

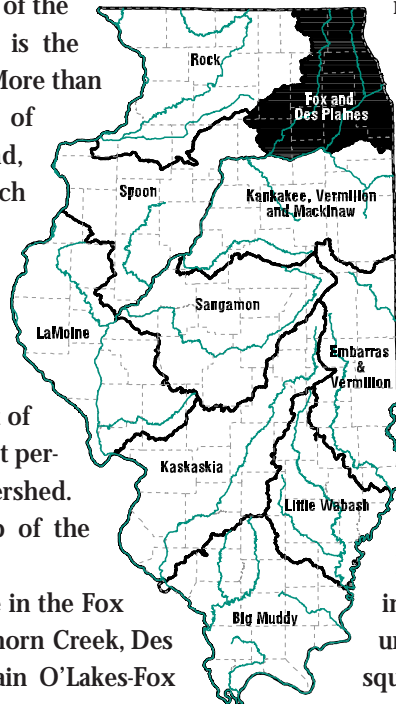
C H A P T E R F I V E

Fox and Des Plaines Rivers Watershed

Located in the northeastern part of the state, the Fox and Des Plaines is the most urbanized ISIS watershed. More than one-third of the area consists of urbanized and developed land, accounting for one-half of such land cover in the state. The watershed has the most non-forested wetland acres in the state as well as the highest percentage of wetland in a watershed. It also has the least amount of cropland acreage and the smallest percentage of cropland in a watershed. (See page 104 for a color map of the watershed's land cover.)

Five Resource Rich Areas are in the Fox and Des Plaines watershed — Thorn Creek, Des Plaines River, DuPage River, Chain O'Lakes-Fox River, Illinois Beach and Prairie Parklands.

- Thorn Creek is a relatively small area — 32 square miles in a heavily urbanized area. Natural resources are confined along streams and in forest preserves. The Thorn Creek Nature Preserve has narrow ridges and deep



ravines, shallow depressions, broad uplands and the stream valley.

- The Des Plaines River RRA is a small — 68 square miles — highly urbanized site which forms a narrow corridor along the river from just west of Chicago to Joliet. Relatively high percentages of upland woods and non-forested wetlands occur at this site. Important natural features include prairie, savanna, river bluffs, cliffs, wetland, floodplain and upland forest.

- The DuPage River RRA, comprised of the watershed of the East Branch of the Du Page River, is located in the highly urbanized western suburbs of Chicago. With its small size (81 square miles) it has a high percentage of upland forest (19%) and non-forested wetlands (3%).

- The Chain O'Lakes-Fox River RRA (447 square miles) encompasses the area of most recent glaciation in Illinois. Significant natural features include glacial landforms, natural lakes, and



The watershed has the most non-forested wetland acres in the state as well as the highest percentage of wetland in a watershed.

Table 18. Watershed Land Cover

Land Cover	Acres	Percent of Watershed	Statewide Percentage*
Upland forest	290,149	11.3% (4)	7.0% (7)
Grassland	326,288	12.7% (8)	5.1% (10)
Non-forested wetlands	78,237	3.1% (1)	22.0% (1)
Bottomland forest	26,448	1.0% (9)	3.0% (10)
Water	36,275	1.4% (5)	7.3% (7)
Urban/built-up	931,664	36.3% (1)	49.8% (1)
Cropland	877,925	34.2% (10)	4.1% (10)
Total acreage	2,566,987	100.0%	7.1% (9)

* The watershed's percentage of the land cover type statewide, e.g., 7% of the state's upland forests are located in this watershed. Note: the watershed's rank (1st-10th) is shown in parentheses.

many types of wetland — bogs, fens, seeps, and shallow and deep marshes. Some rare species and community types are limited in their distribution to this area of the state. Urban expansion from the Chicago metropolitan region continues to put severe pressure on the natural resources here.

