INTRODUCTION

The Upper Des Plaines River originates in Racine and Kenosha Counties in southeastern Wisconsin and flows through Lake and Cook Counties in northeastern Illinois. At Riverside it is joined by Salt Creek, which flows southeast from its headwaters in DuPage and western Cook Counties. The drainage area of the watershed is approximately 480 square miles, 346 of which is in Illinois, and incorporates a diversity of land cover and land uses.

While a significant portion of the river’s banks are lined by a narrow system of forest preserve holdings along its course in Illinois, suburban development within the watershed has created a river system that has lost much of its ecological and hydrological integrity. In Wisconsin, an estimated 10,000 acres of wetlands have been drained along the Upper Des Plaines and its tributaries, and an additional several thousand acres have been drained in Illinois. Remaining natural areas are often too small, isolated, and/or degraded to be ecologically viable for many species of fauna that would normally inhabit them. Nevertheless, a number of top-quality natural community remnants in or within a few hundred feet of the Upper Des Plaines basin still exist.

In addition to disturbing natural areas, commercial and residential development throughout the watershed have greatly reduced the water-holding capacity of the landscape and increased the impermeable land cover. This has dramatically changed the intensity and impact of flood events, which continue to increase as more development occurs within the watershed. Projections for population growth within the watershed suggest that flood damages will be even greater in the future. Nonpoint source pollution associated with agriculture, increasing urbanization, and stormwater runoff also severely impacts water quality and its capacity to support human uses and wildlife populations.
In light of the conditions of the watershed, a regional strategy is necessary to address the multiple impacts and impairments to natural resources and water quality. This Watershed Restoration Action Strategy (WRAS) is intended to begin the planning and implementation process for protecting, enhancing, and restoring the upper Des Plaines River basin to a healthy state. The WRAS addresses the following issues:

- water quality
- flood mitigation and floodplain management
- natural habitats and hydrology
- open space and recreational opportunities
- watershed monitoring
- education of public officials, residents, and developers
- potential funding sources for watershed projects
THE UPPER DES PLAINES RIVER ECOSYSTEM PARTNERSHIP

Background

The Wisconsin-Illinois Upper Des Plaines River Ecosystem Partnership was organized in 1996 under the Illinois Department of Natural Resources Ecosystems Program of Conservation 2000, a multi-year initiative to preserve and restore Illinois ecosystems. The partnership promotes collaboration among the diverse organizations and private landowners who share an interest in achieving multiple objectives in improving conditions within the watershed.

The goals of the partnership are:
♦ to improve water quality and reduce soil erosion;
♦ to protect and restore wildlife habitat and open space;
♦ to manage stormwater and the floodplain;
♦ to enhance recreational opportunities; and
♦ to demonstrate the feasibility of interstate and public/private partnerships.

The Partnership is composed of a diverse group of non-profit organizations, businesses, landowners, planning agencies, and government representatives, including the following:

- Applied Ecological Services
- Cook County Forest Preserve District
- Des Plaines River Alliance
- Des Plaines Watershed Team
- Eyring and Associates
- Home Builders Association of Lake County
- Integrated Lakes Management
- Kenosha–Racine Land Trust
- Lake County Soil and Water Conservation District
- Lake County Forest Preserve District
- Lake County Stormwater Management Commission
- Liberty Prairie Conservancy
- Liberty Prairie Foundation
- Loch Lomond Property Owners Association
- North Cook County Soil and Water Conservation District
- Northeastern Illinois Planning Commission
- Openlands Project
- Rivershire Property Owners Association
- Southeastern Wisconsin Regional Planning Commission
- U.S. Army Corps of Engineers
- U.S. Fish & Wildlife Service
Collaboration and Public Involvement

The ecosystem partnership has initiated and participated in a number of collaborative activities to involve the public and address watershed impacts. The partnership project coordinator has worked with groups in the watershed to identify stakeholders and their concerns. In June of 1998, the partnership organized and identified funding for the Des Plaines River Conference held at Dominican University in River Forest, which was attended by over 200 people. This conference led to the creation of the Des Plaines River Alliance, a confederation of groups that represents the entire Des Plaines River Watershed. The partnership also participates in the annual Des Plaines River Canoe Expedition and works with the Des Plaines River Watershed Team, a group focused on flooding concerns in Cook County. As part of the Upper Des Plaines Phase 2 advisory committee, the partnership is helping to determine the feasibility of improvements in flood damage reduction, environmental restoration, and water quality. The Kenosha–Racine Land Trust, a partner organization, is leading the effort to preserve and manage hundreds of acres of wetlands adjacent to the Des Plaines River in Kenosha County.

