mouse, deer mouse, prairie vole, least weasel, and badger. Other species primarily associated with or that reach their greatest densities in grasslands include northern short-tailed shrew, eastern cottontail, meadow vole, meadow jumping mouse, and southern bog lemming (the latter two especially in mesic grasslands). Additional species include the habitat generalists are also listed in Table 15. The exotic species *Mus musculus*, house mouse, can be found in and around grassland associated buildings.

Unique or Rare Species

The white-tailed jackrabbit [SE] once occurred in this area, but no recent sightings have been confirmed and it may be extinct in Illinois. Protection of the area and habitat restoration could allow recolonization from the north or west, or make reintroduction feasible. The Savanna Army Depot, in extreme northwestern Illinois, is the area of its last known occurrence in the state (Herkert, 1991b). The RRAW would be the only other part of the state where reestablishment of white-tailed jackrabbit could occur (assuming it is actually extirpated from Illinois).

COMMUNITY DESCRIPTIONS: SAVANNA/BARRENS

Characteristics of Savanna/Barrens Vegetation

Structural changes due to fire absence throughout the RRAW, grazing, and habitat destruction have eliminated most savannalike communities, particularly mesic sites. However, features in the surface geology that have promoted the persistence of savanna/barrenslike habitats are localized throughout the region. Droughtlike conditions found where bedrock is near the surface have slowed vegetational changes characterized on more mesic sites by the encroachment of woody vegetation in the absence of fire. These local openings with scattered, open-grown oaks usually occur within a complex of dry upland forest, sandstone cliff communities, and even sand prairies and thus have somewhat similar floristic composition (Table 22). Species on sandstone cliffs are included in the following section on **Primary Communities**. Some of these remnants have been degraded but not destroyed by cattle grazing.

Table 22. Compiled list of vascular plant species of savanna/barrens within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

canopy dominants - *Quercus velutina* (black oak), *Q. alba* (white oak)

subcanopy - *Juniperus virginiana* (red cedar)

shrubs - ***Vaccinium myrtilloides*** W (Canada blueberry), *Gaylussacia baccata* (huckleberry), *Amorpha canescens* (lead plant)

ground cover -

Andropogon gerardii	Big bluestem
Anemone virginica	Tall anemone
Antennaria plantaginifolia	Plantainleaf pussytoes
Aquilegia canadensis	Columbine
Astragalus canadensis +	Milk vetch
Besseya bullii +	**Kitten tails ST**
Bouteloua curtipendula	Sideoats grama
Campanula rotundifolia +	Harebell
Carex pensylvanica+	Pennsylvania sedge
Comandra umbellata	Bastard toadflax
Cyperus filiculmis	Fern flatsedge
Cystopteris protrusa	Fragile fern
Danthonia spicata	Poverty oat grass
*Daucus carota**	Queen Anne's lace
Dichanthelium oligosanthes	Panic grass
Dichanthelium villosissimum	Panic grass
Dodecatheon meadia	Shooting star
Erigeron strigosus	Whitetop fleabane
Gaylussacia baccata	Huckleberry
Helianthemum canadense	Rock rose
Heuchera americana	Tall alum root
Juniperus virginiana	Red cedar
Krigia biflora	False dandelion
Lathyrus ochroleucus +	**Pale vetchling ST**
Liatris aspera	Rough blazing star
Liatris cylindracea	Blazing star
Lupinus perennis +	Wild lupine
Maianthemum canadense	Wild lily-of-the-valley
Monarda fistulosa	Bergamont
Onosmodium hispidissimum	Marbleseed

table 22 continued

Paronychia canadensis+	Forked chickweed
Penstemon calycosus	Smooth beard-tongue
Penstemon hirsutus	Hairy beard-tongue
*Poa compressa**	Canadian bluegrass
Pteridium aquilinum +	Bracken fern
*Rumex acetosella**	Sour dock
Schizachyrium scoparium +	Little bluestem
Selaginella rupestris	Sand club moss
Sporobolus asper	Drop seed
Talinum rugospermum W+	Prairie fame-flower
Tephrosia virginiana	Goat's rue
Tradescantia ohiensis	Spiderwort
Vicia villosa	Vetch
Vulpia octoflora	Six-weeks fescue

Savanna/Barrens Fauna

There are no faunal species restricted to any of the savanna/barrens community habitats discussed. Because these communities occur within the forest/prairie transition, many woodland and grassland species may by considered occasional associates.

COMMUNITY DESCRIPTIONS: PRIMARY

Characteristics of Primary Community Vegetation

Primary communities are formed on bedrock outcroppings. Sandstone and dolomite are the two basic types of bedrock exposed within the RRAW.

Sandstone Cliff

The extent of sandstone bedrock outcrops in the Oregon Section of the Rock River Hill Country Natural Division makes this unique community type especially important to the biologic integrity of the RRAW. As noted previously, outcroppings of St. Peter sandstone provide habitat for numerous rare plant species under a variety of environmental conditions (eg., exposed xeric sites and more moderate mesic canyon walls and north facing sites). Particularly noteworthy examples of sandstone cliff communities occur at Castle Rock State Park, including the Castle Rock itself. Other outcroppings with high quality plant communities occur in the following INAI natural areas (see also Table 5): Rock River Yellow Birch Stand, Grand Detour Yellow Birch Site, Lowden-Miller, Little Tract at Castle Rock, and Nachusa Grasslands. Species found on sandstone include the following list.

Table 23. Compiled list of vascular plant species of sandstone cliff communities within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, TE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

*Achillea millefolium**	Yarrow
*Alliaria petiolata**	Garlic mustard
Amelanchier laevis	Shadbush
Antennaria plantaginifolia	Plantainleaf pussytoes
Aralia nudicaulis	Wild sarsaparilla
Arctostaphylos uva-ursi	**Bearberry ST**
Aronia melanocarpa	Black chokecherry
Artemesia campestris+	Beach wormwood
Aster azureus	Sky-blue aster
Besseya bullii	**Kitten tails ST**
Betula allegheniense	**Yellow birch SE**
Campanula rotundifolia+	Harebell

Table 23 continued

Carex pensylvanica	Pennsylvania sedge
Comandra umbellata	Bastard toadflax
Cornus canadensis	**Bunchberry SE**
Corydalis sempervirens	**Pink corydalis SE**
Corylus americanus	Hazelnut
Cyperus filiculmis	Fern flatsedge
Cystopteris protrusa +	Fragile fern
Danthonia spicata	Poverty oat grass
Dichanthelium villosissimum	Panic grass
Diervilla lonicera	Bush honeysuckle
Dryopteris marginalis	Leather fern
Dryopteris carthusiana	Spinulose woodfern
Eragrostis spectabilis	Purple love grass
Euphorbia corollata	fFowering spurge
Gaylussacia baccata+	Huckleberry
Goodyera pubescens+	Rattlesnake plantain
Gymnocarpium dryopteris	**Oak fern SE**
Hamamelis virginiana	Witch-hazel
Helianthemum canadense+	Rock rose
Hedyotis caerulea	Bluets
Hypericum gentianoides+	Orange grass
Koeleria macrantha	June grass
Krigia biflora	False dandelion
Lechea tenuifolia+	Narrow-leaved pinweed
Lespedeza capitata	Round-headed bush clover
Liatris aspera	Rough blazing star
Liatris cylindracea+	Blazing star
Linaria canadensis +	Blue toadflax
Lycopodium dendroideum	**Ground pine SE**
Maianthemum canadense +	Wild lily-of-the-valley
Osmunda claytonii+	Interrupted fern
Osmunda cinnamomea+	Cinnamon fern
Penstemon hirsutus	Hairy beard-tongue
Phegopteris connectilis	**Long beech fern SE**
Pinus strobus	White pine
*Poa compressa**	Canadian bluegrass
*Poa pratensis**	Kentucky bluegrass
Polypodium virginianum+	Common polypody
Populus grandidentata	Big-tooth aspen
Ptelea trifoliata	Wafer ash
Pteridium aquilinum+	Bracken fern
Quercus velutina	Black oak
Rhus glabra	Smooth sumac
*Rumex acetosella**	sour dock
Schizachyrium scoparium	Little bluestem
Selaginella rupestris +	Sand club moss
Solidago hispida	Hispid goldenrod
Solidago nemoralis	Old-field goldenrod
Solidago speciosa	Showy goldenrod
Sorbus americanus	**American mountain ash SE**
Talinum rugospermum +	**Prairie fame-flower SW**
Taxus canadensis	Canada yew
Tephrosia virginiana	Goat's rue
Trientalis borealis	**Star-flower ST**

Table 23 continued

Vaccinium myrtilloides	**Canada blueberry SW**
Viola macloskeyi ssp. *pallens*	Smooth white violet
Vulpia octoflora+	Six-weeks fescue
Woodsia ilvensis	**Rusty woodsia SE**
Woodsia obtusa +	Common woodsia

Dolomite Cliff

Outcroppings of dolomite are primarily along the Rock River bluffs on the west side of the Rock River north of Oregon, at Franklin Creek Nature Preserve, and at White Pines Forest State Park. Species found on dolomite cliff faces include those in the following list.

Table 24. Compiled list of vascular plant species of dolomite cliff communities within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

Acalypha rhomboidea	Three-sided mercury
Aquilegia canadensis +	Columbine
Arabis shortii	Toothed cress
Aralia racemosa +	American spikenard
Asplenium rhizophyllum +	Walking fern
Cheilanthes feei +	Lip fern
Cornus alternifolia	Alternate-leaved dogwood
Cystopteris bulbifera #+	Bulblet fern
Dirca palustris +	Leatherwood
Dodecatheon meadia	Shooting star
Eupatorium rugosa	White snakeroot
Hydrangea arborea	Wild hydrangea
Hydrophyllum virginianum	Virginia waterleaf
Impatiens pallida	Pale touch-me-not
Juniperus virginiana	Red cedar
Lonicera prolifera +	Yellow honeysuckle
Oryzopsis racemosa +	**Black-seeded ricegrass ST**
Parthenocissus quinquifolia	Virginia creeper
Pellaea glabella +	Purple cliff brake
Physocarpus opulifolius +	Common ninebark
Pilea pumila	Clearweed
Pinus strobus	White pine
Polymnia canadense #+	Leafcup
Ptelea trifoliata	Wafer-ash
Ribes cynbostii	Prickly wild gooseberry
Rubus occidentalis	Black raspberry
Sambucus canadensis	Elderberry
Scrophularia marilandica	Late figwort
Solidago flexicaulis	Broadleaf goldenrod
Staphylea trifolia	Bladdernut
Sullivantia renifolia +	**Sullivantia ST**
Taxus canadensis +	Canada yew

Primary Community Fauna

There are no faunal species restricted to any of the primary communities habitats discussed. Because these predominantly small communities typically occur within forests, many woodland faunal species are considered occasional associates.

COMMUNTIY DESCRIPTIONS: WETLANDS

Characteristics of Wetland Vegetation

Introduction

It is estimated that Ogle county, which accounts for the majority of the RRAW, suffered a loss of between 80-89% of its wetland habitat following European settlement (Suloway and Hubble, 1994). According to the Land Cover Database of Illinois (IDENR, 1995), wetlands (lacustrine and palustrine) currently cover 1,140 ha. (2,818 acres [0.4%]) of the RRAW land area. The inclusion of floodplain forest to wetland acreage brings the total to about 3,300 ha. (8,152 acres [1.2%]) of the land area, compared to 2.3% for Illinois overall. Also in comparison to the rest of Illinois, a greater proportion of the RRAW wetland area is wet meadow with some sedge meadow (38.4% vs. 13%) and a smaller proportion is floodplain forest (34.2% vs. 60.5%). The RRAW is most similar to the rest of Illinois in percentage of wetland area that is marsh (3.6% vs. 3.1%) (Suloway and Hubbell, 1994). See **Forest** descriptions for floodplain forest community description. Community classification follows White and Madany (1978) with the exception of wet meadow which is used to describe degraded wetland communities currently dominated by *Phalaris arundinacea* (reed canary grass).

Wet Meadow

Pre-European settlement vegetation of wet meadows was probably mostly wet to wet-mesic prairie and sedge meadow. Today, wet meadows are characterized by strong dominance of the exotic *Phalaris arundinacea*, an aggressive, disturbance-tolerant cool-season grass species that readily occupies exposed moist ground. *Phalaris arundinacea* has been widely recommended for planting on moist soils throughout Illinois. However, the abundance of *P. arundinacea* often serves as evidence that some widespread disturbance has occurred in the wetland, such as hydrological changes associated with beaver dams, other alterations in flooding patterns, or siltation from croplands. Flooding for prolonged periods can kill even wetland vegetation including wet prairie and sedge meadow species. Typical composition of wet meadows within the RRAW is listed below (Table 25).

Table 25. Compiled list of vascular plant species of wet meadow within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

Agalinis tenuifolia	Slender false foxglove
Agrimonia parviflora	Swamp agrimony
*Agrostis alba**	Red top
Ambrosia trifida	Giant ragweed
Asclepias incarnata	Swamp milweed
Asclepias syriaca	Common milkweed
Aster pilosus	Hairy aster
Aster simplex	Panicled aster
Bidens cernua	Nodding bur-marigold
Bidens frondosa	Beggar's-ticks
Boehmeria cylindrica	False nettle
Carex annectans	Yellow fox sedge
Carex hystricina	Bottlebrush sedge
Carex stipata	Prickly sedge
Carex tribuloides	Sedge
Carex trichocarpa	Sedge
*Cerastium nutans**	Nodding mouse-ear chickweed
Cirsium altissimum	Tall thistle
Conyza canadensis	Horseweed
*Daucus carota**	Queen-Anne's-lace
Echinocystis lobata	Wild cucumber
Epilobium coloratum	Cinnamon willow herb
Erigeron annuus	Daisy fleabane
Eupatorium perfoliatum	Common boneset
Helenium autumnale	Sneezeweed
Humulus lupulus	Common hops
Impatiens capensis	Jewelweed

Table 25 continued

*Lactuca serriola**	Prickly lettuce
Leersia oryzoides	Rice cutgrass
Lobelia siphilitica	Great blue lobelia
Lycopus americanus	Common water horehound
Lycopus virginicus	Bugle weed
Lysimachia lanceolata	Loosestrife
Monarda fistulosa	Bergamont
Oenothera biennis	Evening primrose
Penthorum sedoides	Ditch stonecrop
Phalaris arundinacea #+	Reed canary grass
Polygonum hydropiperoides	Wild water pepper
Polygonum lapathifolium	Pale smartweed
Polygonum pensylvanicum	Common smartweed
Polygonum punctatum	Smartweed
Polygonum sagittatum	Arrowleaf tearthumb
Polygonum scandens	Climbing false buckwheat
Populus deltoides	Eastern cottonwood
*Prunella vulgaris**	Self heal
Pycnanthemum virginianum	Mountain mint
Ranunculus septentrionalis	Swamp buttercup
Rumex altissimus	Pale dock
Salix amygdaloides	Peach-leaved willow
Salix exigua	Sandbar willow
Scirpus atrovirens	Common bulrush
Scirpus tabernaemontanii	Great bulrush
Scutellaria lateriflora	Mad-dog skullcap
Solidago canadensis	Canada goldenrod
Solidago gigantea	Late goldenrod
Solidago juncea	Early goldenrod
Spiranthes cernua	Nodding ladies tresses
Typha latifolia #	Common cattail
Verbena hastata	Blue vervain
Verbena urticifolia	White vervain

Sedge Meadow

Sedge meadows are graminoid wetland communities generally defined by dominance of several *Carex* species, particularly *C. stricta*, the tussock sedge. Sedge meadows sometimes are associated with marsh, wet prairie, and seeps. The RRAW historically featured a relatively greater coverage of sedge meadows than Illinois overall. Due to grazing and increased sedimentation, most sedge meadows have been converted to wet meadows dominated by the exotic species, *Phalaris arundinacea* (reed canary grass). *Typha latifolia* (common cattail) and *T. angustifolia* (narrow-leaved cattail) have become more abundant. Table 26 lists species typical of sedge meadow within the RRAW.

Table 26. Compiled list of vascular plant species of sedge meadow within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or W). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic spSecies.

Acer negundo	Black maple
*Agropyron repens**	Quack grass
*Agrostis alba**	Red top
Ambrosia trifida	Giant ragweed
Anemone canadensis	Canada anemone
Asclepias syriaca	Common milkweed
Asclepias incarnata	Swamp milkweed
Aster novae-angliae	New England aster
Aster puniceus	Swamp aster

Table 26 continued

Aster simplex	Panicled aster
Aster umbellatus	Flat-top aster
Bidens cernua	Nodding bur-marigold
Bidens frondosa	Beggar's-ticks
Calamagrostis canadensis	Bluejoint grass
Caltha palustris	Marsh marigold
Cardamine bulbosa	Bulbous cress
Carex annectans +	Sedge
Carex hystricina	Bottlebrush sedge
Carex interior #+	Inland sedge
Carex stipata	Prickly sedge
Carex stricta #+	Tussock sedge
Carex trichocarpa	Sedge
Cicuta bulbifera	Bulblet water hemlock
Cicuta maculata	Water hemlock
*Cirsium vulgare**	Bull thistle
Cornus racemosa	Gray dogwood
*Daucus carota**	Queen-Anne's-lace
Echinocystis lobata	Wild cucumber
Epilobium coloratum +	Cinnamon willow herb
Erigeron annuus	Daisy fleabane
Eupatorium maculatum	Spotted joe-pye weed
Eupatorium perfoliatum	Common boneset
Glyceria striata	Fowl meadow grass
Helenium autumnale	Sneezeweed
Helianthus grosseserratus	Sawtooth sunflower
Impatiens capensis	Pale touch-me-not
Iris shrevei	Wild blue iris
Juncus dudleyi +	Rush
*Lactuca serriola**	Prickly lettuce
Lathyrus palustris +	Marsh vetchling
Lycopus americanus	Common water horehound
Mentha arvensis	Wild mint
Mimulus ringens	Monkey flower
Oenothera biennis	Evening primrose
Onoclea sensibilis	Sensitive fern
Phalaris arundinacea	Need canary grass
*Poa pratensis**	Kentucky bluegrass
Polygonum lapathifolium	Pale smartweed
Polygonum pensylvanicum	common smartweed
Polygonum punctatum	Smartweed
Polygonum scandens	Climbing false buckwheat
Populus deltoides	Eastern cottonwood
Pycnanthemum virginianum	Mountain mint
Rudbeckia subtomentosa	Fragrant coneflower
*Rumex crispus**	Curly dock
Salix discolor +	Pussy willow
Salix exigua	Sandbar willow
Salix nigra	Black willow
Scirpus atrovirens	Common bulrush
Scirpus tabernaemontanii	Bulrush
Thalictrum dasycarpum	Meadow rue
Thelypteris palustris +	Marsh fern
Triadenum fraseri +	Fraser's St. John's-wort
Typha latifolia	Common cattail
Verbena hastata	Blue vervain
Verbena urticifolia	White vervain

Marsh

Marshes are freshwater communities that have water near or at the surface for most of the year. They are typically found in river valleys, glacial potholes, and lake plains. The INAI recognized 902 ha. (2230 acres) of high quality marsh for the state; 24 ha. (60 acres) within the Rock River Hill Country Natural Division (White, 1978). Nearly the entire 60 acres occur within the Nachusa Grasslands INAI site (Illinois Natural Heritage Database, 1995). Characteristic plant species for the community include: *Polygonum amphibium* (water smartweed), *Typha angustifolia* (narrow-leaved cattail), *Typha latifolia* (common cattail), *Alisma plantago-aquatica* var. *parviflorum* (common water-plantain), *Scirpus cyperinus* (wool grass), and *Scutellaria lateriflora* (mad-dog skullcap). Marsh plant-species composition tends to intergrade with wet prairie and sedge meadow when in association.

Graminoid Fen

Fens are alkaline peatlands maintained by a constant flow of ground water mineralized by calcareous glacial till. Due to the constant flow of cold ground water, growth of plants exceeds the rate of decomposition and consequently peat accumulates. Only one small graminoid fen, found adjacent to a marsh/sedge meadow at the Nachusa Grasslands INAI site, is known in the RRAW. Fens have a unique flora composed of numerous calciphiles (Table 27).

Table 27. Compiled list of vascular plant species of graminoid fen within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

Andropogon gerardii	Big bluestem
Angelica atropurpurea +	Angelica
Aster furcatus	**Forked aster ST**
Aster puniceus	Swamp aster
Cacalia suaveolens +	Sweet Indian plantain
Calamagrostis canadensis	Bluejoint grass
Caltha palustris +	Marsh marigold
Cardamine bulbosa	Bulbous cress
Cirsium muticum +	Swamp thistle
Cornus stolonifera	Red-osier dogwood
Eupatorium maculatum +	Spotted joe-pye weed
Eupatorium perfoliatum	Boneset
Galium boreale	Northern bedstraw
Gentiana andrewsii	Bottle gentian
Gentiana crinita +	Fringed gentian
Iris shrevii	Wild blue iris
Juncus effusus	Common rush
Lathyrus palustris	Marsh vetchling
Lilium michiganense	Michigan lily
Lobelia kalmii +	Bog lobelia
Lycopus americanus	Common water horehound
Lysimachia quadriflora +	Loosestrife
Muhlenbergia glomerata +	Muhly
Muhlenbergia mexicana +	Leaf satin grass
Parnassia glauca +	Grass-of-Parnassus
Pedicularis lanceolata +	Swamp betony
Polygala sanguinea	Field milkwort
Saxifraga pensylvanica	Swamp saxifrage
Solidago ohioensis +	Ohio goldenrod
Solidago patula +	Rough-leaved goldenrod
Solidago riddellii +	Goldenrod
Thelypteris palustris	Marsh fern
Veronicastrum virginicum	Culver's root

Seep *(sandstone)*
Seeps are wetland communities sustained by a constant flow of ground water. The ground water is usually mineralized by the local bedrock. Only a few acid seeps are known for the region, one is in the George B. Fell Nature Preserve in Castle Rock State Park, another is in the Nachusa Grasslands INAI site. Acreage is usually not reported for these typically small communities. Plant species typical of sandstone seeps within the RRAW are listed in Table 28.

Table 28. Compiled list of vascular plant species of sandstone seeps within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

Species characteristic of northern seeps that occur in the RRAW include: *Symplocarpus foetidus* (skunk cabbage), *Eupatorium maculatum* (spotted joe-pye weed), *Osmunda claytoniana* (interrupted fern), and *O. cinnamomea* (cinnamon fern).