- Even though its boundaries include urbanized areas of the Chicago metropolitan region, the Illinois Beach RRA (77 square miles) is one of the most ecologically rich and unique areas in Illinois. Its location on the shores of Lake Michigan provides a diversity of habitats that support a wide variety of plants and animals. Significant and unusual topographic features include beaches, ridges and swales, and dunes. The area is an important migratory route for birds.
- The dominant feature of the Prairie Parklands RRA is the recently created Midewin National Tallgrass Prairie, the nation's first federally designated tallgrass prairie, at the former Joliet Arsenal. Significant natural resources include prairies, wetlands and streams. The largest

concentration of upland sandpipers in the state is in the Prairie Parklands area. The RRA takes in 239 square miles — 41% in this watershed and 59% in the Kankakee/Vermilion/Mackinaw watershed.

ECOSYSTEM MONITORING

HBI values at the eight sites sampled by CTAP biologists indicate moderate organic enrichment, while EPT richness was slightly below the statewide average. Most fish richness measures were also close to statewide averages and habitat quality was slightly higher than the statewide average. One high quality stream was Ferson Creek below Kane County's Leroy Oaks Forest Preserve; it had high habitat quality, good EPT and HBI scores, and high fish richness. The lowest quality site was Willow Creek at Rosemont. It supported no EPT species, relatively low fish richness, and had a very low habitat quality score.

RiverWatch volunteers collected 313 samples at 139 sites on 91 streams. Most RiverWatch biological indicator data also suggest the watershed is below-average in ecological quality. It ranked seventh and eighth among the ten watersheds in MBI and EPT taxa, suggesting that organic pollution has disturbed sensitive taxa. It ranked fifth in taxa richness — with 9.1 taxa per site, slightly above the state average of 8.9 — but seventh in taxa dominance. Sowbugs and hydropsychid caddisfly are the most common taxa.



Most fish richness measures were also close to statewide averages and habitat quality was slightly higher than the statewide average.

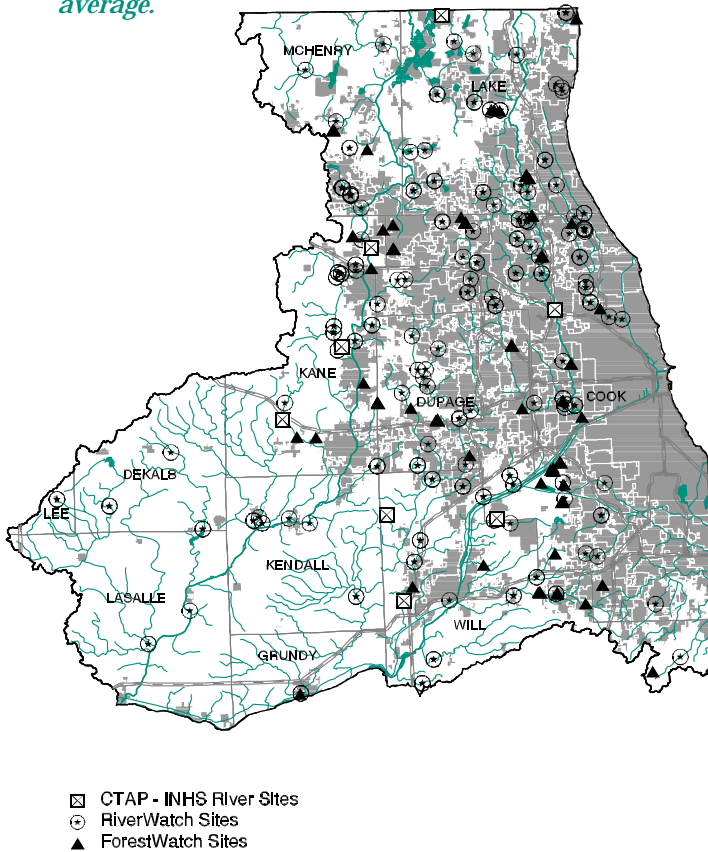


Figure 35. Monitoring sites

Table 19. Watershed Indicator Scorecard

Indicator	Watershed Value	Statewide Value	Watershed Ranking
<i>Macroinvertebrates</i>			
HBI	5.1	5.2	5
MBI	6.0	5.7	7
EPT richness	6.6	7.1	6
EPT taxa (RW)	2.2	2.6	8
Taxa richness	9.1	8.9	5
Taxa dominance	80.4%	80.4%	7
<i>Fish</i>			
Native fish	14.3	13.6	4
Darter richness	1.8	1.9	5
Exotic species	0.3	0.2	6
<i>Habitat</i>			
Habitat score	94.9	88.6	4