In the fall of 1999, the partnership offered a watershed science workshop led by Dr. Edwin Herricks of the University of Illinois. Another course is being planned that will build on this experience and provide an opportunity for residents of the Upper Des Plaines River Watershed to gain a deeper understanding of stream biology.

On April 7, 2000, a group of thirty-five people representing diverse constituencies in the upper Des Plaines watershed met to identify concerns regarding management and restoration of the watershed. The ten highest priority concerns, which are addressed within the recommendations of this WRAS, are as follows:

1. A lack of coordination and leadership throughout the watershed.
2. Significant flooding along the mainstem and tributaries.
3. As development continues, impervious surface is replacing natural surfaces. Wetlands and natural sinks that previously contained runoff are being lost.
4. After thirty years, goals of the Clean Water Act still have not been met. Agency policies that contribute to these goals should be reviewed.
5. Elected officials, homeowners, developers, and other stakeholders need a better understanding of the relationship between people, their activities, and the state of the watershed.
6. Inappropriate residential and commercial development continues to occur throughout the headwaters.
7. Non-point source pollution has led to water quality impairment.
8. The transition from top-down planning to grassroots planning has not occurred.
9. A lack of up-to-date baseline data, including information on the location, capacity and impact of retention/detention within the watershed.
10. Lost focus on the massive amount of flood damage reduction needed. Non-structural, multi-objective solutions to flooding are needed.
To assist in watershed management and communication efforts, the partnership has acquired geographic information system (GIS) technology and ArcView software. It is working with the Lake County Stormwater Management Commission to produce a poster-size map of the entire Des Plaines River watershed. Twenty-five hundred copies of the map will be printed and distributed in June 2000 in an effort to publicize and educate the public about issues within the watershed. The partnership also has created and maintains an Upper Des Plaines River Ecosystem Partnership website to provide information about the partnership as well as links to related resources (http://homepage.interaccess.com/~niwca/desplaines.htm).

Additional public involvement activities are discussed in the following sections on watershed planning, projects, and monitoring.

Watershed Planning

To provide additional focus and direction for watershed management activities, the partnership has formed an executive committee and planning committee from our diverse team of stakeholders. The executive committee nominates the planning team, reviews project proposals, and represents the watershed planning project to the community.

The planning committee will develop and approve a Watershed Restoration Action Strategy based on recommendations from stakeholders. The watershed planning committee consists of municipal and county representatives, recreational groups, landowners, not-for-profit organizations, as well as federal, state, and local agencies. A technical advisory committee will include agency representatives, experts from not-for-profit organizations, and academic experts from universities and colleges. The technical committee will provide input during the planning process and on specific projects.

Because the Upper Des Plaines River Watershed is a large and diverse area, action teams will be formed to focus on specific sub-watersheds. Bringing stakeholders together to focus on their own small piece of the watershed is a popular and effective way to organize project development, and it promotes ownership and action at the local level. Organization and coordination for restoration project implementation and subwatershed plan development has already begun in the Indian Creek and Bull Creek subwatersheds, and funding for detailed Watershed Implementation Plans (WIPs) for these two subwatersheds is being sought.

Partnership Projects

Since 1996, the partnership has received funding through the Illinois Department of Natural Resources’ Ecosystems Program of Conservation 2000 for the projects listed below. The C2000 funding for these projects has been matched by local partners with cash contributions and in-kind services such as staff time for project development and management and volunteer hours.

2000

$75,000 to the Lake County Forest Preserve District for the Rollins Savanna Wetland. The project will help remove reed canary grass along Mill Creek and restore the site with native grasses.
$26,027 to the Rivershire Community Property Owners’ Association for pond bank stabilization. The bank stabilization is designed to reduce erosion and sedimentation of the ponds and outflow into the Des Plaines River.

$12,250 to the Loch Lomond Property Owners’ Association for water quality testing and habitat restoration. Native plant species will be used to enhance habitat and improve water quality.