Other species:

Apios americana	Groundnut
Athyrium angusta	Lady fern
Campanula americana	Tall bellflower
Carex comosa	Bristly sedge
Cinna arundinacea	Stout woodreed
Cornus obliqua	Silky dogwood
Cornus racemosa	Gray dogwood
Cryptotaenia canadensis	Honewort
Cypripedium acaule	**Moccasin flower SE**
Dryopteris carthusiana	Spinulose woodfern
Echinocystis lobata	Wild cucumber
Epilobium coloratum	Cinnamon willow herb
Equisetum sylvaticum	**Horsetail SE**
Impatiens capensis	Spotted touch-me-not
Laportea canadensis	Wood nettle
Leersia virginica	White grass
Lobelia siphilitica	Great blue lobelia
Osmunda cinnamomea +	Cinnamon fern
Osmunda claytoniana +	Interrupted fern
Osmunda regalis +	Regal fern
Polygonum sagittatum	Arrowleaf tearthumb
Saxifraga pensylvanica +	Swamp saxifrage
Scutellaria lateriflora	Mad-dog skullcap
Symplocarpus foetidus +	Skunk cabbage
Thalictrum dasycarpum	Meadow rue
Thelypteris palustris	Marsh fern
Trientalis borealis	**Star-flower ST**
Verbesina alternifolia	Wingstem
Viburnum lentago	Nannyberry

Seep *(calcareous to neutral)*
One seep community within the RRAW (just north of Oregon) is unique because it is formed near the contact zone between St. Peter sandstone and overlying dolomite bedrock. Seepage mineralized by the overlying dolomite in this area may become more neutral as it passes through sandstone prior to discharge, explaining a somewhat weak floristic expression of alkaline seeps. Muck (highly decomposed plant material) accumulation in the wetland produces quaking ground. Four species present, *Chelone glabra* (white turtlehead), *Campanula aparinoides* (marsh bellflower), *Epilobium ciliatum* (northern willow herb), and *Carex laevivaginata* (sedge) occur in calcareous fens, but they are also found in less specialized habitats such as marshes. Other abundant to common species are listed below in Table 29.

Table 29. Compiled list of vascular plant species of calcareous to neutral seeps within the Rock River Assessment Watersheds. Botanical nomenclature follows Mohlenbrock (1986). Species in bold are listed by the Illinois Endangered Species Protection Board as threatened, endangered, or watch-list species (ST, SE, or SW). Asterisks (*) denote alien species, (#) denote dominant species, (+) denote characteristic species.

Apios americanus	Groundnut
Asclepias incarnata	Swamp milkweed
Aster novae-angliae	New England aster
Aster puniceus +	Swamp aster
Boehmeria cylindrica	False nettle
Campanula aparinoides	Marsh bellflower
Cardamine bulbosa	Bulbous cress
Carex hystricina	Bottlebrush sedge
Carex laevivaginata	Sedge
Cassia marilandica +	Maryland senna
Chelone glabra	White turtlehead
Cornus racemosa	Gray dogwood
Epilobium ciliatum	Northern willow herb
Equisetum arvense	Common horsetail
Equisetum fluviatile	Water horsetail
Equisetum hyemale	Scouring rush
Eupatorium maculatum +	Spotted joe-pye weed
Eupatorium perfoliatum	Boneset
Eupatorium serotinum	Late boneset
Galium triflorum	Bedstraw
Geum laciniatum	Rough avens
Helenium autumnale	Sneeze weed
Impatiens capensis	Spotted touch-me-not
Iris shrevei	Wild iris
Leersia oryzoides	Rice cutgrass
Lobelia siphilitica	Great blue lobelia
Osmorhiza claytoniana	Sweet cicely
Pilea pumila	Clearweed
Poa pratensis #*	Kentucky bluegrass
Prunus americanus	Wild plum
Pycnanthemum virginianum	Mountain mint
Rosa blanda	Early wild rose
*Rosa multiflora**	Multiflora rose
Rosa palustris	Swampy rose
Rudbeckia laciniata	Goldenglow
Sagittaria lateriflora	Arrowhead
Sambucus canadensis	Bloodroot
Scirpus fluviatilis	River bulrush
Silphium integrifolium	Wholeleaf rosinweed
Solidago canadensis	Canada goldenrod
Teucrium canadense ssp. *virginicum*	Wood sage
Thelypteris palustris #	Marsh fern
Typha latifolia	Common cattail
Verbesina alternifolia	Wing stem

Wetland Fauna
According to references in Havera and Suloway (1994), from a list of 434 vertebrate species for the state, 37% of the birds require or are strongly associated with wetland habitat, 83% of the reptiles and amphibians, and 78% of the mammals use wetland habitat for some portion of their life cycle. Of the 198 native vertebrates reported for the RRAW, 30% of the birds, 77% of the reptiles and amphibians, and 56% of the mammals use wetland habitat during part of their life cycle.

Wetland Birds
References in italics in the following section refer to tables in Appendix B.
Information included in this section reflects field survey work done during May-August, 1994 (see Robinson, 1995) at the following locations: Lowden-Miller State Forest, Castle Rock State Park (George B. Fell Nature Preserve), White Pines Forest State Park, and Franklin Creek Nature Preserve (within the Franklin Creek State Natural Area) (see Figure 13).

Typical Species
The wetland bird resources of this area include typical riverine and stream species. Table 12 lists breeding birds species for the RRAW; species typical of wetland habitats are indicated. Robinson (1995: *Table 2.5*) lists some of the aquatic species that were recorded during surveys in 1994. Typical river species were great blue heron, mallard, wood duck, eastern Phoebe, house wren, northern rough-winged swallow, tree swallow, barn swallow, and song sparrow. Birds typical of forested wetlands are: wood duck, prothonotary warbler, red-headed woodpecker, American redstart, warbling vireo, Baltimore oriole, cedar waxwing, gray catbird, common yellowthroat, and American woodcock. Oxbow lakes and other backwaters had green herons and prothonotary warblers. *Table 2.7* in Robinson (1995) lists the floodplain forest species of Lowden-Miller and those typical of forest streams (e.g., Louisiana waterthrush, blue-gray gnatcatcher, Acadian flycatcher). The only exotic species reported in the area were starlings and house sparrows.

Unique or Rare Species
There are no wetland-associated state-listed bird species documented as breeding in the RRAW, although Great Egrets (threatened) were occasionally recorded feeding along the river.

Population Abundance and Habitat Notes
Tables 2.5 and 2.7 of Robinson (1995) provide population data. Floodplain forest communities were relatively poor for birds in comparison with upland forests. The comparative lack of natural floodplain disturbance may reduce the value of existing floodplains in Lowden-Miller State Forest.

Wetland Reptiles and Amphibians
Information reported in this section represents field survey work conducted by Phil Smith, herpetologist and ichthyologist at INHS from 1942 to 1979 and more recently, surveys conducted from 1980 to 1995 by Randy Nyboer, Natural Heritage biologist and regional administrator for DNR (see Figure 14).

Introduction
The larval stage for most amphibians requires an aquatic environment. All (13) of the amphibians reported for the RRAW require wetland habitat for some portion of their life cycle. Of the reptiles known for the RRAW, 14 (64%) are associated with wetlands. Seven of these species (50%) are predominantly riverine, while the remaining 50% use a variety of stream and other wetland types.

Typical Species
All reported amphibian species (tiger salamander, eastern newt, four-toed salamander, mudpupppy, American toad, cricket frog, chorus frog, spring peeper, gray treefrog, bullfrog, green frog, northern leopard frog, pickerel frog) may be found in a variety of wetland types. Painted turtle, milk snake, and the common garter snake may also use a variety of wetland types. Species characteristic of streams in the RRAW include: snapping turtle, Blanding's turtle, map turtle, false map turtle, spiny softshell turtle, western ribbon snake, and queen snake.

Unique or Rare Species
An Illinois threatened species, the four-toed salamander, and one state watch list species, the Blanding's turtle, are associated with the wetland habitat types present in the RRAW. Habitat requirements for these species are described below.

Habitat Requirements & Historical Records For Listed Species
Historical records for the two listed species were taken from the following sources: 1) specimens from museum, university, and private collections (referred to as vouchered records), 2) unvouchered records from the literature, 3) unvouchered records taken from reliable biologists and naturalists, and 4) the Illinois Natural Heritage Database (1995).

Four-toed salamander (ST)—This primarily terrestrial salamander is associated with undisturbed forests containing seeps or bogs. Recently, however, Illinois specimens have been taken in wooded ravines near rocky, spring-fed creeks. In the RRAW, three specimens are known from the Castle Rock State Park. This population was discovered by John Lynch in 1964 but repeated efforts by Ron Brandon and Randy Nÿboer (Brandon & Ballard, 1991; Nÿboer, pers. com.) have failed to document its continued presence in the area. However, based on the suitability of the habitat, both Brandon and Nÿboer (pers. com.) believe that this population still exists. This population is in a protected area.

Blanding's Turtle (SW)— 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. There are two sight records for Blanding's turtle in the RRAW by Randy Nÿboer; near a creek in the vicinity of Lowden-Miller State Forest (1982) and in the area of the Nachusa Grassland INAI site (1987).

Wetland Mammals
Species information in this section has been compiled from range maps and known records through 1989, reported in Hoffmeister (1989), Illinois Natural Heritage Database records (1980-1995), and undocumented Natural Heritage records from R.W. Nÿboer, pers. comm. (1995) (see Figure 15).

Typical Species
Typical species for the RRAW are listed in Table 15. Species whose life history require wetland habitats include: all species of bats (primarily as feeding areas), beavers, muskrats, minks, and river otters. Meadow voles and meadow jumping mice use wetland habitats in addition to grassland. Additional species associated with wetlands are the habitat generalists listed in Table 15. There are no known wetland-associated exotic species for the area.

Unique and Rare Species
There are two recent records (Illinois Natural Heritage Database, 1995) of the state endangered river otter reported for this area; one along the Rock River and one on a tributary, Leaf Creek. Additional occurrences have been reported along the Rock in the last few years, but have not been recorded into the Natural Heritage Database (Randy Nÿboer, pers. com.). The river otter is a riverine species that also utilizes the habitat provided by floodplain forests and associated wetlands. There are no confirmed records of Indiana bats for this area, but RRAW is within the geographic range of this species and more thorough surveys could find it. Bobcats occurred in the Rock River area historically, and specimens were recorded from there as recently as 20 years ago.

TERRESTRIAL COMMUNITIES SUMMARIES

Flora

Although less than 1.0% of the area of the Rock River Assessment Watersheds is recognized as statewide-significant natural area by the Illinois Natural Areas Inventory, approximately 38% of the vascular plants native to Illinois (about 795 taxa) are present in this 1,608-km^2 area, or about 0.39% of the state. This remarkable species richness can be attributed to the presence of a variety of a great diversity of habitats. Within the RRAW there is a unique concentration of distinct surface and bedrock geological features and available-moisture habitat conditions. Exposures of sandstone, dolomite, gravel, and glacial till and drift are present. Habitats associated with exposures of St. Peter's sandstone, which is exposed mostly near the Rock River and associated minor drainages in the region, are particularly rich in rare species. Many areas of native vegetation exist within the RRAW that are not INAI sites but that contribute greatly to supporting this floristic diversity. Many of the habitat descriptions described in this report are from areas that are not INAI sites, or are INAI sites only because of the presence of endangered species. These somewhat disturbed remnants provide a buffer for the INAI sites against stochastic losses of species due to small population sizes. Management strategies that enhance floristic diversity and abundance throughout the RRAW, such as prescribed fire and exotic species control efforts, would be instrumental in the long-term maintenance of floristic diversity in the region. Managing the natural vegetation within the RRAW with a landscape-scale approach would provide for the spatial and temporal heterogeneity required to maintain habitat and species diversity in the dynamic systems, such as the open woodlands, savannalike areas, and prairies, that are present.

Fauna

The area also supports a relatively high species diversity for all faunal groups due to the diversity and extent of habitat types present. The location of the RRAW at the northern end of breeding ranges for many southern species and the southern end of many northern species allows for representation of nearly 41% of the birds known for the state. Thirteen (31%) of the Illinois' endangered and threatened bird species can be found within the RRAW, eight of which are known breeders. In addition, the large forest complex at Castle Rock State Park/ Lowden-Miller State Forest supports the richest breeding forest avifaunal assemblage in the state. A similar range/habitat overlap for amphibians and reptiles (Smith's Herpetofaunal Divisions, 1961) results in a distribution of 34% of the state's herpetofaunal species. In particular, the sandy soils of the area allow for the unique occurrence of several western lict species. Two state-threatened and one state watch list species are known for the area. The variety of forest, grassland, and wetland/riverine habitats present also support 66% of the state's mammal species. The RRAW is within the range for 2/3 of northern and 1/2 of western species for the state. Recent reports document occurrences of the Illinois endangered river otter from several locations along the Rock River and one of its tributaries. As discussed for the floral component, managing the natural communities of the RRAW with a landscape-scale perspective should maintain the habitat heterogeneity required to support this faunal species diversity. Also, it is important to maintain and enhance the existing large tracts of contiguous habitat that are functionally important to area sensitive species, such as many of the forest birds discussed previously.

TERRESTRIAL COMMUNITIES: RESOURCE RICH WATERSHEDS

Based on a combination of several terrestrial community natural features, five watersheds were identified as terrestrial community resource rich watersheds (Figure 16). The following features were compared by watershed: % upland forest; % wetland/bottomland forest; Illinois Natural Areas Inventory acreage (White, 1978; Illinois Natural Heritage Database, 1995); and public land acreage (Table 30).

Watersheds with > 10.0% forest and 2.0% wetland were selected. Five watersheds containing the largest INAI and public land acreages were selected (Figure 16). Watersheds selected for more than one feature were identified as the resource rich watersheds. These include (in order of ranking): Rock River Middle, Kishwaukee River South, Rock River North, Franklin Creek, and Pine Creek.

Table 30. Terrestrial Community Resource Rich Watersheds

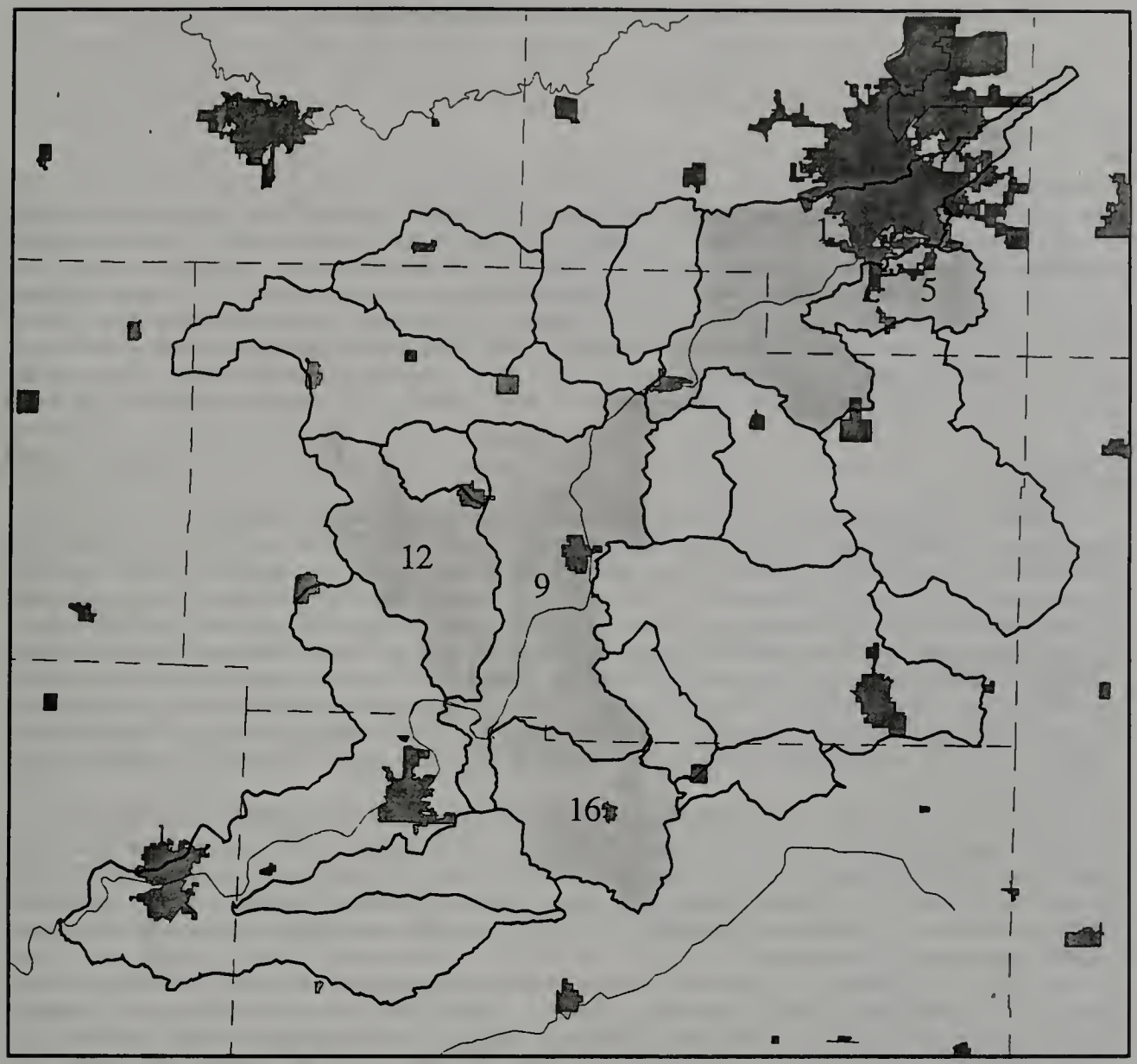
Forest cover > 10.0%:
1. Rock River Middle = 22.74%
2. Kishwaukee River South = 18.68%
3. Rock River North = 12.31%
4. Pine Creek = 10.19%

Wetland (including bottomland forest) cover > 2.0%
1. Kishwaukee River South = 3.77%
2. Middle Creek = 2.22%
3. Rock River Middle = 2.10%
4. Stillman Creek = 2.05%

Illinois Natural Areas Inventory acreage (top 5)
1. Rock River Middle = 3,282.97
2. Franklin Creek = 1,716.17
3. Kishwaukee River South = 676.36
4. Rock River North = 158.72
5. Pine Creek = 63.05

Public land acreage (top 5) (IDNR, Northern Illinois University, county and municipal agencies)
1. Rock River Middle = 4,564.0
2. Kishwaukee River South = 1,447.0
3. Rock River North = 1,179.0
4. Rock River South = 832.0
5. Franklin Creek = 520.0

Five watersheds that were selected for more than one feature (in order of ranking):
1. Rock River Middle
2. Kishwaukee River South
3. Rock River North
4. Franklin Creek
5. Pine Creek



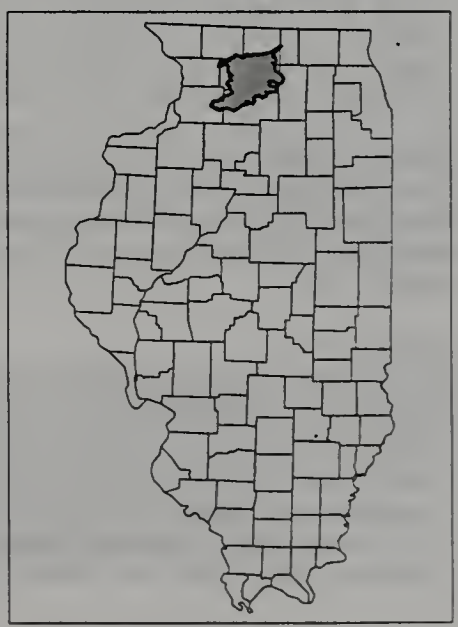


Figure 16. Terrestrial Communities: Resource Rich Watersheds

1. Rock River North
5. Kishwaukee River South
9. Rock River Middle
12. Pine Creek
16. Franklin Creek

AQUATIC NATURAL COMMUNITIES

Introduction

General Description/Physical Setting

The Rock River originates in Horicon Marsh in Dodge County, Wisconsin, and flows in a southerly direction until the river enters Illinois south of Beloit. It continues to flow south for approximately 45 miles, turns to the southwest at Camp Grant, swings southwest in a wide curve across the northwestern part of the state, and joins the Mississippi River at Rock Island. The watershed in Illinois comprises approximately 9.5% of the total area of the state and includes portions of 13 counties—Stephenson, Winnebago, Boone, McHenry, Kane, DeKalb, Ogle, Carroll, Whiteside, Lee, Bureau, Henry, and Rock Island. Five natural divisions are encompassed-Rock River Hill Country, Northeastern Morainal, Grand Prairie, Upper Mississippi River and Illinois River Bottomlands, and Middle Mississippi Border (Schwegman et al., 1973). Soil types in the basin range from thick to thin loess deposits on limestone and thin silty or loamy materials on gravelly Wisconsinan outwash, to sandy or clayey deposits on the bottomlands (Iverson, 1987). The two largest urban centers in the basin are Rockford and Rock Island/Moline.

The Rock River, from the Wisconsin state line at Beloit to the mouth on the Mississippi River at Rock Island, is approximately 163 miles (262 kilometers) long and drains 5,343 mi^2 (8,602 km^2) in Illinois. Its width varies from 500-800 feet with an average of 690 feet. The substrate is gravel interspersed with sand, rubble, and silt. The preglacial Rock River flowed south into Illinois about 1.25 miles (2.01 kilometers) east of and parallel to its present course. At the southern edge of Winnebago County, however, the river continued southward to the LaSalle County line, and here it turned southwest to join the Mississippi River. It did not flow through Rock Island and Whiteside counties. The retreat of the Wisconsinan glacier left a moraine across the former path of the Rock River forcing the river to flow southwesterly through some of its former tributaries and eventually through Rock Island County to the Mississippi River (Brigham, 1978). At one time the river and surrounding area between Beloit and Dixon, with its many limestone bluffs and rocky outcrops, were designated the "Hudson of the West" (Rolfe, 1929).

According to the Land Cover Database for Illinois (IDDNR [CTAP], 1995) the RRAW is 1.48% water (open water). The majority of the RRAW area lies within Ogle and, to a lesser extent, within Lee and then Winnebago counties, respectively. Small branches of the assessment watersheds extend into Boone, Carroll, DeKalb, Stephenson, and Whiteside counties. Because the largest portion of the RRAW includes three counties (Lee, Ogle, and Winnebago) the following description of surface water miles and acreages includes only figures for the entire state and for those counties.

These surface water descriptions include distribution and water quality data from the Illinois Water Quality Report, 1992-1993 (Illinois Environmental Protection Agency [IEPA], 1994) and distribution data only from the Inventory of Illinois Surface Water Resources, 1993 (Illinois Department of Conservation, Division of Fisheries, 1994). Both documents provide statewide distribution data. The IEPA report also provides data at the major basin level and the IDOC report provides statistics for the county level. Data are reported for impounded water bodies; however, because the primary aquatic features of the RRAW are the natural communities of the Rock River and several of its tributaries, only streams are discussed in the following **Aquatic Fauna** descriptions.