Table 20. MBI Values

Statistic	1995	1996	1997	1998	1999	Overall
Mean	6.65	5.91	6.11	5.95	5.81	6.02
Standard deviation	1.78	0.92	0.98	1.02	0.97	1.02
Minimum	4.23	4.84	4.52	3.63	3.47	3.47
Maximum	9.44	9.97	9.50	11.00	8.80	11.00
Number of sites*	10	40	63	110	83	306

* Only samples with at least 25 organisms were included in the analysis.

ForestWatch volunteers monitored 14 sites in the Fox and Des Plaines Rivers watershed in the fall of 1998. Ten were upland forests (4 oak-hickory, 4 maple-ash-basswood, 2 bur oak) and four were bottomland forests (2 ash-elm-maple, 1 ash-cottonwood, 1 scrub). Tree species richness ranged from four to 16 species per site, averaging 10.2 per site, slightly below the statewide average of 11.8 species per site. The site with only four species was dominated by hawthorn trees and was characterized as scrub. Thirty-eight tree taxa were recorded in the watershed (75 taxa statewide).

The great abundance of buckthorn recorded here is alarming. This non-native invasive woody plant is particularly abundant in northeastern Illinois and seems to be a problem throughout the watershed. It grows in both shrub and tree form, spreads rapidly and crowds out native vegetation, reducing the diversity of the forest and the ability of native plants and animals to survive.

In general, the trees that were most abundant also had the highest basal areas and importance values (Table 21). Buckthorn is an exception. Since it is an understory tree it does not grow very large and is only ninth in basal area and seventh in importance value. In contrast, white oak trees grow very large. Despite being seventh in abundance, they have the greatest basal area and are third in importance.

Two upland sites showed some signs of maple takeover. The site graphed in Figure 36 shows that sugar maples dominate the smallest size class, indicating poor regeneration by oaks and hickories and the possible future dominance of maples. This likely reflects changes in the fire regime in the area.

Table 21. Tree Species with the Highest Importance Values

Importance Value	Species	% of total trees counted (n=1,943)	% of total basal area (22.1m ² /ha)
30.6	Ash	14%	16%
22.9	Basswood	11%	11%
20.7	White oak	6%	19%
15.5	Hawthorn	9%	3%
15.4	Bur oak	3%	11%
13.7	Slippery elm	7%	5%
13.5	Buckthorn	14%	3%
9.0	Black cherry	6%	3%
7.2	Sugar maple	3%	4%
6.7	Red oak group	3%	4%

There were no signs of gypsy moths or dogwood anthracnose at any site. Anthracnose has not been a problem in northern Illinois but gypsy moths have been entering northeastern Illinois, primarily from Wisconsin, and pose a major threat to forest health.