1999

$17,700 to the Lake-to-Prairie Wild Ones for native landscaping on residential land, to set up demonstrations, and to provide technical support for converting bluegrass lawns to native landscapes in residential communities within the Bull Creek tributary watershed. The project will enhance water storage capacity and water quality, provide buffers to natural lands, and preserve natural areas within the Liberty Prairie Reserve.

$158,000 to purchase land, a stream corridor, and a small pond located directly between the Oak Openings Nature Preserve and Almond Marsh Nature Preserve. Future restoration of the wetlands, pond, stream, and woodlands will create an exceptional habitat corridor between the two nature preserves.

$28,000 to the Liberty Prairie Conservancy for savanna and mesic prairie restoration within Oak Openings Nature Preserve (in the area of Bull Creek) to accelerate the transition from an old agricultural field to mesic prairie and oak savanna on a 27-acre parcel.

$12,000 for bio-remediation of stormwater runoff from the Arbor Vista subdivision. Funds helped to convert a heavily eroded ditch to a perennial stream running through an Oak Openings Nature Preserve buffer, and to construct an artificial wetland to retain/detain runoff and enhance water quality discharge into two Illinois State Nature Preserves.

1998

$34,000 for the Liberty Prairie Foundation to work with landowners to reduce residential stormwater runoff and preserve and enhance existing natural and restored resources of the Upper Des Plaines River watershed.

$15,000 for the Liberty Prairie Foundation to conduct a series of local workshops and field trips to educate the public about the existing natural and restored resources of the Upper Des Plaines River Watershed.

1997

$95,000 to update current wetland maps, prioritize areas for protection, and to educate community leaders and the public about wetland protection. Partners for this project include the Liberty Prairie Foundation, Lake County Stormwater Management Commission, U.S. Army Corps of Engineers, and the Southeastern Wisconsin Regional Planning Commission.
Monitoring

A number of ongoing and future monitoring activities will not only help measure progress toward watershed restoration goals, but also involve local residents in the restoration process. The Liberty Prairie Conservancy, a partnership member, has conducted a number of monitoring activities in the Liberty Prairie Reserve in central Lake County, including water quality sampling of Bull Creek, shallow well monitoring in a fen, and an inventory of amphibians and reptiles using pit-fall traps. The conservancy has also worked with the Forest Watch, River Watch and Wetlands Watch programs. Volunteers in the Loch Lomond subdivision on the southern branch of Bull Creek are monitoring water quality in their lake. Over time, monitoring on both branches of Bull Creek will provide data for comparison of the two areas—one with conventional development and the other in which a number of conservation practices have been implemented, including native landscaping, streambank stabilization projects, and a conservation development.

Progress toward the WRAS objectives identified in the introduction will be measured by monitoring water quality within subwatersheds. Planning has begun on two pilot watersheds, Indian Creek and Bull Creek, and monitoring plans will be developed as part of this planning process. Action teams of local stakeholders in both subwatersheds have identified resource concerns and conducted tours of the watersheds to be inventoried.

During the summer of 2000, several interns from the Lake County Stormwater Management Commission will work in these sub-watersheds to conduct standard stream inventories. The inventories will provide baseline data and will assess the following:

- channel conditions such as channel dimensions, presence of bank erosion, and type and quantity of bank vegetation;
- type, size, location, and condition of bridges, culverts, and other similar structures within the creeks;
- land use, cover, and type of vegetation within the creek corridors;
- substrate composition and water quality indicators such as the presence of algae, turbidity, or debris in the water; and
- presence and condition of stream habitat for aquatic plants and animals.

With information gathered from the two pilot subwatersheds and data collected by the Illinois EPA, a comprehensive monitoring strategy will be developed. This strategy will be expanded to cover the rest of the watershed and will assess the performance of the Watershed Restoration Action Strategy.
The upper Des Plaines River originates in primarily agricultural Racine and Kenosha Counties in southeastern Wisconsin and flows south by southeast to the confluence with Salt Creek near Riverside, Illinois.1 The upper Des Plaines River basin drains approximately 480 square miles (307,000 acres) of land, 346 of which are in Illinois. Much of this area has been permanently altered by urban and agricultural development, and much of the remaining natural area has been disturbed or degraded.