Impoundments

The IDNR reports a total of 103,894 ha. (256,619 acres) of impounded water within the state. Within the three-county area of the RRAW there are a total of 903 ha. (2,233 acres). The distribution (number of impoundments/ total acreage) is as follows: Lee County - 410/785.9, Ogle County - 171/325.1, Winnebago County -225/1,122.3 (IDOC, 1994).

Streams

In a statewide inventory of all flowing waters (such as canals, creeks, and rivers), the IDNR reported a total of 26,443 miles (42,573 kilometers) of streams over 5 ft. wide (IDOC, 1994). Within the three-county area of the RRAW there are a total of 864.0 stream miles. The distribution is as follows: Lee county - 290.0 miles, Ogle - 318.0 miles, Winnebago - 256.0 miles (IDOC, 1994).

Current and depth of the Rock River have been significantly altered by the construction of channel dams that have created pools throughout most of the Illinois portion of the Rock River. Seven dams are present on the Illinois portion of the river. Channelization has been most extensive in the eastern and southern areas of the

basin. Principal land use bordering the Rock River is cropland and pasture. Less than 10% of the area is still forested and much of that is grazed forest. Very few of the vast wetlands that covered major portions of the basin remain. Drainage ditches and field tiles have converted them into cropland. Siltation has increased and the Rock River has had a history of domestic and industrial pollution, especially below the industrial centers of Rockford and Sterling.

The mainstream of the Kishwaukee River, the largest tributary of the Rock River in the RRAW, joins the Rock River three miles south of Rockford. The Kishwaukee drains approximately 1,225 mi^2 (1,972 km^2). The river valley is oak-prairie open country (originally savanna) with low undulating land that is farmed intensively. At one time many sloughs and marshes occupied the watershed but most have been drained for agriculture.

The Rock River is the core of the RRAW. The presence and functions of the river are responsible for the existence of many of the natural communities that have been highlighted in previous sections of this report. The Rock River flows a total of 70 miles within the RRAW. The entire RRAW (approximately 999mi^2/1,608 km^2) sits inside the Illinois portion of its watershed (IEPA, 1992). Figure 17 illustrates streams within the RRAW. Many additional features of the river are discussed in the Aquatic Resources/Hydrology section of this report. The following natural community descriptions focus on the fauna of streams in the RRAW.

Water Quality

* Note on references made to the report: "Biological Stream Characterization: A Biological Assessment of Illinois Stream Quality" (Hite and Bertrand, 1989). The original report, and accompanying map, were produced in 1989. An updated (many stream classifications have changed) version of the map, but not the report, was produced in 1995. This new map information for the RRAW is reported in the Aquatic Insects section; however, information regarding the classification changes of streams is not available at this time.

The Illinois Environmental Protection Agency (IEPA) report assesess water quality based on requirements of the Federal Clean Water Act as it pertains to supporting aquatic life and recreational uses. As defined by IEPA, aquatic life use assessments are based on a combination of biotic and abiotic data acquired from IEPA monitoring programs. Biotic data consider fishery and macroinvertebrate information, evaluated using the Index of Biotic Integrity and the IEPA Macro-invertebrate Biotic Index. Abiotic data consider water chemistry, fish tissue analysis, sediment chemistry, and physical habitat. A "full use support" rating is the highest rating given in this assessment.

The IEPA assessed 423 ha. (1,045 acres) of impoundments in the Rock River Basin. None of the impoundments assessed received a "full use support" rating. The IEPA stream water quality assessment adheres to the same criteria described for impounded water assessments, except that it does not consider the recreational use component. A total of 1,443.4 stream miles in the Rock River Basin were assessed by the IEPA for overall use support as defined using the IEPA Streams Assessment Criteria (IEPA, 1994). Overall use (aquatic life use) was rated as full support on 888.1 stream miles. Another 45.6 full support stream miles were rated as threatened. Partial support with minor impairment occurred on 449 stream miles and 60.7 stream miles were rated as partial support with moderate impairment. There were no miles rated as nonsupport. Water quality descriptions of major streams follow and are taken from the Illinois Water Quality Report: 1992-1993 (Illinois Environmental Protection Agency, 1994).

Rock River

The Illinois Environmental Protection Agency rated approximately 60 miles (96.6 kilometers [37%]) of the mainstem of the Rock River as "full support" (water quality meets the needs of all designated uses protected by applicable water quality standards). The remaining 63% of stream miles were rated "partial support/minor impairment" (water quality is impaired, but only to a minor degree) (Illinois Environmental Protection Agency, 1994). Thirty-three miles (53 kilometers [55%]) of this "full support" portion of the Rock River lie within the RRAW. Phosphorus originating from municipal wastewater discharges and agricultural runoff led to the lower rating.

Kishwaukee River

Most stream miles (85.4%) of the Kishwaukee River sub-basin fully supported aquatic life use. Partial support/minor impairment was found in Mokeler Creek, East Branch Killbuck Creek, in 47.0 percent of the South Branch Kishwaukee River and 37.0 percent of Lawrence Creek. Phosphorus was the major cause of less than full support in East Branch Killbuck Creek, South Branch Kishwaukee River, Mokeler Creek, and Lawrence Creek. Sources of the impacts were municipal wastewater discharges and cropland runoff. The South Branch Kishwaukee River was impacted primarily by organic enrichment from non-irrigated crop production.

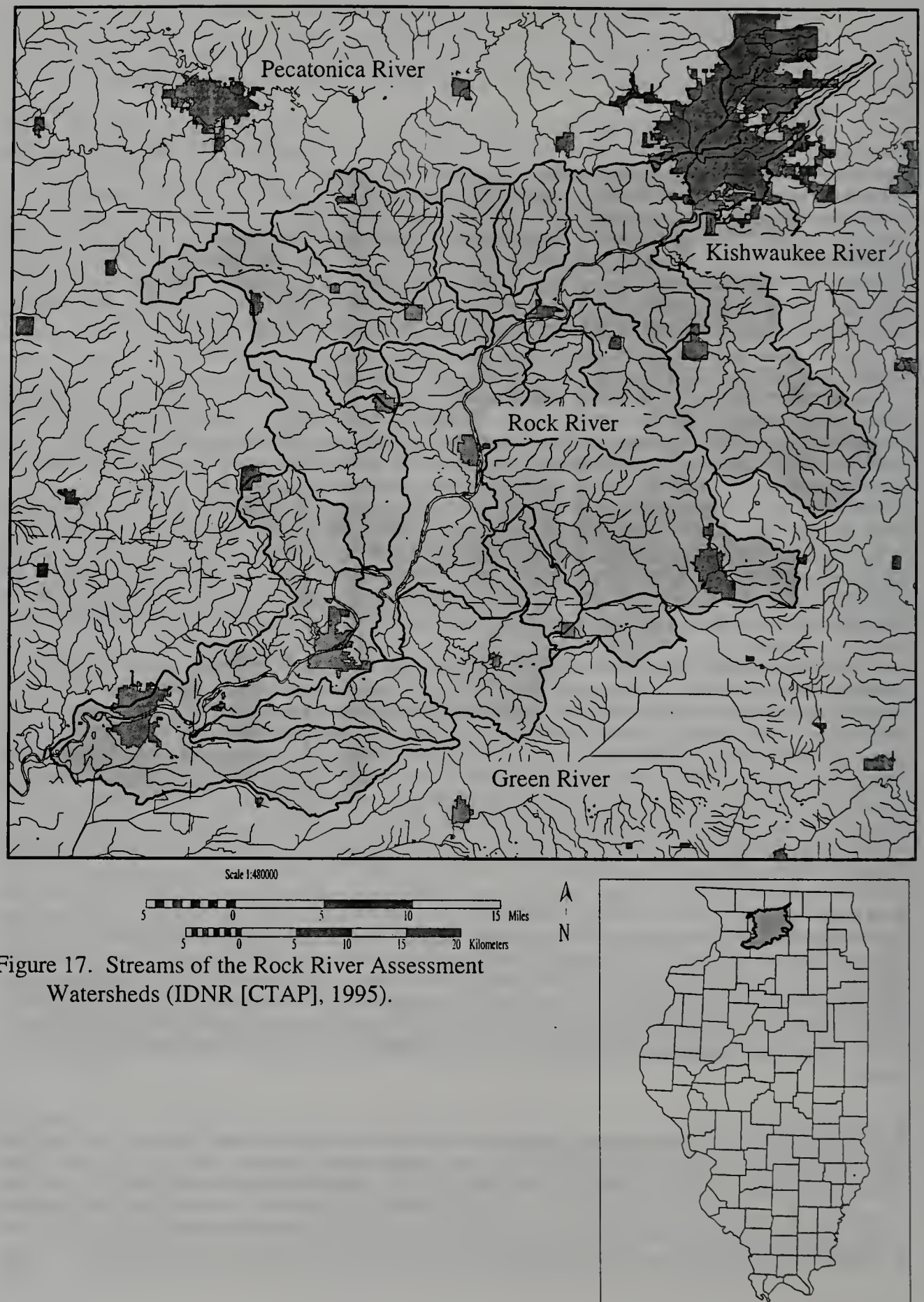


Figure 17. Streams of the Rock River Assessment Watersheds (IDNR [CTAP], 1995).

Kyte River
Eighty-seven percent (53.2 miles) of the Kyte River and three tributaries (Steward, Beach, Prairie and South Beach Creeks) were rated as fully supporting aquatic life use.

Miscellaneous Tributaries
Fifteen other tributaries of the Rock River were assessed for aquatic life use support. Eleven tributaries were in full support, and four were in partial support/minor impairment (Dry, Mill, Coal and Otter Creeks).

The Biological Stream Characterization (Hite and Bertrand, 1989) rated the Kishwaukee River from the South Branch to the Rock as a "B" Stream (Highly Valued Aquatic Resource). Tributaries to the Rock River rated as "B" Streams include Stillman Creek, Franklin Creek, Three Mile Branch, Kyte River from its headwaters to Chana Road, and Pine Creek after White Pines State Park to its mouth. Kilbuck Creek, a tributary to the Kishwaukee, was rated as a "B" stream from where it branches to its mouth. The remaining mainstem of the Rock was rated as a "C" Stream (Moderate Aquatic Resource). Smith (1971) rated the Rock River except where it borders or passes through highly urbanized or industrialized areas as "Good" to "Excellent." The Kishwaukee was also rated as "Good" to "Excellent."

Aquatic Fauna
In addition to playing an ecologically significant role in the life history requirements of many of the terrestrial and wetland wildlife species discussed in the previous sections, the streams of the Rock River Assessment Watersheds (RRAW) support a diverse aquatic fauna. The streams of the RRAW are known to support 80 (78 native) freshwater fish species (Table 31), 33 native mussel species (Table 32), and 11 (10 native) crustacean species (Table 33) (Page et al., this report). Statewide, these numbers represent 41% of fish species known, including 3 (10%) state-listed (endangered and threatened) species, 42% of mussel species known, including 5 (20%) state listed species, one of which is also federally listed, and an additional federal candidate species, and 25% of the crayfish species known (see Tables 12, 31, 32, 33) (United States Department of the Interior, 1994; Illinois Natural Heritage Database, 1995). Fish, mussel, and crayfish species cited within this report are also listed in Appendix A. Aquatic insects for the area include 29 mayfly and 29 caddisfly species (Table 30) and a variety of other species.

Fish/Mussels/Crustaceans
Information presented in the following descriptions reflects field survey data collected by Illinois Natural History Survey (INHS) staff from the early 1980's-1995, historical data from vouchered specimens collected by the INHS from the early 1900's, and Illinois Natural Heritage Database (1995) information. Figure 18 illustrates the area of the RRAW surveyed by INHS staff.

Fishes
Based on data from 63 collection sites, 80 species of fishes are known from the Rock River Assessment Watersheds (Table 31). State endangered fishes known from this region include *Notropis texanus*, the weed shiner, observed in 1877, and *Acipenser fulvescens*, the lake sturgeon, last observed in 1934. *Moxostoma carinatum*, the river redhorse, a state threatened species, was last observed in 1901. *Erimystax x-punctatus*, the gravel chub, a state watch-list species, was observed in 1992.

It is doubtful that the lake sturgeon and river redhorse still exist in the region since neither has been seen since 1934. The weed shiner was last observed in the RRAW in 1877, but is known to maintain populations in the Rock River drainage system in Fairfield Ditch #1 and Fairfield Union Special Ditch in Bureau County, Coon Creek in Whiteside County, and County Ditch #1 in Whiteside County. These sites are in one of only two areas in Illinois still supporting populations of the weed shiner; the other is a region of sandy soil in Kankakee and Iroquois counties.

The gravel chub maintains populations in Illinois only in Rock River, possibly in the Vermilion River in Vermilion County, and in the Wabash River. Although it has not yet been listed in Illinois as a threatened or endangered species, the gravel chub is much less common in the state than it once was and is likely to be listed in the future.

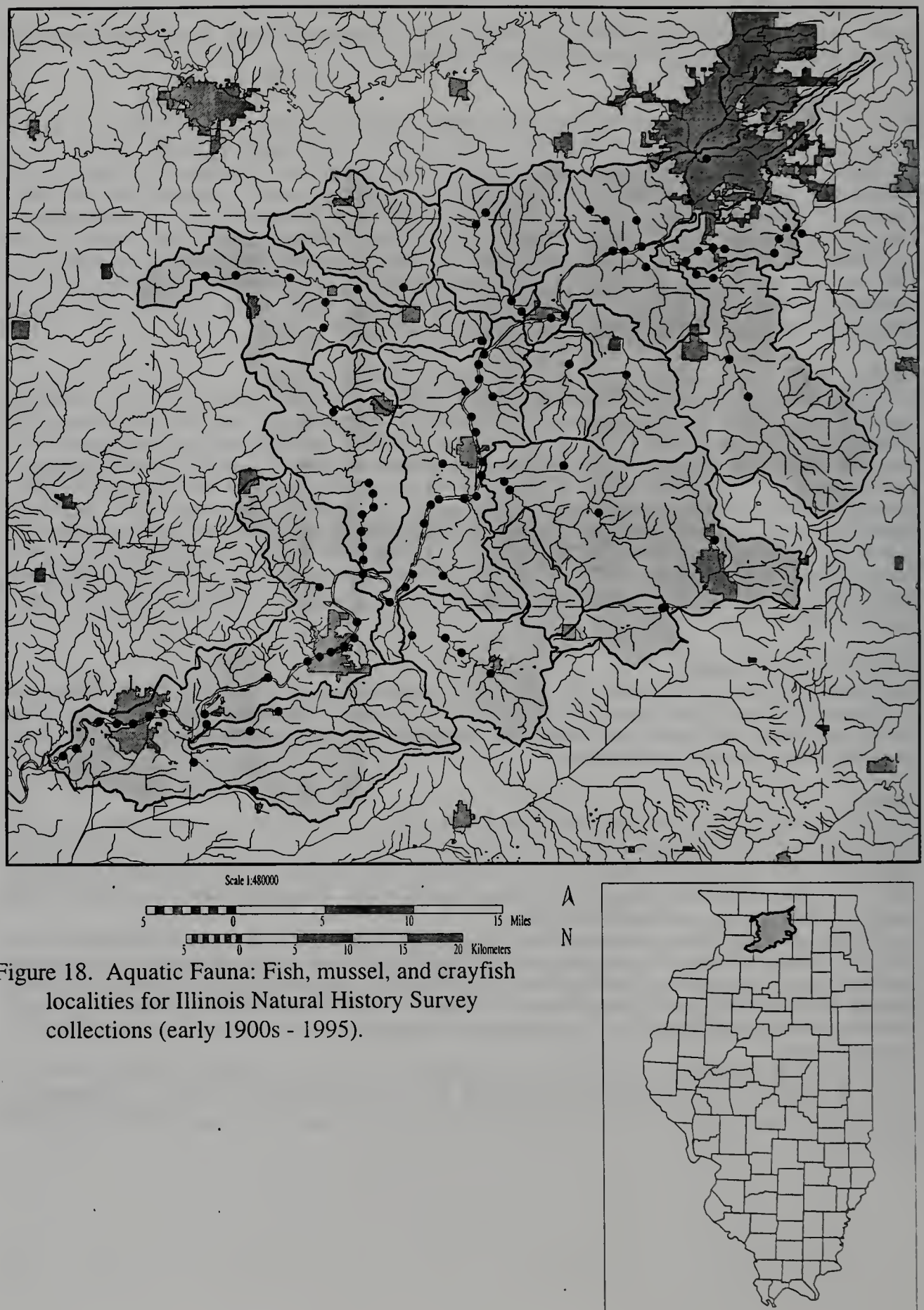


Figure 18. Aquatic Fauna: Fish, mussel, and crayfish localities for Illinois Natural History Survey collections (early 1900s - 1995).

Table 31. Freshwater fishes recorded from the Rock River Assessment Watersheds. Data are from the Illinois Natural History Survey Fish Collection. Bold indicates a special status species: FC = Federal Candidate; SE = State Endangered; ST = State Threatened; WL = Watch List; * = Introduced.

ACIPENSERIDAE	
Acipenser fulvescens	**Lake sturgeon ST,FC**
LEPISOSTEIDAE	
Lepisosteus osseus	Longnose gar
ANGUILLIDAE	
Anguilla rostrata	American eel
HIODONTIDAE	
Hiodon tergisus	Mooneye
CLUPEIDAE	
Dorosoma cepedianum	Gizzard shad
UMBRIDAE	
Umbra limi	Central mudminnow
ESOCIDAE	
Esox americanus	Grass pickerel
Esox lucius	Northern pike
CYPRINIDAE	
Campostoma anomalum	Central stoneroller
Campostoma oligolepis	Largescale stoneroller
Carassius auratus *	Goldfish
Cyprinella spiloptera	Spotfin shiner
Cyprinus carpio *	Common carp
Erimystax x-punctatus	**Gravel chub WL**
Hybognathus nuchalis	Mississippi silvery minnow
Luxilus chrysocephalus	Striped shiner
Luxilus cornutus	Common shiner
Lythrurus umbratilis	Redfin shiner
Macrhybopsis storeriana	Silver chub
Nocomis biguttatus	Hornyhead chub
Notemigonus crysoleucas	Golden shiner
Notropis atherinoides	Emerald shiner
Notropis blennius	River shiner
Notropis dorsalis	Bigmouth shiner
Notropis hudsonius	Spottail shiner
Notropis ludibundus	Sand shiner
Notropis nubilus	Ozark minnow
Notropis rubellus	Rosyface shiner
Notropis texanus	**Weed shiner SE**
Phenacobius mirabilis	Suckermouth minnow
Phoxinus erythrogaster	Southern redbelly dace
Pimephales notatus	Bluntnose minnow
Pimephales promelas	Fathead minnow
Pimephales vigilax	Bullhead minnow
Rhinichthys atratulus	Blacknose dace
Semotilus atromaculatus	Creek chub
CATOSTOMIDAE	
Carpiodes carpio	River carpsucker
Carpiodes cyprinus	Quillback
Carpiodes velifer	Highfin carpsucker
Catostomus commersoni	White sucker
Hypentelium nigricans	Northern hog sucker
Ictiobus cyprinellus	Bigmouth buffalo
Minytrema melanops	Spotted sucker

Table 31 continued

Moxostoma anisurum	Silver redhorse
Moxostoma carinatum	**River redhorse ST**
Moxostoma duquesnei	Black redhorse
Moxostoma erythrurum	Golden redhorse
Moxostoma macrolepidotum	Shorthead redhorse
ICTALURIDAE	
Ameiurus melas	Black bullhead
Ameiurus natalis	Yellow bullhead
Ictalurus punctatus	Channel catfish
Noturus exilis	Slender madtom
Noturus flavus	Stonecat
Noturus gyrinus	Tadpole madtom
Pylodictis olivaris	Flathead catfish
FUNDULIDAE	
Fundu*lus notatus*	Blackstripe topminnow
ATHERINIDAE	
Labidesthes sicculus	Brook silverside
GASTEROSTEIDAE	
Culaea inconstans	Brook stickleback
MORONIDAE	
Morone chrysops	White bass
CENTRARCHIDAE	
Ambloplites rupestris	Rock bass
Lepomis cyanellus	Green sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis humilis	Orangespotted sunfish
Lepomis macrochirus	Bluegill
Micropterus dolomieu	Smallmouth bass
Micropterus salmoides	Largemouth bass
Pomoxis annularis	White crappie
Pomoxis nigromaculatus	Black crappie
PERCIDAE	
Etheostoma caeruleum	Rainbow darter
Etheostoma flabellare	Fantail darter
Etheostoma microperca	Least darter
Etheostoma nigrum	Johnny darter
Etheostoma zonale	Banded darter
Percina caprodes	Logperch
Percina maculata	Blackside darter
Percina phoxocephala	Slenderhead darter
Stizostedion canadense	Sauger
Stizostedion vitreum	Walleye
SCIAENIDAE	
Aplodinotus grunniens	Freshwater drum
COTTIDAE	
Cottus bairdi	Mottled sculpim

Total number of species = 80 (78 native, 2 introduced).

Mussels

Surveys for mussels in the Rock River have been sporadic and no comprehensive survey of the drainage has been done since the 1920's (Baker, 1926; Matteson, 1961; Miller, 1972). No recent quantitative data are available to allow a basin-wide assessment of stream quality based on mussel diversity. The Rock River drainage has historically supported 10 special status species including four state threatened, five state endangered species (one of which is also federally endangered), and one federal candidate species. Thirty-three species of mussels have been reported from 39 sites in the RRAW (Table 32). A summary of the six special status species known from the RRAW is given below.

Alasmidonta marginata: The elktoe has been collected live at four sites in the RRAW since 1990. This species is not listed as threatened or endangered by the state of Illinois, but is listed as a candidate for federal listing by the U.S. Fish & Wildlife Service.

Alasmidonta viridis (SE): Within the RRAW, the slippershell (state endangered) is known from a single record from the Kishwaukee River, Rockford, in Winnebago County (Carnegie Museum # 61.3717). No slippershells have been collected live within the RRAW since 1908 and its status in the area is uncertain.

Elliptio dilatata (ST): The spike (state threatened) has been found at numerous localities within the RRAW, but no live individuals have been collected since the 1940's. This species has undergone a dramatic decline in distribution in Illinois and is rarely found alive today.

Fusconaia ebena (ST): The ebonyshell (state threatened) is known from two collections in the RRAW, both at Castle Rock. The first was collected in 1905 (Chicago Acad. Sci. uncat.) and a live individual was found in 1986.