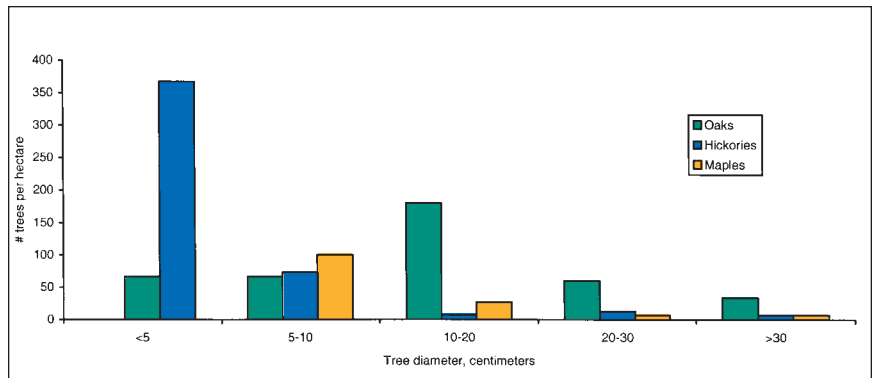


Figure 36. Maple take-over in an oak-hickory forest

Abundance of invasive shrubs (primarily non-native) was rather high, comprising 74% of the 1,340 total shrub stems recorded. Honeysuckle shrubs, buckthorn, and European highbush cranberry reached high densities here compared to the statewide average (Fig. 37). Ninety-eight percent of the buckthorn, 60% of the honeysuckle shrubs, 22% of the multiflora rose, and 100% of the cranberry recorded across the state were recorded in this watershed. Buckthorns were found on nine of 14 sites. Two sites were particularly dominated by buckthorn and contributed most of the

buckthorn stems for the watershed and for the state. These numbers are not surprising since this is one of the most populated areas in the state and a major port-of-entry, both of which increase the odds that non-native plants will be introduced.

Spring monitoring also recorded numerous

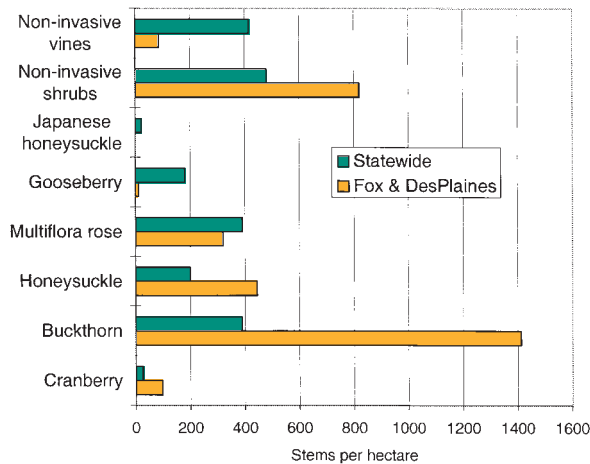


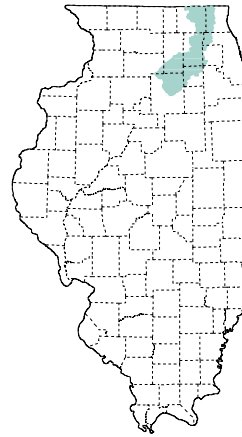
Figure 37. Number of invasive and non-invasive shrub and vine stems

non-natives among the ground cover — ground ivy and garlic mustard were common, with one or both widespread at 10 of the 12 sites monitored. At three of these sites, disturbance-sensitive species were also recorded — blue cohosh and bleeding hearts at one site, and white trillium at two sites. Future monitoring should determine if the disturbance-sensitive species are being replaced by the non-native invasive species.

REGIONAL ASSESSMENTS

Two regional assessments have been completed for this watershed — the Fox River Basin and the Upper Des Plaines River Basin.

Fox River Basin



The Fox River, the third largest tributary of the Illinois River, enters Illinois in the northwest corner of Lake County and flows 115 miles south, emptying into the Illinois River at Ottawa.

Its basin is about 130 miles long and rarely exceeds 25 miles in width. The basin encompasses 1,720 square miles and includes portions of