Land Cover

The basin is comprised of a variety of land uses, stages of development, and habitat types. Generally speaking, the upper half of the basin is characterized by a combination of cropland, grassland, wetlands, lakes, and forests. The lower half of the basin, in Cook County and the far northeast corner of DuPage, is highly developed, yet small concentrations of forests and wetlands have been preserved along the Des Plaines and some tributaries.

Remaining agricultural land within the basin exists primarily in Racine and Kenosha Counties, and the northern reaches of Lake County. Approximately 92 square miles (68 percent) of the Wisconsin portion of the watershed was in agriculture in 1990, and is slowly converting to urban use. In 1995 farm acreage in Illinois comprised only 9 percent of the land, down from 38 percent in 1925. Between 1978 and 1993, however, farm acreage dropped by 22 percent. The landscape becomes increasingly interspersed with higher concentrations of urbanization from north to south.

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1 This plan primarily addresses the Illinois portion of the watershed. The majority of the Wisconsin data was supplied by the ongoing Des Plaines River Watershed Study of the Southeast Wisconsin Regional Planning Commission.
2 Salt Creek is a tributary of the lower Des Plaines River for the purposes of this plan.
Tabular summaries of land cover for the basin follow.

Principal Land Cover of the Illinois Portion of the Upper Des Plaines River Assessment Area

<table>
<thead>
<tr>
<th>Category</th>
<th>Sq. Miles</th>
<th>Acres</th>
<th>% Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>67.8</td>
<td>43,414</td>
<td>19.6</td>
</tr>
<tr>
<td>Cropland</td>
<td>37.2</td>
<td>23,796</td>
<td>10.7</td>
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<tr>
<td>Rural Grassland</td>
<td>30.7</td>
<td>19,617</td>
<td>8.9</td>
</tr>
<tr>
<td>Forest &amp; Woodland</td>
<td>54.9</td>
<td>35,107</td>
<td>15.8</td>
</tr>
<tr>
<td>Urban &amp; Built-Up</td>
<td>198.9</td>
<td>127,321</td>
<td>57.4</td>
</tr>
<tr>
<td>High Density</td>
<td>55.8</td>
<td>35,683</td>
<td>16.1</td>
</tr>
<tr>
<td>Medium Density</td>
<td>60.3</td>
<td>38,566</td>
<td>17.4</td>
</tr>
<tr>
<td>Low Density</td>
<td>32.4</td>
<td>20,734</td>
<td>9.4</td>
</tr>
<tr>
<td>Urban Grassland</td>
<td>50.5</td>
<td>32,338</td>
<td>14.6</td>
</tr>
<tr>
<td>Wetland</td>
<td>16.9</td>
<td>10,825</td>
<td>4.9</td>
</tr>
<tr>
<td>Forested</td>
<td>5.1</td>
<td>3,261</td>
<td>1.5</td>
</tr>
<tr>
<td>Nonforested</td>
<td>1.8</td>
<td>7,564</td>
<td>3.4</td>
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<tr>
<td>Other Land</td>
<td>7.8</td>
<td>5,017</td>
<td>2.3</td>
</tr>
<tr>
<td>Lakes &amp; Streams</td>
<td>7.6</td>
<td>4,881</td>
<td>2.2</td>
</tr>
<tr>
<td>Barren &amp; Exposed</td>
<td>0.2</td>
<td>137</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td>346.4</td>
<td>221,684</td>
<td>100</td>
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</tbody>
</table>

Principal Land Cover of the Wisconsin Portion of the Upper Des Plaines River Assessment Area

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Residential</th>
<th>Commercial/Industrial/Government</th>
<th>Recreational/Open Space</th>
<th>Agricultural</th>
<th>Lakes, Rivers, and Streams</th>
<th>Wetlands</th>
<th>Woodlands</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (sq mi)</td>
<td>7.3</td>
<td>7.2</td>
<td>1.4</td>
<td>91.9</td>
<td>1.9</td>
<td>10.5</td>
<td>7.4</td>
<td>6.9</td>
</tr>
<tr>
<td>Percent of Watershed</td>
<td>5.5</td>
<td>5.4</td>
<td>1</td>
<td>68.3</td>
<td>1.4</td>
<td>7.8</td>
<td>5.5</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Habitat