Lampsilis higginsii (SE,FE): The Higgins eye (federally endangered, state endangered) was reported from the Rock River below Como, Whiteside County in 1925 (INHS #1052). No live Higgins eye have been collected in the RRAW in over 70 years.

Plethobasus cyphyus (SE): The sheepnose (state endangered) was known from the Rock River in Whiteside and Rock Island counties. No live sheepnose have been found in the Rock River drainage since 1926 (INHS #910). No other information is available and this species may be extirpated from the drainage.

Table 32. Freshwater mussels recorded from the Rock River Assessment Watersheds. Data from the Illinois Natural History Survey Mollusk Collection. Bold indicates a special status species: FC = Federal Candidate; SE = State Endangered; ST = State Threatened; WL = Watch List; * = Introduced.

Actinonaias ligamentina	Mucket
Alasmidonta marginata	**Elktoe FC**
Alasmidonta viridis	**Slippershell mussel SE**
Amblema plicata	Threeridge
Anodontoides ferussacianus	Cylindrical papershell
Cyclonaias tuberculata	Purple wartyback
Elliptio dilatata	**Spike ST**
Fusconaia ebena	**Ebonyshell ST**
Fusconaia flava	Wabash pigtoe
Lampsilis cardium	Plain pocketbook
Lampsilis higginsii	**Higgins eye SE,FE**
Lampsilis siliquoidea	Fatmucket
Lasmigona complanata	White heelsplitter
Lasmigona compressa	Creek heelsplitter
Lasmigona costata	Flutedshell
Leptodea fragilis	Fragile papershell
Ligumia recta	Black sandshell
Obliquaria reflexa	Threehorn wartyback
Plethobasus cyphyus	**Sheepnose SE**
Pleurobema sintoxia	Round pigtoe

Table 32 continued

Potamilus alatus	Pink heelsplitter
Potamilus ohiensis	Pink papershell
Pyganodon grandis	Giant floater
Quadrula metanevra	Monkeyface
Quadrula pustulosa	Pimpleback
Quadrula quadrula	Mapleleaf
Strophitus undulatus	Squawfoot
Toxolasma parvus	Lilliput
Tritogonia verrucosa	Pistolgrip
Truncilla donaciformis	Fawnsfoot
Truncilla truncata	Deertoe
Utterbackia imbecillis	Paper pondshell
Venustaconcha ellipsiformis	Ellipse

Total number of species = 33

Crustaceans

Based on the data from 27 collecting sites, 11 species of Malacostraca are known from this region (Table 33). None is considered threatened or endangered.

Table 33. Freshwater crustaceans recorded from the Rock River System. Data from the Illinois Natural History Survey Crustacean Collection. There are no special status species recorded for the area. An asterick indicates an introduced species.

ISOPODA (ISOPODS)

ASELLIDAE
Caecidotea forbesi
Caecidotea intermedia
Caecidotea kendeighi

AMPHIPODA (AMPHIPODS)

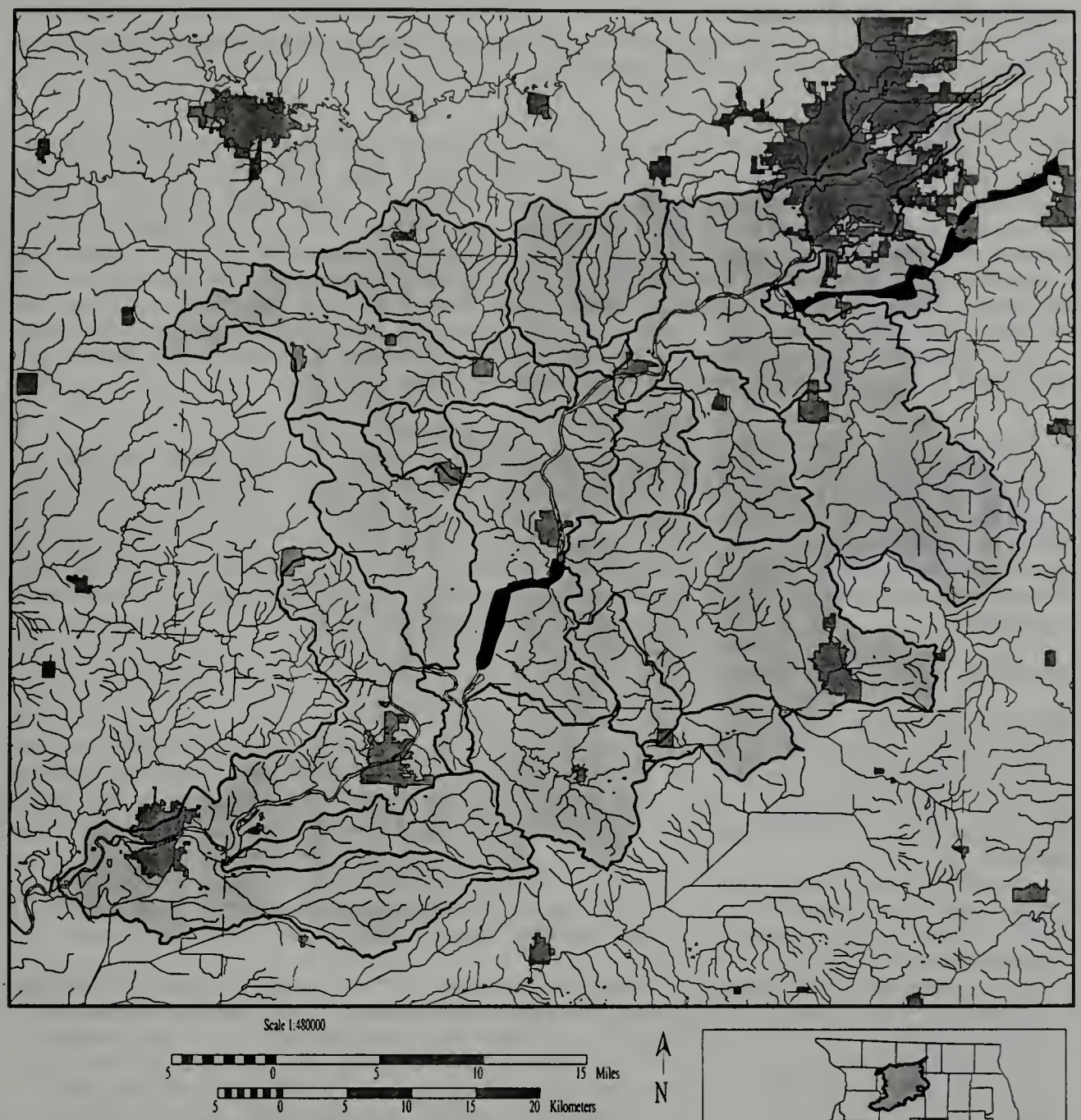
GAMMARIDAE
Gammarus pseudolimnaeus
HYALELLIDAE
Hyalella azteca

DECAPODA (CRAYFISHES & SHRIMPS)

CAMBARIDAE

Cambarus diogenes	Devil crawfish
Orconectes immunis	Calico crayfish
Orconectes propinquus	Northern clearwater crayfish
Orconectes rusticus *	Rusty crayfish
Orconectes virilis	Virile crayfish
Procambarus acutus	White river crayfish

Total number of species = 11 (10 native, 1 introduced).



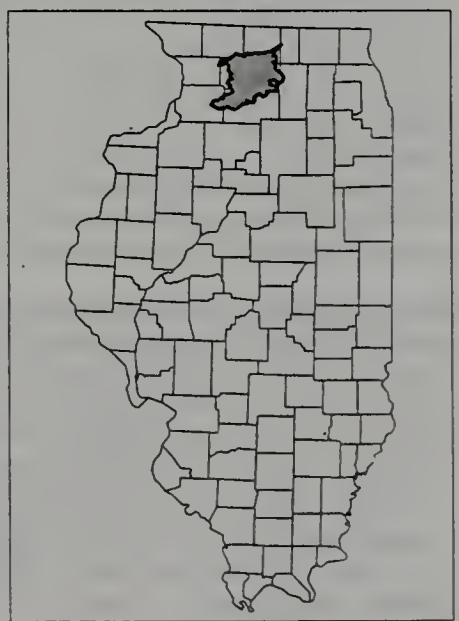


Figure 19. Biologically significant Illinois stream segments within the Rock River Assessment Watersheds (after Page et al., 1992).

Biologically Significant Streams
The following Biologically Significant Stream (Page et al., 1992) segments lie within the Kishwaukee River South and Rock River Middle watersheds, respectively.

1. *Kishwaukee River* (Figure 19)
The mainstem of the Kishwaukee River, from the confluence of the North and South branches downstream to the Rock River has been identified as a Biologically Significant Stream (Page, et al. 1992). This stretch of the Kishwaukee River is a medium-sized stream (30-70 feet in width) with a gravel, sand, and cobble substrate. Riffles, runs, and pools habitats are common. Turbidity is low and the water is clear with a moderate flow. Little vascular aquatic vegetation is present. The riparian zone is tree-lined and ranges from 20-100 feet wide. Surrounding land use is agricultural, residential, or forest; stream bank erosion is low. The mussel fauna of the Kishwaukee River mainstem in Winnebago County is quite diverse with 19 species present, and at one time included the following special status mussels: *Alasmidonta marginata*, elktoe (federal candidate), *Alasmidonta viridis*, slippershell (Illinois endangered), and *Elliptio dilatata*, spike (Illinois threatened) (United States Department of the Interior, 1994; Illinois Natural Heritage Database, 1995).

2. *Rock River*, from Honey Creek to Clear Creek, Ogle County (Figure 19)
This Biologically Significant Stream segment of the Rock River is a moderately large stream with gravel and cobble riffles and sandy pools and runs. In some areas, the shoreline is wooded. *Erimystax x-punctatus*, the gravel chub, a state watch-list species, is found in the large rocky riffles and runs. Three special status mussels are known from this segment: *Alasmidonta marginata*, elktoe (federal candidate), *Elliptio dilatata*, spike (state threatened), and *Fusconaia ebena*, ebonyshell (state threatened) (United States Department of the Interior, 1994; Illinois Natural Heritage Database, 1995). Of those three species, only the ebonyshell has been collected alive in recent years.

Aquatic Insects

Mayfly and Caddisfly Species
The mayfly (Ephemeroptera) and caddisfly (Trichoptera) fauna of the Rock River between Rockford and Sterling are well known historically from work done largely between 1920 and 1950 by Survey scientists (**Figure 20**) (e.g., see Ross 1944, Burks 1953). In particular, repeated collections were made at Dixon and Oregon. More recently, these sites have been resurveyed by Kohler and Soluk, but results of their work are unavailable at this time.

A total of 29 mayfly species have been collected at these locations: 22 species at Dixon, 24 species at Oregon, with 17 species common to both sites. A total of 29 caddisfly species have been collected at these sites: 17 species at Dixon, 19 species at Oregon, and only 7 at both locations. Table 34 lists mayfly and caddisfly species from the area.

These numbers are best evaluated by comparison with similar data from a river(s) of similar size, location (e.g., latitude), physical conditions (e.g., geology, instream manipulations such as channelization and damming), and collecting history. The Kankakee River provides a reasonable comparison, as its size (drainage area = 5150 mi^2 at Wilmington) is similar to that of the Rock River (drainage area = 8753 mi^2 at Como), it is located at a similar latitude, and it has historically received intensive study. The Kankakee River has been sampled largely at four locations: Momence, Aroma Park, Kankakee, and Wilmington. For all sites combined, a total of 45 mayfly and 73 caddisfly species have been described. At a single site, Momence, 27 mayflies and 56 caddisflies have been collected. Despite having fewer species, the Rock River has 11 mayfly and 7 caddisfly species that are unknown from the Kankakee River, although one of the mayflies, *Pseudiron centralis,* has recently been obtained in the Kankakee by Soluk and Kohler.

Biological Stream Characterization (Hite and Bertrand), 1995
From an ecological perspective, the Rock River between Rockford and Sterling is rated as a Class C stream ("moderate aquatic resource") by the Illinois Biological Stream Characterization (BSC) Workgroup (Biological Stream Characterization map, 1995). This classification is based largely on the structure and integrity (i.e., diversity, composition, and species abundances) of the fish community present in the river, in comparison with reference streams. Classification rankings range from A ("unique aquatic resource") to E ("restricted aquatic resource"). The Rock River shares a Class C rating with several other similarly-sized rivers in the state (e.g., Sangamon, Kaskaskia, lower Embarras, Little Wabash, most of the Fox, Big Muddy), while the Kankakee is the only large river (drainage area > 1,500 mi^2) in the state to have a Class B rating. There are no large rivers in Illinois with a Class A rating (several large rivers have not been rated: the Illinois, Mississippi, Wabash, and Ohio).

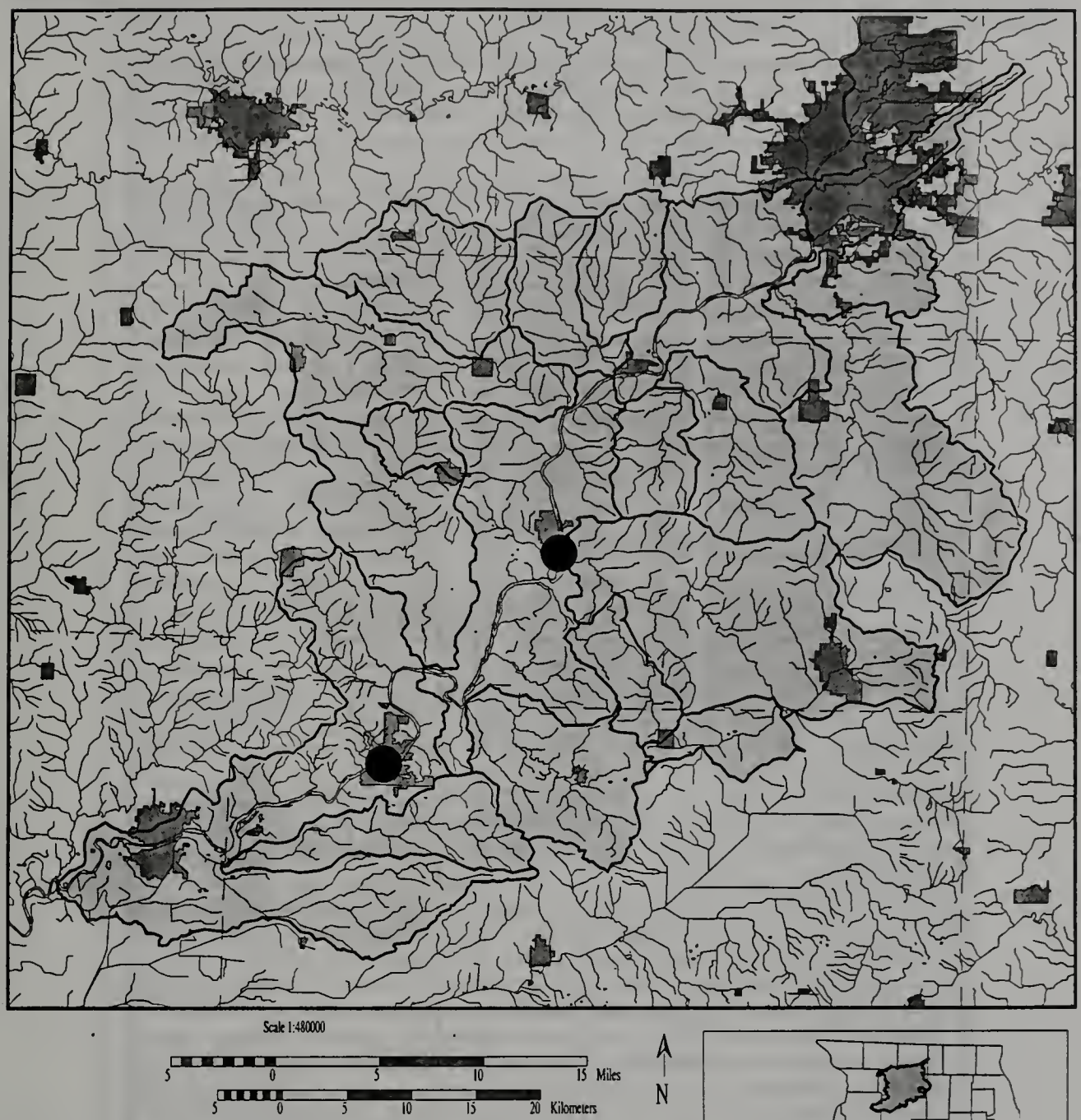


Figure 20. Aquatic Fauna: Mayfly and caddisfly survey locations for Illinois Natural History Survey staff (1914-1950).

Table 34. Mayfly and caddisfly species recorded from the Rock River Assessment Watersheds. Compiled by Steve Kohler, Illinois Natural History Survey (1995).

Species	Water Body	Date	Collector	Method (if known)
	Rock River at Dixon			
Mayflies (Ephemeroptera)				
Anepeorus simplex	Rock River	May 22 1925	Thompson	
Baetisca bajkovi	Rock River	May 22 1925	Thompson	
Caenis hilaris		June 27 1935	Delong and Ross	
Ephemerella invaria	Rock River	May 22 1925	Thompson	
Ephemerella lita	Rock River	May 21-22 1925	Thompson	
Ephoron leukon	Rock River			
Heptagenia diabasia		June 25 1947	Burks	
Heptagenia flavescens		June 27 1935	Delong and Ross	
Heptagenia inconspicua		June 25 1947	Burks	at light
Hexagenia rigida	Rock River			
Isonychia rufa		May 31 1914		
Leucrocuta maculipennis				
Pentagenia vittigera				
Potamanthus myops	Rock River			
Potomantus verticis	Rock River			
Pseudiron centralis		June 26 1947	Burks	at light
Rithrogena pellucida	Rock River	May 12 1925	Thompson	many exuviae
Stenacron interpunctatum interpunctatum				
Stenonema ares		June 25 1947	Burks	at light
Stenonema bipunctatum		June 27 1935	Delong and Ross	
Stenonema integrum				
Stenonema pulchellum				
Caddisflies (Trichoptera)				
Ceraclea cancellatus				
Ceraclea flavus				
Ceraclea mentieus	Rock River			
Ceraclea tarsi-punctatus				
Ceraclea transversus				
Cheumatopsyche campyla				
Cheumatopsyche lasia				
Cheumatopsyche speciosa				
Cyrnellus fraternus				
Hydropsyche orris				
Hydropsyche phalerata	Rock River			
Hydroptila consimilis				
Limnephilus moestus	Rock River	June 27 1935	Delong and Ross	at light
Macronemum zebratum	Rock River			
Mayatrichia ayama				
Nectopsyche candida				
Potamyia flava	Rock River			
	Rock River at Oregon			
Mayflies (Ephemeroptera)				

Table 34 continued

Anepeorus simplex	Rock River	July 9 1925	Frison	
Bactis intercalaris		July 9 1925	Frison	
Baetisca bajkovi	Rock River	May 25 1927	Thompson	
Caenis hilaris		July 2 1946	Burks and Sanderson	
Ephemerella invaria	Rock River	May 15 1930	Frison and Ross	
Heptagenia flavescens		July 13 1926	Frison and Hayes	
Heptagenia inconspicua		July 18 1927	Frison and Glasgow	
Hexagenia limbata				
Hexagenia rigida				
Isonychia rufa		July 4 1946	Burks and Sanderson	
Isonychia sicca		July 9 1925	Frison	
Leucrocuta maculipennis				
Potamanthus myops				
Potomantus verticis				
Rithrogena pellucida		July 11 1929	Frison	
Stenacron interpunctatum canadense				
Stenacron interpunctatum interpunctatum				
Stenonema ares		July 9 1925	Frison	
Stenonema bipunctatum		July 9 1925	Frison	
Stenonema integrum				
Stenonema mediopunctatum		July 4 1946	Burks and Sanderson	
Stenonema pulchellum				
Stenonema terminatum		July 9 1925	Frison	
Tricorythodes atratus		July 18 1927	Frison and Glasgow	at light
Caddisflies (Trichoptera)				
Ceraclea angustus		July 18 1927	Frison and Glasgow	at light
Ceraclea menticus	Rock River			
Cheumatopsyche aphanta				
Cheumatopsyche campyla				
Cheumatopsyche pettiti				
Chimarra obscura				
Hydropsyche arinale				
Hydropsyche betteni				
Hydropsyche bifida				
Hydropsyche bronta				
Hydropsyche orris	Castle Rock			
Hydropsyche phalerata				
Macronemum zebratum				
Mayatrichia ayama				
Nyctiophylax vestitus				
Oecetis avara				
Potamyia flava	Rock River			
Ptilostois semifasciata		June 1930	Sauer	
Ptilostomis postica		May 1929	Sauer	

In summary, the Rock River Assessment Area contains several important characteristics:
1) The site contains a large segment of the Rock River itself, including the main channel areas and adjacent floodplains.
2) Streams of varied orders (headwaters to main channel) are represented, covering a wide range of lotic habitats; and
3) A portion of the Kishwaukee River and most of Killbuck Creek, both of which are "highly valued aquatic resources" in the BSC classification, are included in the proposed site.
4) The Rock River compares favorably with similarly-sized rivers in the state in terms of its aquatic fauna.

AQUATIC COMMUNITIES: RESOURCE RICH WATERSHEDS

Based on several aquatic community natural features, three watersheds were identified as aquatic community resource rich watersheds (Figure 21). The following features were compared by watershed: segment (miles) of Biologically Significant Illinois Stream (BSIS) (Page et al., 1992); % open water; % upland forest; and % wetland/bottomland forest (Table 35).