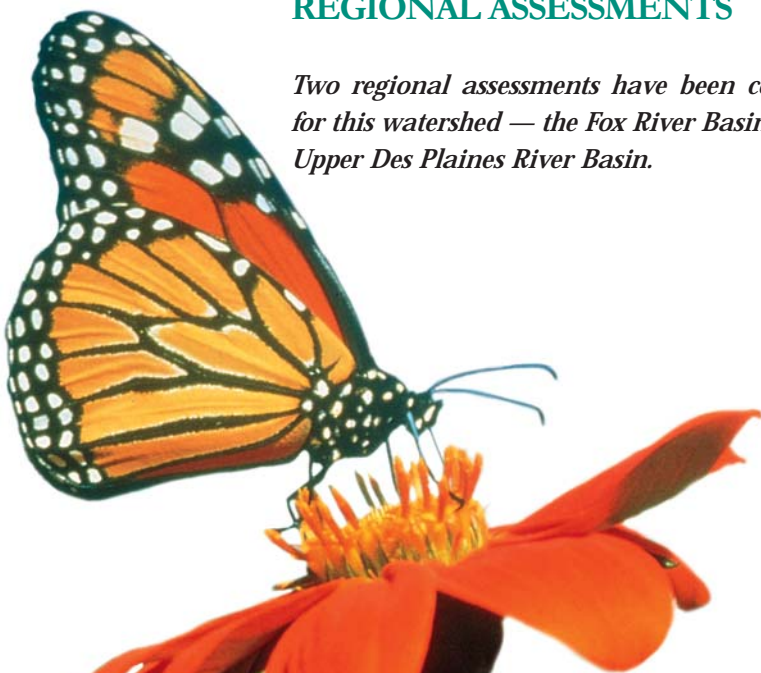
eleven counties: McHenry, Lake, DeKalb, Kane, Cook, DuPage, LaSalle, Lee, Kendall, Will, and Grundy. The portion of each county within the basin varies from less than 1% (Grundey County) to 74% (Kane County).

Within these counties is a diverse land cover; 19 of the 20 major state land cover categories are represented (only swamps are not found here). At one extreme are DeKalb, Kendall, and LaSalle counties which have 89-94% of their land in agricultural uses and 4-6% in urban uses. At the other extreme is Lake County, where agriculture takes up less than 25% of the land and urban development encompasses 42%. Despite its urban character, Lake County has more wetland acreage than all but three counties in Illinois.

Compared to the rest of the state, the Fox River area has less forest and agricultural land and more wetland. Seventy-two percent of the state's graminoid bog communities and all of the low shrub bogs and forested bogs occur here, as well as four of the state's five fen community types. Geological landforms such as kames, eskers and moraines have also contributed to the area's natural communities — 65% of Illinois' dry gravel prairies and 86% of the gravel hill prairies are found here. Other significant features:

- the 5,506 acres of high quality sites represents 0.5% of the land in the basin and 21% of the total undegraded natural communities in Illinois,
- the watershed has 63 miles of Biologically Significant Streams and 2,204 acres of Biologically Significant Lakes,

Spring monitoring also recorded numerous non-natives among the ground cover.



- 285,844 acres have been designated a state Resource Rich Area,
- all of the state's undegraded natural lakes are found along the Fox River.

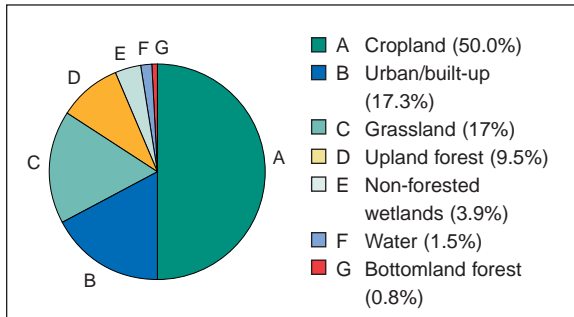


Figure 38. Fox River basin land cover

Plant and animal life

Due to the area's unique ecological diversity, many of the state's plants and animals are found in the basin; some are found nowhere else. From carnivorous pitcher plants and sundews to the diminutive white and yellow lady's slipper orchids, the area has a rich flora, with 102 species listed as state endangered or threatened, and two as federally threatened.

The diverse wetland habitats harbor a rich bird community — herons, waterfowl and geese provide common sightings. This is one of the major areas in Illinois for rare wetland species such as the pied-billed grebe, great egret, king rail, common moorhen, least bittern, yellow-headed blackbird, sandhill crane, and red shouldered hawk.

Basin acreage - 1,092,871 acres

State land* - 8,331 acres

County land - 17,270

Total natural areas - 16,125 acres

High-quality natural areas - 5,506 acres

Nature preserves - 4,425 acres

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

While most mammal species are fairly common, the pigmy shrew, one of the smallest and rarest shrews in Illinois, has been collected only in the Fox River area.

Local economy and outdoor recreation

The six main counties through which the Fox River and its tributaries flow — Lake, McHenry, Kane, Kendall, DeKalb, and LaSalle — form one of the most dynamic areas in the state. It is home to 11% of the state's population and is highly urban — only 15% of the residents live in rural areas. Between 1969 and 1994, the Fox River economy grew twice as fast as the rest of the state, supporting 12% of the state's employment and 13% of its personal income. Four of the six counties rank among the top ten in the state in per capita income.

The state operates five major sites in the area: Chain O' Lakes, Shabbona Lake, Silver Springs, and Moraine Hills state parks and Volo Bog Natural Area. Hunting, fishing, boating and nature activities are all popular pursuits here.

Threats

Prior to European settlement (1820), prairie occupied 31% of the Fox River area and forest 68%. Up until World War II settlements were still rural in character; woodlands, fields, and farms still occupied large areas. The post World War II period, with its flight to the suburbs, changed the composition of the area. With population explosion came habitat loss, degradation, and fragmentation, along with the accompanying invasive and exotic flora and fauna. Trends in the terrestrial community classes of forest, savanna and prairie indicate habitat loss equals or exceeds statewide rates, although the rate of loss for wetlands and natural lakes and ponds is substantially less than statewide.

The watershed can be divided into three distinct segments. The upper Fox, with its many lakes and wetlands, is the most pristine and rich in natural ecosystems, yet is experiencing the greatest population pressure from growth in the northwest Chicago suburbs. The middle Fox is very much an urban river, flowing through six Kane County cities with populations of 15,000-100,000. The challenges in the area include flood control, pollution prevention, and recreation oriented toward the river. Finally, the lower Fox flows through a primarily



Due to the area's unique ecological diversity, many of the state's plants and animals are found in the basin; some are found nowhere else.

agricultural landscape and is threatened by soil erosion and chemical runoff from farms.

Urbanization - Urban expansion from the Chicago metropolitan region is putting severe pressure on the natural ecosystems of the region. During the last 20 years, nearly 1,100 miles of new roads have been built in the area, population has grown 30%, and employment and vehicle miles traveled have grown 75%. Urbanized acreage has expanded by 25% in just the last 10 years.

Water pollution - Wastewater treatment standards have greatly improved the quality of the river since the early 1960s, reducing phosphorous concentrations and fecal coliform counts. However, excessive algal blooms are still a concern. If wastewater treatment is not changed in the upcoming decades, it is likely that the growing amount of effluents may halt or reverse the declining trends in phosphorous and fecal coliform bacteria.

Habitat loss and fragmentation - Natural habitats in the area are typically found in small patches separated from each other by agricultural or developed land and this will continue as development pressure mounts. Stream habitat fragmentation has caused the extirpation or declines in fish species.

Flooding - The loss of natural habitats has reduced the water storage and retention abilities in the basin. Urban settings increase runoff and quickly move water into the river through ditches and tributaries. Similarly, intense cultivation lessens the capacity of water to infiltrate the soil and increases the rate of flow into tributaries and, ultimately, the river. Flooding is now a major problem in the area.

Opportunities

Although many of the area's natural communities are degraded, they retain relatively high levels of ecological integrity and have potential for improvement. For example, forests could be restored in areas where they could potentially have at least a 500-acre core; this would improve habitat for breeding birds. In smaller upland forests, native plant communities could be restored, with shrubby areas and oak trees provided for migrant birds. Managing forests to maintain large snags with

exfoliating bark or cavities would provide roosting habitat for forest-dwelling bats and den sites for other mammals, including the southern flying squirrel.

Wetland conservation should also be a high priority because of the relatively large population of threatened and endangered species. Grassland restoration around existing wetlands would provide habitat for declining grassland birds, help buffer wetlands from surrounding development, and provide nesting habitat for many wetland species.