Table 35. Aquatic Community Resource Rich Watersheds

Biologically Significant Illinois Stream (miles)
1. Kishwaukee River South = 10.7%
2. Rock River Middle = 6.8%

Water cover (open water) > 2.0%
1. Rock River South = 4.28%
2. Rock River Middle = 3.89%
3. Rock River North = 2.34%
4. Kishwaukee River South = 2.11%

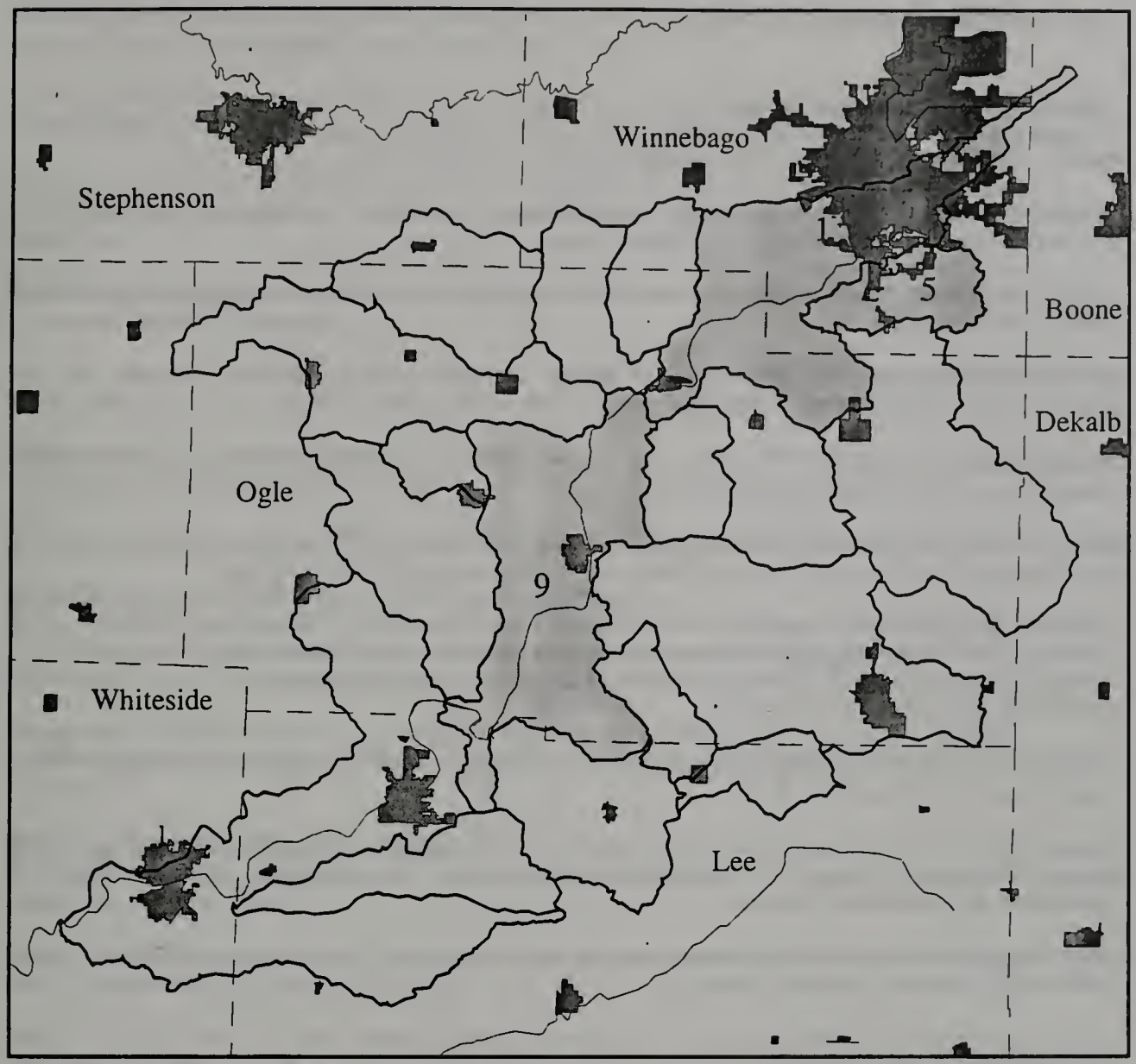
Forest cover > 10.0%
1. Rock River Middle = 22.74%
2. Kishwaukee River South = 18.68%
3. Rock River North = 12.31%
4. Pine Creek = 10.19%

Wetland (including bottomland forest) cover > 2.0%
1. Kishwaukee River South = 3.77%
2. Middle Creek = 2.22%
3. Rock River Middle = 2.10%
4. Stillman Creek = 2.05%

Three watersheds selected for more than one feature (in order of ranking):
1. Rock River Middle
2. Kishwaukee River South
3. Rock River North

Forest cover and wetland acreage were considered for this evaluation (in addition to the terrestrial communities evaluation) because the presence of significant riparian vegetation and wetlands is important to maintaining the hydrologic integrity of a watershed and the river itself. Forty-nine percent of the forest cover present in the RRAW is found in three basins directly associated with the Rock River and the Kishwaukee River: Rock River Middle, Kishwaukee River South, and Rock River North. These same three basins contain 32.4% of the wetlands (plus bottomland forest) in the RRAW.

The only two watersheds that contain BSIS miles were selected. Watersheds with > 2.0% open water, and as with the terrestrial communities evaluation watersheds with > 10.0% forest and 2.0% wetland were selected. Watersheds that were selected for more than one feature were identified as the resource rich watersheds. These include (in order of ranking): Rock River Middle, Kishwaukee River South, and Rock River North.



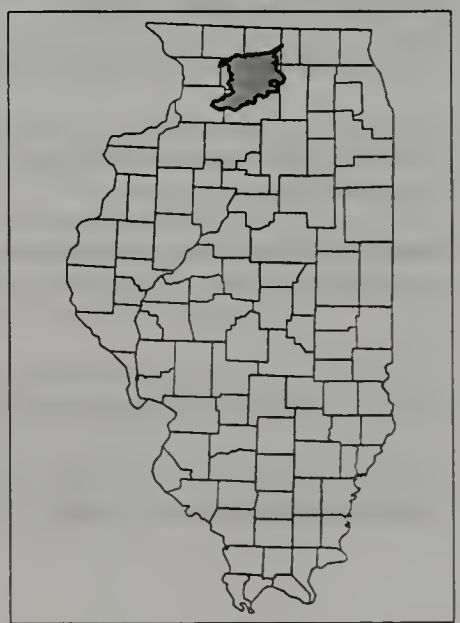


Figure 21. Aquatic Communities: Resource Rich Watersheds

1. Rock River North
5. Kishwaukee River South
9. Rock River Middle

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Appendix A. Species cited in this technical report (scientific and common nomenclature) for the Rock River Assessment Watersheds, excluding insects (see Table 38). **Bold** type indicates a state endangered (SE), state threatened (ST), state watch list (WL), federally endangered (FE), federally threatened (FT), or federal candidate (FC) species (Illinois Endangered Species Protection Board, 1994; United State Department of Interior, 1994) an asterick * indicates an introduced species.

Vascular plant species
Botanical nomenclature follows Mohlenbrock (1986).
Total number of species = 525 (518 native, 7 introduced)

Acalypha gracilens	Slender three-seeded mercury
Acalypha rhomboidea	Three-sided mercury
Acer negundo	Box elder
Acer nigrum	Black maple
Acer saccharinum	Silver maple
Acer saccharum	Sugar maple
*Achillea millefolium**	Yarrow
Actaea pachypoda	White baneberry
Actaea rubra	Red baneberry
Adiantum pedatum	Maidenhair fern
Agalinis tenuifolia	Slender false foxglove
Agrimonia gryposepala	Tall agrimony
Agrimonia parviflora	Swamp agrimony
*Agropyron repens**	Quack grass
*Agrostis alba**	Red top
Agrostis hyemalis	Winter bent grass
Agrostis scabra	Tickle grass
*Alliaria petiolata**	Garlic mustard
Ambrosia artemisiifolia	Common ragweed
Ambrosia trifida	Giant ragweed
Amelanchier laevis	Shadbush
Amelanchier arborea	Shadbush
Amorpha canescens	Lead plant
Amphicarpa bracteata	Hog peanut
Andropogon gerardii	Big bluestem
Anemone canadensis	Canada anemone
Anemone cylindrica	Thimbleweed
Anemone patens	Pasque flower
Anemone virginiana	Tall anemone
Anemone quinquefolia	Wood anenome
Angelica atropurpurea	Angelica
Antennaria neglecta	Pussytoes
Antennaria plantaginifolia	Plantainleaf pussytoes
Apios americana	Groundnut
Apocynum androsaemifolium	Spreading dogbane
Apocynum cannabinum	Indian hemp
Aquilegia canadensis	Columbine
Arabis canadensis	Sickle pod
Arabis laevigata	Smooth bank cress
Arabis shortii	Toothed cress
Aralia nudicaulis	Wild sarsaparilla
Aralia racemosa	American spikenard
Arctostaphylos uva-ursi T	Bearberry
Arenaria stricta	Sandwort
Arisaema triphyllum	Jack-in-the-pulpit
Aronia melanocarpa	Black chokecherry
Artemisia campestris	Beach wormwood

Plants continued

Asarum canadense	Wild ginger
Asclepias amplexicaulis	Sand milkweed
Asclepias hirtella	Green milkweed
Asclepias incarnata	Swamp milweed
Asclepias ontarioides E	Wooly milkweed
Asclepias purpurescens	Purple milkweed
Asclepias syriaca	Common milkweed
Asclepias tuberosa	Butterfly weed
Asclepias verticillata	Whorled milkweed
Asclepias viridiflora	Short green milkweed
Asimina triloba	Pawpaw
Asplenium platyneuron	Ebony spleenwort
Asplenium rhizophyllum	Walking fern
Aster azureus	Sky-blue aster
Aster ericoides	Heath aster
Aster furcatus T	Forked aster
Aster laevis	Smooth blue aster
Aster linariifolius	Stiff-leaved aster
Aster novae-angliae	New England aster
Aster oblongifolius	Aromatic aster
Aster pilosus	Hairy aster
Aster ptarmicoides	Stiff aster
Aster puniceus	Swamp aster
Aster sericeus	Silky aster
Aster simplex	Panicled aster
Aster umbellatus	Flat-top aster
Astragalus canadensis	Milk vetch
Athyrium angustum	Lady fern
Aureolaria grandiflora	Yellow false foxglove
Baptisia leucophaea	Cream wild indigo
Besseya bullii T	Kitten tails
Betula alleghenienses E	Yellow birch
Bidens cernua	Nodding bur-marigold
Bidens frondosa	Beggar's-ticks
Boehmeria cylindrica	False nettle
Botrychium dissectum var. *obliquum*	Bronze fern
Botrychium virginianum	Rattlesnake fern
Bouteloua curtipendula	Sideoats grama
Brickellia eupatorioides	False boneset
*Bromus inermis**	Smooth brome
Cacalia atriplicifolia	Pale indian plantain
Cacalia suaveolens	Sweet Indian plantain
Calamagrostis canadensis	Bluejoint grass
Callirhoë triangulata	Poppy mallow
Calystegia spithamaea	Dwarf bindweed
Caltha palustris	Marsh marigold
Campanula americana	Tall bellflower
Campanula aparinoides	Marsh bellflower
Campanula rotundifolia	Harebell
Cardamine bulbosa	Bulbous cress
Carex albursina	Sedge
Carex annectans	Yellow fox sedge
Carex blanda	Woodland sedge
Carex brevior	Sedge
Carex cephaloidea	Sedge
Carex comosa	Bristly sedge
Carex gracillima	Sedge

Plants continued

Carex hystricina	Bottlebrush sedge
Carex interior	Inland sedge
Carex laevivaginata	Sedge
Carex meadia	Sedge
Carex muhlenbergii	Sand sedge
Carex pensylvanica	Pennsylvania sedge
Carex rosea	Sedge
Carex stipata	Prickly sedge
Carex stricta	Tussock sedge
Carex tribuloides	Sedge
Carex trichocarpa	Sedge
Carpinus caroliniana	American hornbeam
Carya cordiformis	Bitternut hickory
Carya ovata	Shagbark hickory
Cassia marilandica	Maryland senna
Castilleja sessiliflora T	Downy yellow painted cup
Caulophyllum thalictroides	Blue cohosh
Ceanothus americanus	New Jersey tea
Ceanothus herbaceous E	Redroot
Celtis occidentalis	Hackberry
Cerastium nutans	Nodding mouse-ear chickweed
Cheilanthes feei	Lip fern
Chelone glabra	White turtlehead
Cicuta bulbifera	Bulblet water hemlock
Cicuta maculata	Water hemlock
Cinna arundinacea	Stout woodreed
Circaea lutetiana	Enchanter's nightshade
Cirsium altissimum	Tall thistle
Cirsium discolor	Pasture thistle
Cirsium hillii T	Hill's thistle
Cirsium muticum	Swamp thistle
Cirsium vulgare	Bull thistle
Claytonia virginica	Spring beauty
Clematis virginiana	Virgin's bower
Coeloglossum viride	Bracted green orchid
Comandra umbellata	Bastard toadflax
Conyza canadensis	Dwarf fleabane
Coreopsis palmata	Tickseed
Coreopsis tripteris	Tall tickseed
Cornus alternifolia	Alternate-leaved dogwood
Cornus canadensis E	Bunchberry
Cornus obliqua	Silky dogwood
Cornus racemosa	Gray dogwood
Cornus stolonifera	Red-osier dogwood
Corydalis sempervirens E	Pink corydalis
Corylus americana	Hazelnut
Cryptotaenia canadensis	Honewort
Cyperus filiculmis	Fern flatsedge
Cyperus schweinitzii	Schweinitz sedge
Cypripedium acaule E	Moccasin flower
Cypripedium pubescens W	Yellow lady's slipper orchid
Cystopteris bulbifera	Bulblet fern
Cystopteris protrusa	Fragile fern
Dalea candida	White prairie-clover
Dalea purpurea	Purple prairie-clover
Danthonia spicata	Poverty oat grass
Dasistoma macrophylla	Mullein foxglove

Plants continued

*Daucus carota**	Queen Anne's lace
Dentaria laciniata	Toothwort
Desmodium canadense	Showy tick trefoil
Desmodium glutinosum	Pointed tick trefoil
Desmodium illinoense	Tick trefoil
Desmodium nudiflorum	Bare-stemmed tick trefoil
Desmodium sessilifolia	Tick trefoil
Dicentra cucullaria	Dutchman's breeches
Dichanthelium acuminatum var. *linheimeri*	Panic grass
Dichanthelium depauperatum	Starved panic grass
Dichanthelium leibergii	Panic grass
Dichanthelium oligosanthes	panic grass
Dichanthelium villosissimum	Panic grass
Diervilla lonicera	Bush honeysuckle
Dioscorea villosa	Wild yam
Dirca palustris	Leatherwood
Dodecatheon meadia	Shooting star
Dryopteris carthusiana	Spinulose woodfern
Dryopteris cristata	Crested shield fern
Dryopteris intermedia	Intermediate fern
Dryopteris marginalis	Leather fern
Echinacea pallida	Pale purple coneflower
Echinocystis lobata	Wild cucumber
Ellisia nyctellia	Waterpod
Elymus canadensis	Canada wild rye
Elymus hystrix	Bottlebrush grass
Elymus virginicus	Virginia wild rye
Epilobium ciliatum	Northern willow herb
Epilobium coloratum	Cinnamon willow herb
Equisetum arvense	Field horsetail
Equisetum fluviatile	Water horsetail
Equisetum hyemale	Scouring rush
Equisetum laevigatum	Smooth scouring rush
Equisetum pratense E	Meadow horsetail
Equisetum sylvaticum E	Horsetail
Eragrostis spectabilis	Purple love grass
Erigeron annuus	Daisy fleabane
Erigeron strigosus	Whitetop fleabane
Eryngium yuccifolium	Rattlesnake master
Erythronium albidum	White trout lily
Euonymus obovatus	Running strawberry bush
Eupatorium altissimum	Tall boneset
Eupatorium maculatum	Spotted joe-pye weed
Eupatorium perfoliatum	Common boneset
Eupatorium purpureum	Sweet joe-pye weed
Eupatorium rugosa	White snakeroot
Eupatorium serotinum	Late boneset
Euphorbia corollata	Flowering spurge
Euthamia graminifolia	Grass-leaved goldenrod
Festuca obtusa	Nodding fescue
Fragaria virginiana	Wild strawberry
Fraxinus americana	White ash
Fraxinus pennsylvanicus	Green ash
Fraxinus quadrangulata	Blue ash
Galearis spectabilis	Showy orchis
Galium aparine	Annual bedstraw
Galium boreale	Northern bedstraw

Plants continued

Galium circaezans	Wild licorice
Galium triflorum	Bedstraw
Gaura biennis	Gaura
Gaylussacia baccata	Huckleberry
Gentiana andrewsii	Bottle gentian
Gentiana crinita	Fringed gentian
Gentiana puberula	Downy gentian
Geranium maculatum	Wild geranium
Geum canadense	White avens
Geum laciniatum	Rough avens
Geum triflorum	Prairie smoke
Glechoma hederacea	Ground ivy
Glyceria striata	Fowl meadow grass
Gleditsia triacanthos	Honey locust
Gnaphalium obtusifolium	Sweet everlasting
Goodyera pubescens	Rattlesnake plantain
Gymnocarpium dryopteris E	Oak fern
Hamamelis virginiana	Witch hazel
Hedeoma hispida	Rough pennyroyal
Hedyotis caerulea	Bluets
Hedyotis longifolia	Long-leaved bluets
Helenium autumnale	Sneezeweed
Helianthemum bicknellii	Rock rose
Helianthemum canadense	Rock rose
Helianthus divaricatus	Woodland sunflower
Helianthus grosseserratus	Sawtooth sunflower
Helianthus hirsuta	Oblong sunflower
Helianthus occidentalis	Western sunflower
Helianthus rigidus	Stiff sunflower
Heliopsis helianthoides	False sunflower
Hepatica nobilis var. *acuta*	Sharped-lobed hepatica
Heuchera americana	Tall alum root
Heuchera richardsonii	Prairie alum root
Hieracium longipilum	Long-bearded hawkweed
Hieracium scabrum	Rough hawkweed
Humulus lupulus	Common hops
Hydrangea arborea	Wild hydrangea
Hydrastis canadensis	Golden seal
Hydrophyllum appendiculatum	Great waterleaf
Hydrophyllum virginianum	Virginia waterleaf
Hypericum gentianoides	Orange grass
Hypericum punctatum	Spotted St. Johns-wort
Hypoxis hirsuta	Yellow stargrass
Impatiens capensis	Spotted touch-me-not
Impatiens pallida	Pale touch-me-not
Iris shrevei	Wild blue iris
Isopyrum biternatum	False rue anemone
Juglans nigra	Black walnut
Juncus dudleyi	Rush
Juncus effusus	Common rush
Juncus tenuis	Path rush
Juniperus virginiana	Red cedar
Koeleria macrantha	June grass
Krigia biflora	False dandelion
Krigia virginica	False dandelion
Lactuca floridana	Blue lettuce
Lactuca serriola	Prickly lettuce

Plants continued	
Laportea canadensis	Wood nettle
Lathyrus ochroleucus T	Pale vetchling
Lathyrus palustris	Marsh vetchling
Lechea tenuifolia	Narrow-leaved pinweed
Lechea villosa	Hairy pinweed
Leersia oryzoides	Rice cutgrass
Leersia virginica	White grass
Lespedeza capitata	Round-headed bush clover
Lespedeza leptostachya E	Prairie bush clover
Liatris aspera	Rough blazing star
Liatris cylindracea	Blazing star
Liatris pycnostachya	Gay feather
Lilium michiganense	Turk's-cap lily
Linaria canadensis	Blue toadflax
Linum sulcatum	Grooved yellow flax
Liparis lilifolia	Purple twayblade
Lithospermum canescens	Hoary puccoon
Lithospermum caroliniense	Hairy puccoon
Lithospermum incisum	Yellow puccoon
Lobelia inflata	Indian tobacco
Lobelia kalmii	Bog lobelia
Lobelia siphilitica	Great blue lobelia
Lobelia spicata	Lobelia
Lonicera prolifera	Yellow honeysuckle
Lupinus perennis	Wild lupine
Luzula acuminata E	Hairy wood rush
Luzula multiflora var. *echinata*	Wood rush
Lycopodium clavatum E	Common club moss
Lycopodium dendroideum E	Ground pine
Lycopodium digitatum	Ground pine
Lycopodium lucidulum	Shining clubmoss
Lycopus americanus	Common water horehound
Lycopus virginicus	Bugle weed
Lysimachia lanceolata	Loosestrife
Lysimachia nummularia	Moneywort
Lysimachia quadriflora	Loosestrife
Maclura pomifera	Osage orange
Maianthemum canadense	Wild lily-of-the-valley
Menispermum canadense	Moonseed
Mentha arvensis	Wild mint
Mertensia virginica	Bluebells
Mimulus ringens	Monkey flower
Mitella diphylla	Miterwort
Monarda fistulosa	Bergamont
Muhlenbergia cuspidata	Prairie satin grass
Muhlenbergia frondosa var. *commutata*	Muhly
Muhlenbergia glomerata	Muhly
Muhlenbergia mexicana	Leaf satin grass
Muhlenbergia racemosa	Green muhly
Napaea dioica	Glade mallow
Nothocalais cuspidata E	Prairie dandelion
Oenothera biennis	Evening primrose
Oenothera rhombipetala	Sand primrose
Onoclea sensibilis	Sensitive fern
Onosmodium hispidissium	Marbleseed
Oryzopsis racemosa T	Black-seeded ricegrass
Osmorhiza claytoniana	Sweet cicely

Plants continued

Osmunda cinnamomea	Cinnamon fern
Osmunda claytoniana	Interrupted fern
Osmunda regalis	Regal fern
Ostrya virginiana	Eastern hophornbeam
Oxalis violacea	Violet wood sorrel
Panax quinquefolius	Ginseng
Panicum capillare	Witch grass
Panicum virgatum	Prairie switchgrass
Parnassia glauca	Grass-of-Parnassus
Paronychia canadensis	Forked chickweed
Parthenium integrifolium	Wild quinine
Parthenocissus quinquefolius	Virginia creeper
Paspalum ciliatifolium	Hairy lens grass
Pastinaca sativa *	Wild parsnip
Pedicularis canadensis	Wood betony
Pedicularis lanceolata	Swamp betony
Pellaea glabella	Purple cliff brake
Penstemon calycosus	Smooth beard-tongue
Penstemon hirsutus	Hairy beardstongue
Penstemon pallidus	Pale beardstongue
Penthorum sedoides	Ditch stonecrop
Phalaris arundinacea	Reed canary grass
Phegopteris connectilis E	Long beech fern
Phlox divaricata	Blue phlox
Phlox pilosa	Prairie phlox
Physalis virginiana	Ground cherry
Pilea pumila	Clearweed
Physocarpus opulifolius	Ninebark
Pinus strobus	White pine
Plantago aristata	Bracted plantain
Plantago lanceolata	English plantain
Platanus occidentalis	American sycamore
Poa compressa	Canadian bluegrass
Poa pratensis	Kentucky bluegrass
Podophyllum peltatum	May apple
Polygala polygama	Purple milkwort
Polygala sanguinea	Field milkwort
Polygala verticillata	Whorled milkwort
Polygonatum commutatum	Great Solomon's seal
Polygonum amphibium	Water smartweed
Polygonum hydropiperoides	Wild water pepper
Polygonum lapathifolium	Pale smartweed
Polygonum pensylvanicum	Common smartweed
Polygonum punctatum	Smartweed
Polygonum sagittatum	Arrowleaf tearthumb
Polygonum scandens	Climbing false buckwheat
Polygonum tenue	Slender knotweed
Polymnia canadensis	Leafcup
Polypodium virginianum	Common polypody
Populus deltoides	Eastern cottonwood
Populus grandidentata	Big-tooth aspen
Potentilla arguta	Prairie cinquefoil
Potentilla recta	Sulphur cinquefoil
Potentilla simplex	Common cinquefoil
Prenanthes aspera	Rough white lettuce
Prunella vulgaris	Self heal
Prunus americanus	Wild plum