Prairie restoration, coupled with the preservation of native prairie and other grassland habitats, would provide additional habitat for badger and red fox. Restoring native vegetation in the riparian zone along creeks and rivers will not only help wildlife but will also reduce siltation, desiccation, and higher than normal temperatures in the stream. Vegetation will shade the stream, stabilize the banks and filter sediment and chemicals from runoff before they reach the stream.

Upper Des Plaines River Basin



The upper Des Plaines River Basin includes the river basin from the Wisconsin border to the Chicago Sanitary and Ship Canal in Cook County. It drains approximately 346 square miles and includes central Lake, north central Cook and a small portion of DuPage counties. No other natural Illinois river runs through such an urbanized watershed, and yet no other urban river still has so much nature left in and around it.

Scientists estimate that prior to settlement the landscape was 60% forest and savanna and 40% prairie. Wetlands made up a little more than one-quarter of the basin, mostly wet prairie, prairie pothole marsh, sedge meadow, peatland and floodplain forest. Today, urban land takes up more than 40% of Lake County and 75% of Cook County, yet pockets and pieces of natural lands still exist.



Although many of the area's natural communities are degraded, they retain relatively high levels of ecological integrity.

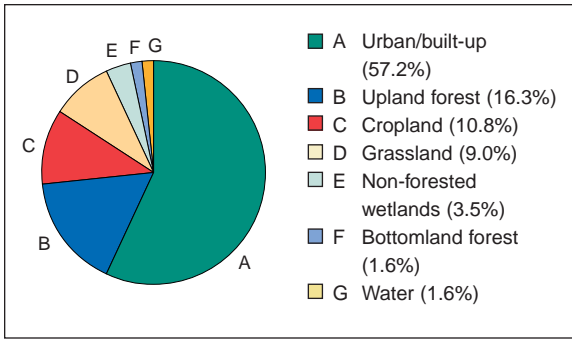


Figure 39. Upper Des Plaines River basin land cover

Eighteen percent of the upper Des Plaines basin is woodland. Marshes, wet meadows, and ponds cover 3.5% of the surface with 167 pothole lakes still surviving. The basin contains 63% of the statewide total of northern flatwoods (open woodlands that occur on claypan soil), 10% of the state's calcareous floating mat community (floating mat of sedge peat over a lake or pond), and 7.3% of the state's sedge meadow community. Other significant features:

- the combination of different moisture, terrain, and soil types produce 16 distinct habitat types in the basin; several — bogs, fens, marl flats — are more typical of Canada than Chicago's collar counties;
- high quality natural areas make up 0.2% of the basin; and
- nine nature preserves offer wet prairies, fens, sedge meadows, marsh, oak savanna, and oak woods.

Plant and animal life

The Upper Des Plaines area has distinctive flora, with some plants such as northern cranesbill and hairy white violet more typical of Canada. Only 662 species of plants have been recorded in the area. Of these, 24 species are listed as state threatened or endangered; the prairie white fringed orchid is also listed as federally threatened.

With its large amount of urban land, the area does not figure importantly as wildlife habitat, although at least 270 of the 300 bird species that occur in Illinois can be found here, as well as 43 species of mammal. Twenty-three species of reptiles and 16 species of amphibians are found here, with

the state endangered eastern massasauga occurring in pockets of habitat provided by the many forest preserves and conservation areas. Butterflies and skippers are well known with 109 species documented. Scattered pockets of lupine in the upper Des Plaines area provide food for the federally endangered Karner blue butterfly.

Local economy and outdoor recreation

The Des Plaines River runs through the heart of Illinois' most urbanized region. Cook and Lake counties encompass merely 2.5% of Illinois' land area, but account for 31% of its urban land and 50% of its population. In the last 120 years, the population of the area grew fourteen-fold. Nearly 99% of residents live in urban areas, and urban land takes up more than 40% of Lake County and nearly three-quarters of Cook County, compared to only 6% for the rest of Illinois.

The area employs nearly 3.5 million people with a total income of \$150 billion — over half of the jobs and income in Illinois. Most agriculture, which plays only a small part in the economy and land cover, is in specialty crops, commodities that have a high cash value in a region of high land values.

Basin acreage - 221,637
Total natural areas - 2,259 acres
High quality natural areas - 440 acres
Nature preserves - 1,476 acres

The region does not include any state outdoor recreation sites, but it does contain county forest preserves and interpretive centers. The urban character of the area deters hunting; firearm deer hunting is not allowed.

Threats

Pollution - While surface water pollution has been reduced, water quality is still compromised by hard-to-regulate nonpoint sources such as soils washed into streams from fields and building sites, and de-icing salts from roads. The Illinois Environmental Protection Agency has assessed about a quarter of the upper Des Plaines basin and rates water quality as fair. Mussel diversity, an indicator of water

The Upper Des Plaines area has distinctive flora, with some plants such as northern cranesbill and hairy white violet more typical of Canada.

quality, is also low. Although 18 native species have been reported from the region, only three common species have been found alive since 1963.

Emissions of federally regulated pollutants have also been reduced, although locally produced air pollution (i.e. engine exhaust) is still a problem. Cook and Lake counties are crisscrossed with 10% of the state's roads and they carry 40% of the vehicle-miles traveled in the state.

Modification - Humans have long pre-empted nature as engineers of the watershed — fields have been tiled and wetlands drained. Impounding structures have been installed on natural lakes to stabilize their levels and the lakes now function like artificial impoundments. Low-head dams alter both water level and the movement of sediments, nutrients, and plants and animals in the river channel. Average flows in the Des Plaines are 80% higher today than in the 1940s and 1950s.

The basin has become an outdoor laboratory for experiments in the restoration and reconstruction of habitats.



Exotic species - An arkful of non-native animals and plants have been introduced into the basin, often with unintended ecological effects. The rusty crayfish (used as bait) has been dumped into the water and its survivors outcompete the native clearwater crayfish. Ten percent of the vascular plant species now found in the basin are not native to it. Several species of exotic turtles as well as two caimans have been reported in the Des Plaines River — probably discarded pets.

Fragmentation - Construction of roads, fields, and houses divides forests, wetlands, or prairies into small habitat “islands.” Forested wetlands in the basin consists of 390 separate tracts, the mean size of which is 7.5 acres. Research suggests that many forest birds need the protection of at least 500

acres of woods to breed successfully. The two largest contiguous forested tracts on the Des Plaines River (near Gurnee and near Libertyville) measure 239 and 106 acres respectively. The largest emergent wetland in the basin covers 355 acres — massive by Illinois standards — but the average is 3.7 acres.

Fire - The extent of savanna in the presettlement basin is thought to be explained in part by the occasional fires that swept the area, recycling nutrients, clearing the ground for new growth, and killing all but the fire-resistant oak species. Without fire to stem plant invaders, savanna becomes dense woods. In deep woods, young maples untouched by fire survive to shade the forest floor. Plants that thrive in the sun — including oak seedlings — languish. As a result, the old oaks in the woods of the upper Des Plaines basin are not reproducing themselves. Mid- and late-summer wildflowers also struggle to bloom after the leafed-out trees block the sun. These effects can be reversed for some flowering plants, such as the state endangered northern cranesbill that occurs in one dryish forest in the basin. Its numbers increase after ground fires are deliberately set to burn off competing plants.

Opportunities

The basin has become an outdoor laboratory for experiments in the restoration and reconstruction of habitats. For example, the Des Plaines River Wetlands Demonstration Project consists of 450 marshy acres along the river in northern Lake County that have been reconfigured and replanted. The site quickly attracted waterfowl and tests have shown that water quality improved as it progressed through the wetland. Also in Lake County, a damaged savanna is regenerating at Reed-Turner Woodland Nature Preserve. Cutting brush and burning periodically are restoring savanna-like growing conditions in other areas, and plans are underway to link public stream margins, forest preserves, and roadsides with appropriately managed private and commercial sites to create corridors of protected land.