Plants continued

Prunus virginiana	Choke cherry
Ptelea trifoliata	Wafer ash
Pteridium aquilinum	Bracken fern
Pycnanthemum tenuifolium	Slender mountain mint
Pycnanthemum virginianum	Mountain mint
Pyrola elliptica	Shinleaf
Quercus alba	White oak
Quercus macrocarpa	Bur oak
Quercus rubra	Red oak
Quercus prinoides var. *acuminata*	Chinkapin oak
Quercus velutina	Black oak
Ranunculus abortivus	Small-flowered buttercup
Ranunculus fascicularis	Early buttercup
Ranunculus hispidus	Bristly buttercup
Ranunculus recurvatus	Hooked buttercup
Ranunculus septentrionalis	Swamp buttercup
Ratibida pinnata	Gray-headed coneflower
Rhamnus cathartica	Common buckthorn
Rhus glabra	Smooth sumac
Ribes cynbostii	Prickly wild gooseberry
Ribes missouriense	Missouri gooseberry
Robinia pseudoacacia	Black locust
Rosa blanda	Early wild rose
Rosa carolina	Carolina rose
Rosa multiflora	Multiflora rose
Rosa palustris	Swampy rose
Rubus pensylvanicus	Blackberry
Rubus occidentalis	Black raspberry
Rudbeckia hirta	Black-eyed Susan
Rudbeckia laciniata	Goldenglow
Rudbeckia subtomentosa	Fragrant coneflower
Ruellia humilis	Wild petunia
Rumex acetosella	Sour dock
Rumex altissimus	Pale dock
Rumex crispus	Curly dock
Sagittaria lateriflora	Arrowhead
Salix amygdaloides	Peach-leaved willow
Salix discolor	Pussy willow
Salix exigua	Sandbar willow
Salix humilus	Prairie willow
Salix nigra	Black willow
Sambucus canadensis	Elderberry
Sanguinaria canadensis	Bloodroot
Saxifraga pensylvanica	Swamp saxifrage
Schizachyrium scoparium	Little bluestem
Scirpus atrovirens	Common bulrush
Scirpus fluviatilis	River bulrush
Scirpus tabernaemontanii	Great bulrush
Scrophularia marilandica	Late figwort
Scutellaria lateriflora	Mad-dog skullcap
Scutellaria leonardii	Small skullcap
Selaginella rupestris	Sand club moss
Senecio plattensis	Prairie ragwort
Sicyos angulatus	Bur cucumber
Silene stellata	Starry campion
Silphium integrifolium	Rosin weed
Silphium laciniatum	Compass plant

Plants continued

Sisyrinchium albidum	Blue-eyed grass
Sisyrinchium campestre	Prairie blue-eyed grass
Smilacina racemosa	False Solomon's seal
Smilacina stellata	Starry false Solomon's seal
Smilax hispida	Green-brier
Solidago canadensis	Canada goldenrod
Solidago flexicaulis	Broadleaved goldenrod
Solidago gigantea	Late goldenrod
Solidago hispida	Hispid goldenrod
Solidago juncea	Early goldenrod
Solidago missouriensis	Goldenrod
Solidago nemoralis	Old-field goldenrod
Solidago ohioensis	Ohio goldenrod
Solidago patula	Rough-leaved goldenrod
Solidago ptarmicoides	Stiff aster
Solidago riddellii	Goldenrod
Solidago rigida	Stiff goldenrod
Solidago speciosa var. *jejunifolia*	Showy goldenrod
Solidago ulmifolia	Elm-leaved goldenrod
Sorbus americanus E	American mountain ash
Sorghastrum nutans	Indian grass
Specularia perfoliata	Venus' looking-glass
Spiranthes cernua	Nodding ladies tresses
Sporobolus asper	Dropseed
Sporobolus heterolepis	Prairie dropseed
Staphylea trifolia	Bladdernut
Stipa spartea	Porcupine grass
Sullivantia renifolia T	Sullivantia
Symphoricarpos orbiculatus	Coralberry
Symplocarpus foetidus	Skunk cabbage
Talinum rugospermum W	Prairie fame-flower
Taxus canadensis	Canada yew
Tephrosia virginiana	Goat's rue
Teucrium canadense ssp. *virginicum*	Wood sage
Thalictrum dasycarpum	Meadow rue
Thalictrum dioicum	Early meadow rue
Thalictrum thalictroides	Rue anemone
Thelypteris palustris	Marsh fern
Tilia americana	American basswood)
Toxicodendron radicans	Poison ivy
Tradescantia ohiensis	Spiderwort
Tradescantia virginiana	Spiderwort
Triadenum fraseri	Fraser's St. John's-wort
Trichostema brachiatum	False pennyroyal
Trientalis borealis T	Star-flower
Trillium grandiflorum	Large white trillium
Trillium nivale	Snow trillium
Trillium recurvatum	Red trillium
Triosteum perfoliatum	Horse-gentian
Triphora trianthophora	Nodding pogonia
Typha angustifolia	Narrow-leaved cattail
Typha latifolia	Common cattail
Ulmus americana	American elm
Ulmus rubra	Slippery elm·
Urtica dioica	Stinging nettle
Uvularia grandiflora	Bellwort
Vaccinium myrtilloides W	Canada blueberry

Plants continued

Vaccinium pallidum	Low-bush blueberry
Verbena hastata	Blue vervain
Verbena stricta	Hoary vervain
Verbena urticifolia	White vervain
Verbesina alternifolia	Wingstem
Veronicastrum virginicum	Culver's root
Viburnum lentago	Nannyberry
Viburnum prunifolium	Black haw
Viburnum rafinesquianum	Downy arrowwood
Vicia villosa	Vetch
Viola macloskeyi ssp. *pallens*	Smooth white violet
Viola pedata	Birdfoot violet
Viola pedatifida	Prairie violet
Viola pubescens var. *eriocarpa*	Smooth yellow viloet
Viola sororia	Hairy wood violet
Viola striata	Cream violet
Vitis riparia	riverbank grape
Vulpia octoflora	Six-weeks fescue
Woodsia ilvensis E	Rusty woodsia
Woodsia obtusa	Common woodsia
Zanthoxylum americanum	Prickly ash
Zizia aptera	Heart-leaved meadow parsnip

Breeding birds

Common names follow the American Ornithologists' Union (A.O.U) Checklist (6th edition, 1983 and Supplement of July 1985).

Total number of species = 126 (122 native, 4 introduced)

Ardea herodias	Great blue heron
Casmerodius albus	**Great egret** (SE)
Butorides striatus	Green-backed heron
Branta canadensis	Canada goose
Aix sponsa	Wood duck
Anas platyrhynchos	Mallard
Cathartes aura	Turkey vulture
Circus cyaneus	**Northern harrier** (SE)
Accipiter cooperii	**Cooper's hawk** (SE)
Buteo platypterus	Broad-winged hawk
Buteo jamaicensis	Red-tailed hawk
Pandion haliaetus	**Osprey** (SE)
Falco sparverius	American kestrel
Phasianus colchicus	Ring-necked pheasant*
Meleagris gallopavo	Wild turkey
Colinus virginianus	Northern bobwhite
Grus canadensis	**Sandhill crane** (ST)
Charadrius vociferus	Killdeer
Actitus macularia	Spotted sandpiper
Bartramia longicauda	**Upland sandpiper** (SE)
Scolopax minor	American woodcock
Columba livia	Rock dove*
Zenaida macroura	Mourning dove
Coccyzus erythropthalmus	Black-billed cuckoo
Coccyzus americanus	Yellow-billed cuckoo
Bubo virginianus	Great horned owl
Strix varia	Barred owl
Asio otus	**Long-eared owl** (SE)

Birds continued

Asio flammeus	**Short-eared owl** (SE)
Chordeiles minor	Common nighthawk
Caprimulgus vociferus	Whip-poor-will
Chaetura pelagica	Chimney swift
Archilochus colubris	Ruby-throat. hummingbird
Ceryle alcyon	Belted kingfisher
Melanerpes carolinus	Red-bellied woodpecker
Melanerpes erythrocephalus	Red-headed woodpecker
Sphyrapicus varius	Yellow-bellied sapsucker
Picoides pubescens	Downy woodpecker
Picoides villosus	Hairy woodpecker
Colaptes auratus	Northern flicker
Contopus virens	Eastern wood-pewee
Empidonax traillii	Willow flycatcher
Empidonax minimus	Least flycatcher
Empidonax virescens	Acadian flycatcher
Sayornis phoebe	Eastern phoebe
Myiarchus crinitu	Great crested flycatchers
Tyrannus tyrannus	Eastern kingbird
Eremophila alepstris	Horned lark
Tachycineata bicolor	Tree swallow
Stelgidopteryx serripennis	Rough-winged swallow
Hirundo rustica	Barn swallow
Cyanocitta cristata	Blue jay
Corvus brachyrnchos	American crow
Parus atricapillus	Black-capped chickadee
Parus bicolor	Tufted titmouse
Sitta carolinensis	White-breasted nuthatch
Certhia americana	**Brown creeper** (ST)
Troglodytes aedon	House wren
Cistothorus platensis	Sedge wren
Polioptila caerulen	Blue-gray gnatcatcher
Sialia sialis	Eastern bluebird
Catharus fuscescens	**Veery** (ST)
Hylocichla mustelina	Wood thrush
Turdus migratorius	American robin
Dumetella carolinensis	Gray catbird
Mimus polyglottus	Northern mockingbird
Toxostoma rufum	Brown thrasher
Bombycilla cedrorum	Cedar waxwing
Lanius ludovicianu	**Loggerhead shrike** (ST)*s*
Sturnus vulgaris	European starling*
Vireo griseus	White-eyed vireo
Vireo bellii	Bell's vireo
Vireo flavifrons	Yellow-throated vireo
Vireo solitarius	Solitary vireo
Vireo gilvus	Warbling vireo
Vireo olivaceus	Red-eyed vireo
Protonotaria citrea	Prothonotary warbler
Vermivora pinus	Blue-winged warbler
Vermivora chrysoptera	Golden-winged warbler
Mniotilta varia	Black-and-white warbler
Dendroica cerulea	Cerulean warbler
Dendroica virens	Black-throat. green warbler
Dendroica dominica	Yellow-throated warbler
Oporonis philadelphia	Mourning warbler
Wilsonia canadensis	Canada warbler

Birds continued

Wilsonia citrina	Hooded warbler
Helmitheros vermivorus	Worm-eating warbler
Dendroica petechi	Yellow warblera
Dendroica pensylvanica	Chestnut-sided warbler
Setophaga ruticilla	American redstart
Seiurus aurocapillus	Ovenbird
Seiurus motacilla	Louisiana waterthrush
Geothylpis trichas	Common yellowthroat
Icteria virens	Yellow-breasted chat
Cardinalis cardinalis	Northern cardinal
Pheucticus ludovicianu	Rose-breasted grosbeaks
Passerina cyanea	Indigo bunting
Spiza americana	Dickcissel
Pipilo erythrophthalmus	Rufous-sided towhee
Spizella passerina	Chipping sparrow
Spizella pusilla	Field sparrow
Pooecetes gramineus	Vesper sparrow
Chondestes grammacus	Lark sparrow
Passerculus sandwichensis	Savannah sparrow
Ammodramus savannarum	Grasshopper sparrow
Ammodramus henslowii	**Henslow's sparrow** (ST)
Melospiza melodia	Song sparrow
Melospiza georgiana	Swamp sparrow
Spizella pallida	Clay-colored sparrow
Icterus spurius	Orchard oriole
Icterus galbula	Northern oriole
Piranga olivacea	Scarlet tanager
Piranga rubra	Summer tanager
Dolichonyx oryzivorus	Bobolink
Agelaius phoeniceus	Red-winged blackbird
Sturnella magna	Eastern meadowlark
Sturnella neglecta	Western meadowlark
Quiscalus quiscula	Common grackle
Molothrus aster	Brown-headed cowbird
Carduelis pinus	Pine siskin
Carpodacus mexicanus	House finch
Carduelis tristis	American goldfinch
Passer domesticus	House sparrow*

Amphibians and reptiles

Nomenclature follows Collins (1990).

Total number of species = 35 (no introduced species)

Amphibians

Ambystoma tigrinum	Tiger salamander
Notophthalmus viridescens	Eastern newt
Hemidactylium scutatum	**Four-toed salamander** (ST)
Necturus maculosus	Mudpuppy
Bufo americanus	American toad
Acris crepitans	Cricket frog
Pseudacris triseriata	Chorus frog
Pseudacris crucifer	Spring peeper
Hyla versicolor/chrysocelis	Gray treefrog complex
Rana catesbeiana	Bullfrog
Rana clamitans	Green frog
Rana pipiens	Northern leopard frog
Rana palustris	Pickerel frog

Amphibians and Reptiles continued

Reptiles

Chelydra serpentina	Snapping turtle
Chrysemys picta	Painted turtle
Emydoidea blandingii	**Blanding's turtle** (WL)
Graptemys geographica	Map turtle
Graptemys pseudogeographica	False map turtle
Apalone spinifer	Spiny softshell turtle
Terrapene ornata	Ornate box turtle
Ophisaurus attenuatus	Slender glass lizard
Cnemidophorus sexlineatus sexlineatus	Six-lined racerunner
Heterodon platirhinos	Eastern hognose snake
Heterodon nasicus	**Western hognose snake** (ST)
Coluber constrictor	Racer
Opheodrys vernalis	Smooth green snake
Pituophis catenifer	Bullsnake
Elaphe vulpina	Fox snake
Lampropeltis triangulum	Milk snake
Thamnophis proximus	Western ribbon snake
Thamnophis radix	Plains garter snake
Thamnophis sirtalis	Common garter snake
Storeria dekayi	Brown snake
Regina septemvittata	Queen snake
Nerodia sipedon	Northern water snake

Mammals

(compiled from range maps and known records reported in Hoffmeister, 1989; Illinois Natural Heritage Database, 1995). Notes: [ ] = species that might occur in Rock River RRA, but for which there are no records within the past decade; + = species that is probably extirpated from Illinois.
Total number of species = 41 (39 native, 2 introduced)

Didelphimorphia	Marsupials
Didelphis virginiana	Virginia opossum
Insectivora	Insectivores
Sorex cinereu	Masked shrews
Blarina brevicauda	Northern short-tailed shrew
Cryptotis parva	Least shrew
Scalopus aquaticus	Eastern mole
Chiroptera	Bats
Myotis lucifugus	Little brown bat
[***Myotis sodalis***	**Indiana bat** (SE)]
Myotis keenii	Keen's bat
Lasionycteris noctivagans	Silver-haired bat
Pipistrellus subflavus	Eastern pipistrelle
Eptesicus fuscus	Big brown bat
Lasiurus borealis	Red bat
Lasiurus cinereus	Hoary bat
[*Nycticeius humeralis*	Evening bat]
Lagomorpha	Rabbits
Sylvilagus floridanus	Eastern cottontail
[***Lepus townsendii***	**White-tailed jackrabbit** (SE)+]
Rodentia	Rodent
Tamias striatus	Eastern chipmunk
Marmota monax	Woodchuck
Spermophilus tridecemlineatus	Thirteen-lined ground squirrel
Spermophilus franklinii	Franklin's ground squirrel
Sciurus carolinensis	Gray squirrel

Mammals continued	
Sciurus niger	Fox squirrel
Glaucomys volans	Southern flying squirrel
Castor canadensis	Beaver
Reithrodontomys megalotis	Western harvest mouse
Peromyscus maniculatus	Deer mouse
Peromyscus leucopus	White-footed mouse
Microtus pennsylvanicus	Meadow vole
Microtus ochrogaster	Prairie vole
[*Microtus pinetorum*	Pine vole]
Ondatra zibethicus	Muskrat
[*Synaptomys cooperi*	Southern bog lemming]
Rattus norvegicus	Norway rat *
Mus musculus	House mouse *
Zapus hudsonius	Meadow jumping mouse
Carnivora	Carnivores
Canis latran	Coyotes
Vulpes vulpes	Red fox
Urocyon cinereoargenteus	Gray fox
Procyon lotor	Raccoon
Mustela nivalis	Least weasel
Mustela frenata	Long-tailed weasel
Mustela vison	Mink
Taxidea taxus	Badger
Mephitis mephitis	Striped skunk
Lutra canadensis	**River otter** (SE)
[***Felis rufus***	**Bobcat** (ST)]
Artiodactyla	Even-toed ungulates
Odocoileus virginianus	White-tailed deer

Freshwater fishes
Total number of species = 80 (78 native, 2 introduced).

ACIPENSERIDAE	
Acipenser fulvescens ST,FC	Lake sturgeon
LEPISOSTEIDAE	
Lepisosteus osseus	Longnose gar
ANGUILLIDAE	
Anguilla rostrata	American eel
HIODONTIDAE	
Hiodon tergisus	Mooneye
CLUPEIDAE	
Dorosoma cepedianum	Gizzard shad
UMBRIDAE	
Umbra limi	Central mudminnow
ESOCIDAE	
Esox americanus	Grass pickerel
Esox lucius	Northern pike
CYPRINIDAE	
Campostoma anomalum	Central stoneroller
Campostoma oligolepis	Largescale stoneroller
Carassius auratus *	Goldfish
Cyprinella spiloptera	Spotfin shiner
Cyprinus carpio *	Common carp
Erimystax x-punctatus W	Gravel chub
Hybognathus nuchalis	Mississippi silvery minnow
Luxilus chrysocephalus	Striped shiner

Fishes continued	
Luxilus cornutus	Common shiner
Lythrurus umbratilis	Redfin shiner
Macrhybopsis storeriana	Silver chub
Nocomis biguttatus	Hornyhead chub
Notemigonus crysoleucas	Golden shiner
Notropis atherinoides	Emerald shiner
Notropis blennius	River shiner
Notropis dorsalis	Bigmouth shiner
Notropis hudsonius	Spottail shiner
Notropis ludibundus	Sand shiner
Notropis nubilus	Ozark minnow
Notropis rubellus	Rosyface shiner
Notropis texanus SE	Weed shiner
Phenacobius mirabilis	Suckermouth minnow
Phoxinus erythrogaster	Southern redbelly dace
Pimephales notatus	Bluntnose minnow
Pimephales promelas	Fathead minnow
Pimephales vigilax	Bullhead minnow
Rhinichthys atratulus	Blacknose dace
Semotilus atromaculatus	Creek chub
CATOSTOMIDAE	
Carpiodes carpio	River carpsucker
Carpiodes cyprinus	Quillback
Carpiodes velifer	Highfin carpsucker
Catostomus commersoni	White sucker
Hypentelium nigricans	Northern hog sucker
Ictiobus cyprinellus	Bigmouth buffalo
Minytrema melanops	Spotted sucker
Moxostoma anisurum	Silver redhorse
Moxostoma carinatum ST	River redhorse
Moxostoma duquesnei	Black redhorse
Moxostoma erythrurum	Golden redhorse
Moxostoma macrolepidotum	Shorthead redhorse
ICTALURIDAE	
Ameiurus melas	Black bullhead
Ameiurus natalis	Yellow bullhead
Ictalurus punctatus	Channel catfish
Noturus exilis	Slender madtom
Noturus flavus	Stonecat
Noturus gyrinus	Tadpole madtom
Pylodictis olivaris	Flathead catfish
CYPRINODONTIDAE	
Fundulus notatus	Blackstripe topminnow
ATHERINIDAE	
Labidesthes sicculus	Brook silverside
GASTEROSTEIDAE	
Culaea inconstans	Brook stickleback
MORONIDAE	
Morone chrysops	White bass
CENTRARCHIDAE	
Ambloplites rupestris	Rock bass
Lepomis cyanellus	Green sunfish
Lepomis gibbosus	Pumpkinseed
Lepomis humilis	Orangespotted sunfish
Lepomis macrochirus	Bluegill
Micropterus dolomieu	Smallmouth bass
Micropterus salmoides	Largemouth bass

Fishes continued	
Pomoxis annularis	White crappie
Pomoxis nigromaculatus	Black crappie
PERCIDAE	
Etheostoma caeruleum	Rainbow darter
Etheostoma flabellare	Fantail darter
Etheostoma microperca	Least darter
Etheostoma nigrum	Johnny darter
Etheostoma zonale	Banded darter
Percina caprodes	logperch
Percina maculata	Blackside darter
Percina phoxocephala	Slenderhead darter
Stizostedion canadense	Sauger
Stizostedion vitreum	Walleye
SCIAENIDAE	
Aplodinotus grunniens	Freshwater drum
COTTIDAE	
Cottus bairdi	Mottled sculpim

Freshwater mussels
total number of species = 33 (no introduced species)

Actinonaias ligamentina	Mucket
Alasmidonta marginata FC	Elktoe
Alasmidonta viridis SE	Slippershell mussel
Amblema plicata	Threeridge
Anodontoides ferussacianus	Cylindrical papershell
Cyclonaias tuberculata	Purple wartyback
Elliptio dilatata ST	Spike
Fusconaia ebena ST	Ebonyshell
Fusconaia flava	Wabash pigtoe
Lampsilis cardium	Plain pocketbook
Lampsilis higginsii SE,FE	Higgins eye
Lampsilis siliquoidea	Fatmucket
Lasmigona complanata	White heelsplitter
Lasmigona compressa	Creek heelsplitter
Lasmigona costata	Flutedshell
Leptodea fragilis	Fragile papershell
Ligumia recta	Black sandshell
Obliquaria reflexa	Threehorn wartyback
Plethobasus cyphyus SE	Sheepnose
Pleurobema sintoxia	Round pigtoe
Potamilus alatus	Pink heelsplitter
Potamilus ohiensis	Pink papershell
Pyganodon grandis	Giant floater
Quadrula metanevra	Monkeyface
Quadrula pustulosa	Pimpleback
Quadrula quadrula	Mapleleaf
Strophitus undulatus	Squawfoot
Toxolasma parvus	Lilliput
Tritogonia verrucosa	Pistolgrip
Truncilla donaciformis	Fawnsfoot
Truncilla truncata	Deertoe
Utterbackia imbecillis	Paper pondshell
Venustaconcha ellipsiformis	Ellipse

Freshwater crustaceans
Total number of species = 11 (10 native, 1 introduced).

ISOPODA (ISOPODS)

ASELLIDAE
Caecidotea forbesi
Caecidotea intermedia
Caecidotea kendeighi
AMPHIPODA (AMPHIPODS)
GAMMARIDAE
Gammarus pseudolimnaeus
HYALELLIDAE
Hyalella azteca
DECAPODA (CRAYFISHES & SHRIMPS)
CAMBARIDAE

Cambarus diogenes	Devil crawfish
Orconectes immunis	Calico crawfish
Orconectes propinquus	Northern clearwater crawfish
Orconectes rusticus *	Rusty crawfish
Orconectes virilis	Virile crawfish
Procambarus acutus	White river crawfish

Appendix B

Tables from: Robinson, S.K. 1995. Nesting success of forest song birds in northwestern Illinois. Center for Wildlife Ecology Technical Report, Project W-115-R-3. Illinois Natural History Survey, Champaign.

Table 2.5. Census results from North-central study areas; hardwoods only included from Lowden-Miller State Forest, 1994.

	Registrations/10 points/70-m radius								
Species	HMW [1]	LHNP [2]	SRA [3]	CSFP [4]	SRFP [5]	FCSP [6]	WPSP [7]	CRNP [8]	LMSF [9]
Turkey vulture	0	0	0	0	+	0	0	+ [10]	+
Broad-winged hawk	0	0	0	0	0	0	0	0	0.2
Cooper's hawk	0	0	+	+	1.7	0	0	+	0.6
Red-tailed hawk	0	0	0	0	0	1.0	+	+	+
Red-shouldered hawk	0	0	+	0	0	0	0	0	
Wild turkey	0	0	0	0	0	0	0	+	+
Wood duck	0	2.5	+	+	+	0.8	0	+	+
Mourning dove	+	0	+	0	0	0	+	+	0.3
Yellow-billed cuckoo	+	0	+	+	1.7	0.8	0	0.6	+
Black-billed cuckoo	0	0	+	0	0	0	0	0	0.3
Great horned owl	+	+	+	+	+	+	+	+	+
Barred owl	2.0	+	+	+	+	+	+	+	+
Whip-poor-will	?	?	+	+	+	?	+	+	+
Ruby-throated hummingbird	0	2.5	1.4	1.4	1.7	0	1.0	1.3	0.6
Chimney swift	+	+	+	+	+	+	+	+	+
Belted kingfisher	0	0	0	0	0	1.6	0	0	+
Red-bellied woodpecker	4.0	5.0	1.4	+	0	0	1.9	0.3	1.3
Red-headed woodpecker	0	2.5	2.9	0	+	0.8	0	0	1.0
Northern flicker	2.0	2.5	0	1.4	+	+	0.5	+	0.3
Hairy woodpecker	2.0	+	1.4	+	+	+	1.9	0.3	0.9
Downy woodpecker	4.0	5.0	1.4	2.9	5.0	6.2	2.4	1.9	2.2

Continued.

Table 2.5. Page 2.

Pileated woodpecker	0	0	0	0	0	0	0	+	0.2
Eastern kingbird	0	0	0	+	0	0	0	+	0
Great crested flycatcher	6.0	2.5	4.3	10.0	5.0	2.3	1.9	2.2	1.6
Eastern wood-pewee	10.0	15.0	1.4	8.6	8.3	8.5	7.6	6.9	6.5
Eastern Phoebe	0	0	0	0	0	0	1.4	0.3	0
Least flycatcher	0	0	0	0	0	+	+	0.9	0
Acadian flycatcher	0	0	0	0	6.7	10.0	0	5.0	1.0
Blue jay	8.0	5.0	2.9	+	1.7	5.4	5.2	1.9	4.9
American crow	+	5.0	0	0	5.0	+	1.4	0	0.2
Tufted titmouse	0	2.5	+	5.7	1.7	2.3	0.5	3.1	3.1
Black-capped chickadee	8.0	5.0	1.4	2.9	3.3	9.2	4.8	3.1	3.8
White-breasted nuthatch	8.0	5.0	1.4	5.7	8.3	9.2	6.7	4.1	3.3
House wren	10.0	15.0	1.4	4.3	5.0	10.8	11.0	0.9	1.9
Blue-gray gnatcatcher	4.0	2.5	2.9	5.7	8.3	3.1	1.4	5.0	3.0
Wood thrush	4.0	0	1.4	0	0	2.3	5.7	1.6	2.7
Veery	0	0	0	0	3.3	0.8	0	3.8	2.9
American robin	+	0	0	2.9	0	6.9	7.1	9.4	6.5
Gray catbird	0	2.5	1.4	1.4	3.3	2.3	1.0	4.7	4.7
Cedar waxwing	0	0	0	1.4	0	0.8	1.4	1.9	0.8
Yellow-throated vireo	2.0	2.5	1.4	4.3	0	0		2.2	0.5
Red-eyed vireo	4.0	12.5	11.4	7.1	20.0	11.5	4.3	7.2	6.5
Warbling vireo	0	0	0	0	0	0	0	0.9	+
Prothonotary warbler	0	0	0	0	0	0	0	0.3	+
Blue-winged warbler	0	0	0	0	0	0	0	0.6	0.4
Black-and-white warbler	0	0	0	0	0	0.8	0	0.6	0
Cerulean warbler	0	0	0	0	5.0	0	0	5.3	+
Chestnut-sided warbler	0	0	0	0	0	0	0	+	0

Continued.

Table 2.5. Page 3.

Yellow-throated warbler	0	0	0	0	+	0	0.5	0	0.2
Yellow warbler	0	0	0	0	0	0	0	0.9	+
Kentucky warbler	0	0	0	0	0	0	0	0.9	0.4
Canada warbler	0	0	0	0	0	0	0	0.3	0.1
Hooded warbler	0	0	0	0	0	0	0	+	0.1
Worm-eating warbler	0	0	0	0	0	0.8	0	+	+
Ovenbird	0	0	11.4	+	0	0.8	4.3	3.8	6.9
Louisiana waterthrush	0	0	0	0	0	0	0	0.3	0.6
Common yellowthroat	0	0	+	+	+	+	+	0.9	0.9
American redstart	0	0	0	0	0	+	0	8.1	2.3
Rose-breasted grosbeak	8.0	2.5	+	0	0	0	0	9.7	6.9
Northern cardinal	10.0	2.5	12.9	2.9	6.7	8.5	4.3	3.4	5.6
Indigo bunting	18.0	12.5	4.3	7.1	6.7	1.5	4.8	5.0	4.8
Rufous-sided towhee	0	0	+	0	0	0	0	1.6	1.6
Song sparrow	0	0	0	+	0	+	0	0.3	0.7
Chipping sparrow	0	0	0	+	3.3	0	2.9	0.3	0.3
Brown-headed cowbird (Males only)	4.0	2.5	2.9	0	0	1.6	2.4	6.3	6.1
Brown-headed cowbird (Females only)	2.0	0	1.4	0	1.7	5.4	0.5	3.4	3.5
Common grackle	0	0	0	0	0	0.8	1.0	0	0.1
Northern oriole	8.0	2.5	0	0	0	0	0	1.3	3.5
Scarlet tanager	10.0	0	4.3	2.9	+	3.8	2.4	1.6	2.1
Pine siskin	0	0	0	0	0	0	0.5	0	0
American goldfinch	0	2.5	0	0	0	7.7	0	0.3	0
Eur. starling	0	12.5	0	0	0	0	1.0	0	0

Continued.

Table 2.5. Page 4.

[1] HMW = Hartley Memorial Woods Nature Preserve
[2] LHNP = Laona Heights Nature Preserve
[3] SRA = Sugar River Alder Forest Preserve - upland woods only
[4] CSFP = Colored Sands Forest Preserve - upland, upland burned, and floodplain
[5] SRFP = Sugar River Forest Preserve - upland and floodplain
[6] FCSP = Franklin Creek State Park - ravine only
[7] WPSP = White Pine State Park - uplands only
[8] CRNP = Castle Rock (George B. Fell) Nature Preserve - upland, ravine, and floodplain
[9] LMSF = Lowden-Miller State Forest - upland, ravine, and floodplain hardwoods only - each habitat type weighted equally
[10] + = Bird heard or observed outside the 70-m fixed radius or outside of the census period

Table 2.7. Estimated abundances of breeding birds in major habitats of the Lowden-Miller State Forest, 1994.

Species	Registrations/10 points/70-m radius (No./40 ha) [1]								
	Pines	Pines/ Oaks	Oaks	Ravine	Floodplain	Oak/ Clearcut	Pines/ Clearcut	Pines/Oaks/ Clearcut	Clearcuts
Green-backed heron	0	0	0	0	+	0	0	0	0
Great Blue heron	0	0	0	0	+	0	0	0	0
Great egret	0	0	0	0	+	0	0	0	0
Mallard	0	0	0	0	+	0	0	0	0
Am. woodcock	0	0	0	0.8(2.1)	0.7(1.8)	0	0	0	0
Turkey vulture	+	+	+	+	+	+	+	+	+
Cooper's hawk	+	0.4(1.0)	0.2(0.5)	1.7(4.4)	+	0	+	0	0
Broad-winged hawk	+	+	+	+	0.7(1.8)	0	0	0	0
Red-tailed hawk	+	+	+	+	+	0	0	0	0
Am. kestrel [2]	0	0	0	0	0	0	0	0	0
Wild turkey	+	+	+	+	+	+	+	+	+
Mourning dove	0.7(1.8)	0.8(2.1)	+	0.8(2.1)	0	0.7(1.8)	1.4(3.6)	+	0.8(2.1)
Yellow-billed cuckoo	0	0	0	+	0	+	0	+	0
Black-billed cuckoo	0	0.4(1.0)	0.2(0.5)	0	0.7(1.8)	0	0.3(0.8)	+	0.8(2.1)
Great horned owl	+	+	+	+	+	+	+	+	+
Barred owl	+	+	+	+	+	+	+	+	+
Whip-poor-will	+	+	+	+	+	+	+	+	+
Common nighthawk	+	+	+	+	+	+	+	+	+
Chimney swift	+	+	+	+	+	+	+	+	+
Ruby-throated hummingbird	0	0	0.2(0.5)	1.7(4.4)	0	0.3(0.8)	0	0	0.8(2.1)

Continued.

Table 2.7. Page 2.

Registrations/10 points/70-m radius (No./40 ha) [1]

Species	Pines	Pines/ Oaks	Oaks	Ravine	Floodplain	Oak/ Clearcut	Pines/ Clearcut	Pines/Oaks/ Clearcut	Clearcuts
Belted Kkngfisher	0	0	0	+	+	0	0	0	0
Red-bellied woodpecker	0.2(0.5)	1.5(3.9)	1.6(4.2)	1.7(4.4)	0.7(1.8)	1.3(3.4)	0	0	0.8(2.1)
Red-headed woodpecker	+	0	0	0.8(2.1)	2.1(5.5)	+	1.0(2.6)	0	0.8(2.1)
Northern flicker	+	+	0.2(0.5)	+	0.7(1.8)	0.7(1.8)	+	+	0.8(2.1)
Pileated woodpecker	0	+	+	0	0.7(1.8)	0	0	0	0
Yellow-bellied sapsucker	0.2(0.5)	0	0	0	0	0	0	0	0
Hairy woodpecker	0.7(1.8)	+	0.2(0.5)	1.7(4.4)	0.7(1.8)	1.3(3.4)	0	2.5(6.5)	0.8(2.1)
Downy woodpecker	1.2(3.1)	2.7(7.0)	2.7(7.0)	2.5(6.5)	1.4(3.6)	2.3(6.0)	2.2(5.7)	5.0	0
Eastern kingbird	0	0	0	0	0	0	0	0	+
Great crested flycatcher	0	0.8(2.1)	2.5(6.5)	1.7(4.4)	0.7(1.8)	0.7(1.8)	0	0	0.8(2.1)
Eastern wood-pewee	5.4(14.0)	5.8(15.1)	7.3(19.0)	9.2(23.9)	2.9(7.5)	4.3(11.2)	5.2(13.5)	10.0(26.0)	0.8(2.1)
Eastern Phoebe	0	0	0	0	0	0	+	0	0
Least flycatcher	0.5(1.3)	0	0	0	0	0	1.0(2.6)	0	0
Acadian flycatcher	0.5(1.3)	0	0	0.8(2.1)	2.1(5.5)	0	0	0	0
Horned lark [2]	0	0	0	0	0	0	0	0	0
Tree swallow	0	0	0	0	+	0	0	0	0
Purple martin	0	0	0	0	+	0	0	0	0
N. rough-winged swallow	0	0	0	0	+	0	0	0	0
Barn swallow	0	0	0	0	+	0	0	0	0
Blue jay	5.4(14.0)	4.2(10.9)	5.5(14.3)	5.0(13.0)	4.3(11.2)	3.3(8.6)	5.9(15.3)	2.5(6.5)	2.5(6.5)
American crow	0.5(1.3)	0.4(1.0)	0.7(1.8)	+	+	+	0.2(0.5)	0	0
Tufted titmouse	1.4(3.6)	1.2(3.1)	2.7(7.0)	1.7(4.4)	5.0(13.0)	0.7(1.8)	0	0	0
Blacked-capped chickadee	3.2(8.3)	3.1(8.1)	3.2(8.3)	2.5(6.5)	5.7(14.8)	3.7(9.6)	4.1(10.7)	5.0(13.0)	2.5(6.5)

Continued.

Table 2.7. Page 3.

Species	Registrations/10 points/70-m radius (No./40 ha) [1]								
	Pines	Pines/ Oaks	Oaks	Ravine	Floodplain	Oak/ Clearcut	Pines/ Clearcut	Pines/Oaks/ Clearcut	Clearcuts
Brown Cceeper	0.5(1.3)	0	0	0	0	0	0.3(0.8)	0	0
White-breasted nuthatch	1.7(4.4)	3.8(9.9)	3.6(9.4)	3.3(8.6)	2.9(7.5)	2.3(6.0)	1.4(3.6)	+	0
House wren	0.5(1.3)	1.2(3.1)	0.9(2.3)	3.3(8.6)	1.4(3.6)	2.7(7.0)	3.4(8.8)	+	3.3(8.6)
Golden-crowned kinglet	0.2(0.5)	0	0	0	0	0	0	0	0
Blue-gray gnatcatcher	0.2(0.5)	1.2(3.1)	1.6(4.2)	6.7(17.4)	0.7(1.8)	1.7(4.4)	0.3(0.8)	0	0
Eastern bluebird	0	0	0	0	0	0	+	0	0
Wood thrush	3.2(8.3)	2.7(7.0)	4.3(11.2)	2.5(6.5)	1.4(3.6)	4.3(11.2)	0.7(1.8)	2.5(6.5)	0.8(2.1)
Veery	3.4(8.8)	5.8(15.1)	3.9(10.1)	3.3(8.6)	1.4(3.6)	6.0(15.6)	3.1(8.1)	+	3.3(8.6)
American robin	4.4(11.4)	2.3(6.0)	5.9(15.3)	10.0(26.0)	3.6(9.4)	4.0(10.4)	7.9(20.5)	5.0(13.0)	4.2(10.9)
Gray catbird	2.4(6.2)	2.7(7.0)	3.0(7.8)	7.5(19.5)	3.6(9.4)	13.0(33.8)	7.6(19.8)	7.5(19.5)	11.7(30.4)
Brown thrasher	0	0	0.2(0.5)	0	0	0.7(1.8)	0.3(0.8)	+	+
Cedar waxwing	5.6(14.6)	4.6(12.0)	1.8(4.7)	0.8(2.1)	0	2.3(6.0)	7.6(19.8)	5.0(13.0)	1.7(4.4)
White-eyed vireo	0.2(0.5)		0.2(0.5)	0.8(2.1)	+	0.7(1.8)	+	2.5(6.5)	2.5(6.5)
Yellow-throated vireo	0	+	0.7(1.8)	+	0.7(1.8)	0	0.3(0.8)	2.5(6.5)	0
Solitary vireo	0.2(0.5)	0	0	0	0	0	0	0	0
Red-eyed vireo	5.9(15.3)	8.5(22.1)	8.0(20.8)	5.0(13.0)	6.4(16.6)	4.7(12.2)	1.0(2.6)	10.0(26.0)	2.5(6.0)
Warbling vireo	0	0	0	0	+	0	0	0	0
Prothonotary warbler	0	0	0	0	+	0	0	0	0
Blue-winged warbler	0.2(0.5)	0.4(1.0)	0.5(1.3)	0.8(2.1)	0	2.0(5.2)	2.1(5.5	2.5(6.5)	5.8(15.1)
Golden-winged warbler	0	0	0	0	0	0.3(0.8)	0	0	0
Black-and-white warbler	0.2(0.5)	0	0	0	0	0.3(0.8)	0	+	0.8(0.8)
Cerulean warbler	0	0	+	0	0	0	0	0	0
Chestnut-sided warbler	0.2(0.5)	0	0	0	0	5.7(14.8)	5.2(13.5)	5.0(13.0)	8.3(21.6)

Continued.

Table 2.7. Page 4.

Registrations/10 points/70-m radius (No./40 ha) [1]

Species	Pines	Pines/ Oaks	Oaks	Ravine	Floodplain	Oak/ Clearcut	Pines/ Clearcut	Pines/Oaks/ Clearcut	Clearcuts
Black-throated green warbler	1.0(2.6)	1.5(3.9)	0	0	0	0.3(0.8)	0.3(0.8)	0	0
Yellow-throated warbler	4.6(12.0)	1.5(3.9)	0	0	0.7(1.8)	0	2.8(7.3)	2.5(6.5)	0
Yellow warbler	0	0	0	0	+	0	0.3(0.8)	0	0
Mourning warbler	0	0	0	0	0	2.0(5.2)	0.3(0.8)	2.5(6.5)	0
Kentucky warbler	0.2(0.5)	0.4(1.0)	0.5(1.3)	+	0.7(1.8)	2.3(6.0)	0	0	0
Canada warbler	0	0.4(1.0)	0.2(0.5)	0	0	1.0(2.6)	0	0	0
Hooded warbler	0.2(0.5)	0.4(1.0)	0.2(0.5)	0	0	0.7(1.8)	0	0	0
Worm-eating warbler	0	0	+	0	0	0	0	0	0
Ovenbird	14.9(38.7)	12.7(33.0)	12.7(33.0)	6.7(17.4)	1.4(3.6)	6.0(15.6)	9.0(23.4)	10.0(26.0)	5.0(13.0)
Louisiana waterthrush	0	0	0	1.7(4.4)	0	0	0	0	0
Common yellowthroat	0	0.4(1.0)	0.9(2.3)	1.7(4.4)	+	3.0(7.8)	+	+	1.7(4.4)
Yellow-breasted chat	0	0	0	0	0	+	0.7(1.8)	0	0
American redstart	0	0.8(2.1)	0.5(1.3)	4.2(10.9)	2.1(5.5)	3.3(8.6)	0	0	0
Rose-breasted grosbeak	5.4(14.0)	7.3(19.0)	7.5(19.5)	11.7(30.4)	1.4(3.6)	10.3(26.8)	6.6(17.2)	2.5(6.5)	10.8(28.1)
Northern cardinal	5.6(14.6)	6.2(16.1)	5.0(13.0)	6.7(17.4)	5.0(13.0)	7.0(18.2)	9.3(24.2)	7.5(19.5)	5.0(13.0)
Indigo bunting	1.7(4.4)	2.3(6.0)	2.3(6.0)	5.8(15.1)	6.4(16.6)	4.3(11.2)	7.2(18.7)	5.0(13.0)	8.3(21.6)
Rufous-sided towhee	4.1(10.7)	2.7(7.0)	1.6(4.2)	3.3(8.6)	0	6.0(15.6)	10.3(26.8)	7.5(19.5)	6.7(17.4)
Savannah sparrow [2]	0	0	0	0	0	0	0	0	0
Vesper sparrow [2]	0	0	0	0	0	0	0	0	0
Song sparrow	0	0	0	0	2.1(5.5)	1.0(2.6)	1.4(3.6)	2.5(6.5)	0.8(2.1)
Lark sparrow	0	0	0	0	0	0	0.3(0.8)	0	0.8(2.1)
Field sparrow	0.2(0.5)	0	0.2(0.5)	0	0	0.7(1.8)	1.4(3.6)	2.5(6.5)	2.5(6.5)
Chipping sparrow	19.5(50.7)	13.1(34.1)	0.2(0.5)	+	0.7(1.8)	0.3(0.8)	14.1(36.7)	7.5(19.5)	0.8(2.1)

Continued.

Table 2.7. Page 5.

Species	Registrations/10 points/70-m radius (No./40 ha) [1]								
	Pines	Pines/ Oaks	Oaks	Ravine	Floodplain	Oak/ Clearcut	Pines/ Clearcut	Pines/Oaks/ Clearcut	Clearcuts
Dickcissel [2]	0	0	0	0	0	0	0	0	0
Bobolink [2]	0	0	0	0	0	0	0	0	0
Eastern meadowlark [2]	0	0	0	0	0	0	0	0	0
Red-winged blackbird [2]	0	0	0	0	0	0	0	0	0
Brown-headed cowbird: Male only	5.4(14.0)	5.0(13.0)	8.4(21.8)	5.0(13.0)	5.0(13.0)	7.0(18.2)	5.5(14.3)	7.5(19.5)	10.0(26.0)
Brown-headed cowbird: Female only	4.4(11.4)	8.1(21.1)	4.1(10.7)	5.0(13.0)	1.4(3.6)	5.3(13.8)	5.9(15.3)	2.5(6.5)	1.7(4.4)
Common grackle	0	0	0.2(0.5)	0	0	0	0	0	0
Northern oriole	0.5(1.3)	0	0.9(2.3)	8.3(21.6)	1.4(3.6)	0	1.0(2.6)	+	2.5(6.5)
Scarlet tanager	1.0(2.6)	3.1(8.1)	3.0(7.8)	2.5(6.5)	0.7(1.8)	0.7(1.8)	0.3(0.8)	0	0
Summer tanager	0	0	0	0	0	0.3(0.8)	1.0(2.6)	+	1.7(4.4)
House sparrow [2]	0	0	0	0	0	0	0	0	0
Pine siskin	0.5(1.3)	0	0	0	0	0	0.3(0.8)	0	0
American goldfinch	1.5(3.9)	0.8(2.1)	0	0	0	0.7(1.8)	2.8(7.3)	0	0
House finch	0.2(0.5)	0	0	0	0	0	0	0	0

[1] + =Bird was observed in this habitat, but not within 70-m of a census point or during a point count.

[2] = Only recorded in Christmas-tree plantation.

Table 2.9. Area effects on relative abundance (No. 110 points/70-m radius and species richness of selected groups of forest-breeding birds in 15 woodlots in northern Illinois, 1992-1994).

	R square	Slope	F	P
Residents plus short-distance migrants	0.02	+1.20	0.22	0.643
Neotropical migrants	0.02	-2.13	0.30	0.60
All birds	0.00	-0.92	0.025	0.876
Ground Nesters	0.35	+2.44	7.15	0.019
Cowbird Hosts	0.02	+1.68	0.21	0.657
High-quality Cowbird Hosts	0.12	+2.82	1.60	0.230
Proportion Neotropical Migrants	0.16	-0.02	2.43	0.143
Neotropical Migrant Species	0.76	+4.83	42.11	0.00002
Total Species	0.78	+7.29	46.08	0.00001

Table 2.10. Area effects on relative abundance (No./10 points/70-m radius) of forest- dwelling breeding birds in 15 woodlots in northern Illinois, 1992-1994.
All years combined.

Species	Regression of area on abundance			
	R square	Slope	F	P
Cooper's hawk	0.16	+0.05	2.42	0.144
Broad-winged hawk	0.41	+0.05	9.18	0.010**
Yellow-billed cuckoo	0.00	+0.01	0.00	0.970
Black-billed cuckoo	0.11	+0.04	1.60	0.228
Ruby-throated hummingbird	0.14	-0.23	2.04	0.176
Red-bellied woodpecker	0.02	-0.19	0.29	0.601
Red-headed woodpecker	0.06	-0.20	0.89	0.363
Northern flicker	0.29	-0.36	5.28	0.039*
Pileated woodpecker	0.41	+0.08	9.02	0.010**
Yellow-bellied sapsucker	0.04	+0.004	0.49	0.496
Hairy woodpecker	0.00	-0.05	0.05	0.828
Downy woodpecker	0.10	-0.45	1.47	0.247
Great crested flycatcher	0.48	-1.46	11.77	0.004**
Eastern wood-pewee	0.04	-0.57	0.59	0.455
Least flycatcher	0.10	+0.07	1.44	0.25
Acadian flycatcher	0.00	+0.09	0.01	0.91
Blue jay	0.02	-0.26	0.32	0.58
Am. crow	0.08	-0.42	1.13	0.31
Tufted titmouse	0.24	+0.84	4.21	0.061
Black-capped chickadee	0.01	-0.19	0.16	0.70
White-breasted nuthatch	0.12	-0.68	1.85	0.20
House wren	0.20	-1.90	3.28	0.09
Blue-gray gnatcatcher	0.11	-0.54	1.66	0.22
Wood thrush	0.07	+0.52	0.97	0.34
Veery	0.09	+0.55	1.31	0.273
Am. robin	0.18	+1.07	2.81	0.117
Gray catbird	0.09	+0.38	1.30	0.275
Cedar waxwing	0.16	+0.34	2.53	0.136
Yellow-throated vireo	0.16	-0.44	2.54	0.135
Red-eyed vireo	0.03	-0.58	0.38	0.548
Blue-winged warbler	0.55	+0.08	15.80	0.002**

Continued:

Table 2.10. Page 2.

Black-and-white warbler	0.00	+0.01	0.01	0.917
Cerulean warbler	0.02	+0.48	0.33	0.573
Chestnut-sided warbler	0.10	+0.04	1.46	0.248
Yellow-throated warbler	0.04	+0.02	0.52	0.485
Kentucky warbler	0.21	+0.38	3.38	0.089
Hooded warbler	0.04	+0.14	0.56	0.465
Worm-eating warbler	0.03	+0.03	0.40	0.540
Ovenbird	0.20	+1.33	3.17	0.098
Louisiana waterthrush	0.07	+0.11	0.98	0.341
Common yellowthroat	0.34	+0.13	6.66	0.023
Am. redstart	0.21	+0.70	3.47	0.085
Rose-breasted grosbeak	0.10	+0.90	1.37	0.262
Northern cardinal	0.10	-0.78	1.51	0.241
Indigo bunting	0.27	-1.91	4.79	0.047*
Rufous-sided towhee	0.43	+0.70	9.87	0.008**
Chipping sparrow	0.00	-0.06	0.06	0.804
Brown-headed cowbird - M	0.27	+1.37	4.73	0.049
- F	0.27	+1.08	4.88	0.046
Common grackle	0.09	+0.10	1.22	0.289
Northern oriole	0.02	-0.23	0.21	0.657
Scarlet tanager	0.05	-0.43	0.63	0.440
Summer tanager	0.14	+0.04	2.13	0.168
Am. goldfinch	0.01	-0.14	0.09	0.769
Carolina wren	0.00	0.00	0.02	0.882
Canada warbler	0.22	+0.023	3.77	0.074
Eur. starling	0.05	-0.65	0.76	0.401

Table 2.11. Correlates of Cowbird:host ratios.

	R square	Slope	F	P
Male+Female Cowbird: Host vs. Area	0.40	+0.04	8.55	0.012
Female Cowbird: Host vs. Area	0.32	+0.02	6.14	0.028
Female Cowbird: Host vs. Cowbird host abundance	0.01	+0.04	0.17	0.686
Male+Female Cowbird: Host vs. Cowbird host abundance	0.02	+0.09	0.26	0.618
Female Cowbird: Host vs. High-Quality Hosts	0.28	+0.02	4.76	0.05
Male+Female Cowbird: Host vs. High Quality Cowbird host abundance	0.33	+0.003	5.85	0.032

Table 3.1. Costs of parasitism in terms of reduced clutch size and reduced fledging success from nests that fledge at least one young (i.e., that escape predation).

Species	Host Eggs		Cowbird	Host Fledglings		Cowbird
	Unparasitized	Parasitized	Eggs	Unparasitized	Parasitized	Fledglings
Arcadian flycatcher	2.9 (19)	1.9 (14)	1.4 (14)	1.8 (5)	0.4 (5)	0.8 (5)
Wood thrush	3.0 (31)	2.2 (129)	2.8(129)	2.5(18)	1.2 (48)	1.5 (48)
Veery	3.0 (7)	1.7 (18)	2.4 (18)	3.0 (2)	1.0 (3)	2.3 (3)
Red-eyed vireo	2.5 (2)	0.8 (14)	2.5 (14)	- -	0.5 (2)	1.5 (2)
Yellow-throated vireo	3.3 (3)	1.0 (1)	2.0 (1)	3.0 (1)	- -	- -
Cerulean warbler	3.0 (1)	2.3 (4)	1.8 (4)	- -	1.0 (2)	1.0 (2)
Ovenbird	4.0 (6)	1.3 (9)	3.2 (9)	3.5 (2)	0 (1)	3.0 (1)
Louisiana waterthrush	- -	1.3 (4)	3.8 (4)	- -	0.5 (2)	2.5 (2)
Kentucky warbler	4.0 (5)	2.0 (6)	1.8 (6)	- -	0.3 (3)	1.3 (3)
Hooded warbler	3.0 (1)	1.6 (7)	1.4 (7)	- -	- -	- -
Am. redstart	3.7 (20)	2.6 (7)	1.0 (7)	3.1 (8)	0.0 (1)	1.0 (1)
Scarlet tanager	- -	2.0 (5)	3.8 (5)	- -	1.5 (2)	2.0 (2)
Northern cardinal	3.0 (37)	2.4 (24)	1.5 (24)	2.8(14)	1.9 (10)	0.8 (10)
Rose-breasted grosbeak	3.7 (28)	2.6 (14)	1.4 (14)	3.3(27)	2.0 (3)	0.3 (3)
Indigo bunting	3.6 (17)	1.6 (36)	1.5 (36)	3.3 (4)	0.8 (4)	1.0 (4)
Rufous-sided towhee	3.0 (7)	2.5 (14)	2.2 (14)	2.3 (3)	1.3 (7)	1.1 (7)

Table 3.13. Edge effects on nest predation and brood parasitism in the Lowden-Miller State Forest, 1994.
* = P<0.05.

Species	Cowbird Eggs/Nests (N)				Daily % Nest Predation (N)			
	Edge		Interior		Edge		Interior	
Wood thrush	3.1	(9)	1.4	(10)	8.0±2.7	(100)	2.7±1.2	(185)
Veery	0.7	(3)	0.5	(6)	11.1±6.0	(27)	6.0±2.9	(67)
Am. robin	-		-		1.2±1.2	(84)	1.4±1.4	(69)
Gray catbird	-		-		5.6±3.1	(54)	16.7±10.8	(12)
Northern cardinal	0.3	(8)	0.4	(7)	8.5±3.3	(71)	7.1±3.1	(71)
Rufous-sided towhee	3.0	(2)	0.5	(2)	10.0±6.8	(20)	3.0±2.9	(34)
Indigo bunting	1.4	(5)	0.0	(2)	16.7±8.8	(18)	4.1±4.0	(24.5)
Rose-breasted grosbeak	0.1	(9)	0.0	(4)	3.4±1.5	(147)	3.0±2.1	(68)
Total	1.4±1.2	(6)	0.5±0.5	(6)	8.1±4.5	(8)	5.5±4.6	(8)

Table 3.14. Effects of proximity to edges (roads) on parasitism and predation rates in the George Fell Nature Preserve and adjacent Castle Rock State Park.

	Cowbird Eggs/Nests (N)		% Daily Predation + SD (N)		
Species	Interior	Edge	Interior		Edge
Wood thrush (119)	1.3	1.8	2.5±1.1	(202)	2.5±1.4
Am. robin (79)	-	-	4.4±2.5	(68)	6.4±2.8
Gray catbird (165)	-	-	6.3±3.0	(64)	2.4±1.2
Am. redstart (203)	0.3	0.1	6.7±3.7	(45)	3.0±1.1
No. cardinal (50)	0.3	0.5	4.9±3.4	(41)	6.0±3.4
Rose-breasted grosbeak (56)	0.3	0.3	5.0±2.8	(60)	3.6±2.4

Table 3.2. Summary of costs of parasitism.

Species	% Clutch Size Reduction	% Eggs Fledge Unparasitized	% Eggs Fledge Parasitized	% Fledge Reduction	% Cowbird Eggs Fledge
Acadian flycatcher	-34%	62%	21%	-78%	57%
Wood thrush	-27%	83%	55%	-52%	54%
Veery	-43%	100%	59%	-67%	96%
Red-eyed vireo	-68%	-	20%	-	60%
Yellow-throated vireo	-70%	91%	-	-	-
Cerulean warbler	-23%	-	43%	-	56%
Ovenbird	-68%	88%	0%	-100%	94%
Louisiana waterthrush	-70%	-	38%	-	66%
Kentucky warbler	-50%	-	15%	-	75%
Hooded warbler	-47%	-	-	-	-
Am. redstart	-30%	84%	0%	-100%	100%
Scarlet tanager	-43%	-	75%	-	53%
Northern cardinal	-20%	93%	79%	-32%	53%
Rose-breasted cardinal	-30%	89%	77%	-39%	21%
Indigo bunting	-56%	92%	50%	-76%	67%
Rufous-sided towhee	-17%	77%	52%	-43%	50%

Table 3.3. Cowbird parasitism levels of species from northwestern Illinois, 1992, all sites combined.

Species	N	% Parasitized	Host eggs/ Nest	Cowbird Eggs/ Nest	Host fledged/ Nest	Cowbirds Fledged/ Nest
Yellow-billed cuckoo	3	0	2.3	0	2.0	0
Black-billed cuckoo	1	0	2.0	0	1.0	0
Eastern Phoebe	1	0	2.0	0	1.0	0
Acadian flycatcher	8	12.5	2.9	0.3	1.5	0
Blue jay	7	0	4.1	0	-	-
Wood thrush	126	86.0	2.3	2.5	1.2	1.3
Veery	7	100.0	1.2	3.0	-	-
Gray catbird	8	0	3.0	0	2.2	0
Yellow-throated vireo	1	0	4.0	0	3.0	0
Blue-winged warbler	2	0	4.5	0	4.0	0
Ovenbird	6	83.3	2.0	3.2	-	-
Louisiana waterthrush	2	100.0	1.5	4.5	1.0	2.0
Kentucky warbler	4	50.0	4.0	1.0	0	1.0
Am. redstart	4	25.0	3.5	0.3	1.0	1.0
Scarlet tanager	2	100.0	4.0	3.0	1.0	1.0
Rose-breasted grosbeak	13	30.8	3.5	0.5	3.1	0.0
No. cardinal	19	41.2	2.6	0.9	2.3	0.1
Indigo bunting	23	71.4	2.2	1.8	2.3	0.5
Rufous-sided towhee	6	66.7	2.8	1.4	1.5	0.5
Chipping sparrow	7	0	4.0	0	4.0	0
Field sparrow	5	0	4.5	0	3.4	0
Song sparrow	1	0	-	-	5.0	0

Table 3.4. Nesting success of Wood thrush in three north-western Illinois sites, 1992.

	56 nests WARD'S GROVE	47 nests HANOVER BLUFF	24 nests MISSISSIPPI PALISADES
X Daily predation: laying and incubation (days)	.0354 (423)	.0308 (422.5)	.0346 (173.5)
% Depredated during laying and incubation	39.7	35.4	38.9
X Daily predation: nestling period	.0235 (382.5)	.0440 (318)	.0414 (145)
% Mortality in nestling period	24.8	41.7	39.8
Daily predation rate whole cycle	.0298 (805.5)	.0365 (740.5)	.0377 (318.5)
% Mortality rate: whole cycle	54.5	61.9	63.2
X ± SD ± SE host eggs during incubation	2.16 ± 1.11 ± 0.16 (51)	2.47 ± 1.06 ± 0.16 (43)	2.00 ± 0.94 ± 0.22 (18)
X ± SD ± SE cowbird eggs during incubation	2.39 ± 1.77 ± 0.25 (51)	2.05 ± 1.46 ± 0.21 (43)	4.06 ± 2.53 ± 0.60 (18)
% Nests parasitized	89.1 (55)	82.6 (46)	95.2 (21)
X No. host fledged/ successful nest	1.20 ± 1.12 ± 0.25 (20)	1.55 ± 1.30 ± 0.28 (22)	1.20 ± 0.75 ± 0.24 (10)
X No. CB fledged/ successful nest	1.23 ± 0.73 ± 0.16 (22)	1.45 ± 1.12 ± 0.24 (22)	1.80 ± 1.17 ± 0.37 (10)
X No. host fledged/ successful unparasitized nest	2.5 (2)	2.20 ± 1.17 ± 0.52 (5)	—
X No. host fledged/ successful parasitized nest	1.18 ± 1.15 ± 0.28 (17)	1.33 ± 1.25 ± 0.29 (18)	—

Table 3.5. Brood parasitism levels at northwestern Illinois study sites, 1993.

Species	South Palisades				North Palisades				Tapley Woods				Ward's Grove			
	% Parasitized	(n)	Cowbird Eggs/Nest	Host Eggs/Nest	% Parasitized	(n)	Cowbird Eggs/Nest	Host Eggs/Nest	% Parasitized	(n)	Cowbird Eggs/Nest	Host Eggs/Nest	% Parasitized	(n)	Cowbird Eggs/Nest	Host Eggs/Nest
Acadian flycatcher	42.9	(14)	0.6	2.1	25.0	(4)	0.3	2.5								
Blge-gray Gnatcatcher																
Wood thrush	93.8	(16)	2.8	1.6	64.7	(17)	1.2	2.6	90	(10)	2.1	2.7	87.8	(41)	2.3	2.0
Veery	100	(4)	3.3	1.0					100	(1)	1.0	4.0	100	(2)	2.0	1.5
Yellow-throated vireo	0	(1)	0.0	3.0					100	(1)	2.0	1.0				
Red-eyed vireo	100	(3)	1.7	1.0	66.7	(3)	1.7	2.0	100	(2)	3.5	0.5				
Cerulean warbler	100	(2)	2.0	3.5	0	(1)	0	3.0	100	(1)	1.0	1.0				
Chestnut-sided warbler	0	(1)	0.0	3.0												
Kentucky. warbler	100	(3)	1.7	1.3	33.3	(3)	0.7	4.0	0	(1)	0	4.0				
Hooded warbler					80.0	(5)	1.2	1.8	100	(2)	1.5	2.5				
Ovenbird	0	(1)	0	4.0	75.0	(4)	1.8	1.8	0	(2)	0	4.5				
Louisiana waterthrush	100	(1)	3.0	2.0												

Continued.

Table 3.5. Page 2.

American redstart	62.5	(8)	0.6	2.8												
Rose-breasted grosbeak	0	(1)	0.0	3.0					100	(2)	2.0	4.0	75	(4)	0.8	2.5
Northern cardinal	25.0	(4)	0.3	2.3	40	(5)	0.8	2.8	100	(8)	1.1	2.4	50	(4)	0.5	3.3
Rufous-sided towhee					50	(2)	1.0	4.0					66.7	(3)	1.0	2.0
Scarlet tanager	100	(3)	4.0	1.0	100	(3)	2.7	1.0	100	(1)	2.0	1.0				
Indigo bunting	72.7	(11)	1.2	1.9	42.9	(7)	0.6	2.6	50	(2)	1.0	2.5	66.7	(6)	0.8	3.2

Table 3.6. Brood parasitism levels at northcentral Illinois study sites, 1994.

Species	White Pines			Castle Rock			Lowden-Miller		
	% Parasitized	(N)	Cowbird Eggs/Nest	% Parasitized	(N)	Cowbird Eggs/Nest	% Parasitized	(N)	Cowbird Eggs/Nest
Eastern wood-pewee	-	-	-	-	-	-	100	(1)	1.0
Acadian flycatcher	-		-	50	(8)	1.3	-		-
Wood thrush	76.9	(13)	2.0	50	(20)	2.7	75	(20)	2.80
Veery	-	-	-		-	-	33.3	(9)	1.33
Am. robin	0	(8)	-	0	(12)	-	0	(9)	-
Brown thrasher	-		-	0	(2)	-	0	(3)	-
Gray catbird	-		-	0	(20)	-	0	(7)	-
White-eyed vireo	-		-	-		-	100	(1)	1.0
Red-eyed vireo	-		-	100	(1)	3.0	-		-
Blue-winged warbler	-		-	50	(2)	1.0	0	(2)	0
Ovenbird	-		-	-		-	0	(1)	-
Am. redstart	-		-	5.3	(19)	1.0	-		-
Red-breasted grosbeak	-		-	22.2	(9)	1.0	0	(14)	-
No. cardinal	66.7	(3)	1.0	33.3	(6)	1.5	26.7	(15)	1.25
Rufous-sided towhee	-		-	60	(5)	1.7	75	(4)	2.67
Indigo bunting	66.7	(3)	1.5	-		-	57.1	(7)	1.75
Scarlet tanager	-		-	100	(1)	4.0	-		-

Appendix C

Table from: Herkert, J.R., and S.K. Robinson. 1995. Birds recorded within a 100-m radius of 39 grassland census points. Unpublished report.

Appendix C. Birds recorded within a 100-m radius of 39 grassland census points (200-300 m apart), June, 1995 by Jim Herkert and Scott Robinson in the Nachusa Grasslands.

Species	X males/10 points/100m radius
No. Harrier	0.3
Cooper's Hawk	0.3
Ring-necked Pheasant	2.6
No. Bobwhite	0.3
Killdeer	0.5
Upland Sandpiper	0.5
Mourning Dove	1.3
Black-billed Cuckoo	0.5
Red-bellied Woodpecker	0.3
Downy Woodpecker	0.3
No. Flicker	0.3
Willow Flycatcher	2.1
E. Kingbird	1.8
Blue Jay	0.8
Black-capped Chickadee	1.0
House Wren	2.1
E. Bluebird	0.5
Wood Thrush	0.3
Am. Robin	3.6
Gray Catbird	3.3
Brown Thrasher	1.5
Cedar Waxwing	0.5
White-eyed Vireo	0.3
Bell's Vireo	1.5
Warbling Vireo	0.5
Yellow Warbler	4.4
Common Yellowthroat	3.1
No. Cardinal	2.3
Indigo Bunting	1.3
Dickcissel	4.1
Rufous-sided Towhee	0.5
Chipping Sparrow	1.0
Field Sparrow	10.3
Vesper Sparrow	2.3
Lark Sparrow	0.3
Savannah Sparrow	3.3
Grasshopper Sparrow	17.4
Song Sparrow	12.6
Bobolink	0.3
Red-winged Blackbird	12.1
E. Meadowlark	7.7
Brown-headed Cowbird	6.4
Orchard Oriole	0.3
Am. Goldfinch	4.9
House Sparrow	0.3
Common Grackle	2.8

Appendix D

Table from: Herkert, J.R., and S.K. Robinson. 1995. Parasitism and predation levels on birds of the Nachusa Grasslands. Unpublished report.

Appendix D. Parasitism and predation levels on birds of the Nachusa Grasslands, June-July, 1995. Data gathered by Jim Herkert and Scott Robinson with the assistance of Patrick Enstrom.

Species	Nests	% Parasitized	% Daily Predation Rate	(exposure days)	% Loss to Predation
Mourning Dove	1	0	0	(16)	0
Eastern Kingbird	3	0	5.3 ± 3.7	(37.5)	76
Willow Flycatcher	7	14.3	0	(119)	0
Am. Robin	2	0	0	(27.5)	0
Gray Catbird	2	0	16.7 ± 10.7	(12)	99
Brown Thrasher	4	0	8.1 ± 3.9	(49.5)	88
Bell's Vireo	1	100	- -		- -
Yellow Warbler	1	100	0	(4.5)	- -
Com. Yellowthroat	1	0	100	(1)	- -
No. Cardinal	1	100	13.3 ± 13.1	(7.5)	99
Rufous-sided Towhee	1	100	11.8 ± 11.0	(8.5)	- -
Dickcissel	16	6.3	8.0 ± 2.9	(87.5)	88
Indigo Bunting	1	0	19.0 ± 12.1	(10.5)	99
Chipping Sparrow	1	0	66.7	(1.5)	- -
Field Sparrow	12	8.3	16.4 ± 4.7	(61)	99
Grasshopper Sparrow	17	5.9	5.8 ± 2.5	(86.5)	76
Savannah Sparrow	2	0	6.5 ± 6.2	(15.5)	80
Song Sparrow	1	0	13.3 ± 13.1	(7.5)	99
Vesper Sparrow	2	0	0	(33)	0
Lark Sparrow	1	0	50.0	(2)	-
Red-winged Blackbird	14	0	10.7 ± 3.0	(103)	94
E. Meadowlark	2	0	3.2 ± 3.2	(31)	56
Am. Goldfinch	4	0	10.5 ± 5.7	(28.5)	94
All nests combined	97	8.2	7.2 ± 0.9	(750.5)	85