Illinois

Illinois Department of Natural Resources (IDNR) assessments of land cover identify 15.8 percent (35,107 acres) of the Illinois portion of the basin as woodland, most of which is protected in forest preserves. Approximately 343 acres of this is considered undisturbed forest of high ecological quality. Total wetland acreage is 10,825 acres, one-fifth of the original 58,000 acres that were thought to exist before settlement, and 4.9 percent of the total basin area. Nonforested wetlands make up approximately 3.4 percent (7,750 acres) of the total basin area. High-quality prairie amounts to 18 acres, only 0.02 percent (two hundredths of one percent) of the 90,000

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4 Southeast Wisconsin Regional Planning Commission,
acres that were thought to have existed prior to European settlement. Many of the original savannas in the basin have been converted to agriculture or urban uses, and no high quality savannas remain. Some highly disturbed savannas do exist, however, leaving open the possibility for restoration of this unique ecosystem.

IDNR has identified 16 distinct habitat types in the basin including forested wetland, emergent wetland, scrub/shrub wetland, sedge meadow, wet and mesic prairie, bottomland hardwoods, and oak savannas. A 1970 survey by the Illinois Natural Areas Inventory (INAI) found 26 high quality remnant natural communities in or near the upper Des Plaines River basin, nine of which are now permanently protected Illinois Nature Preserves. The list includes Busse Woods, Edward L. Ryerson, Reed-Turner Woodland, MacArthur Woods, Wadsworth Prairie, Lloyd’s Woods, Liberty Prairie, Oak Openings, and Almond Marsh. The status of the remaining 17 high quality remnants has not been documented. Together these natural areas compose nearly 2,300 acres, only 440 acres of which are INAI designated Category I (highest quality) sites.

The majority of the other preserved areas within the Illinois portion of the basin are owned by forest preserve districts of Lake and Cook Counties. In fact, the county forest preserve districts own much of the Des Plaines River floodplain corridor in the study area. No federal or state parks or preserves are found in the basin in Illinois.

Aquatic habitats include major riverine systems, as well as small and ephemeral streams. At least 176 pothole lakes, created by melting fragments of ice remaining after the most recent glacial period, still exist in Lake County portions of the basin. The majority of Cook County’s lakes have been drained.

**Wisconsin**

Presettlement vegetation of the Wisconsin portion of the watershed included oak forest, oak savanna, prairie, and open wetlands, including deep and shallow marsh, wet prairie, and sedge meadow communities. In 1990, 13.6 percent of the watershed was covered by natural vegetation, 99.6 percent of which was wetlands and oak forest. Current wetland communities include deep and shallow marsh, southern sedge meadow, fresh (wet) meadow, wet prairie, shrub carr, and southern wet to wet-mesic lowland hardwoods. The remaining 0.4 percent of the current natural vegetation could be classified as prairie.

Twenty natural areas, totaling 1,587 acres (less than 2 percent of the Wisconsin watershed area), were identified, 15 of which (759 acres) are unprotected and in private ownership. Nine of these natural areas were judged to be of high or moderately high quality. There are 74 existing park and open space sites within the watershed, totaling about 5,436 acres. Forty-seven of these sites encompassing 3,077 acres are in public ownership.

Eighteen lakes and ponds larger than two acres are located within the Wisconsin basin. Approximately 69 miles of perennial streams drain the basin, including the Des Plaines River mainstem (20.3 miles), Jerome Creek, Kilbourn Road Ditch, Center Creek, Brighton Creek, and Dutch Gap Canal.

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Flora and Fauna

Forty-three mammal species are either known or are thought to be living in the Illinois portion of the basin. Sixty-six species of amphibians, and 23 reptiles make up the herpetological classification. Of nearly 300 bird species regularly found in Illinois, 270 are found in the upper Des Plaines basin for at least part of the year. A number of these species, including 14 that are threatened or endangered, are dependent on wetland habitats.

Aquatic macroinvertebrate surveys found that pollution-tolerant species (i.e., *Oligochaeta*, *Chironomids*, and *Gastropoda*) are found throughout the study area, and pollution-intolerant species (i.e. *Coleoptera*, *Ephemeroptera*, *Megaloptera* and *Tricoptera*) are found in greater proportions in Lake County reaches of the river than in Cook County. Mussel diversity in the entire study area is lower than that of other more pristine rivers of the state. This may be due to the high concentrations of sediments, some of them polluted, at the bottom of streams where most mussels live and feed. In 1975 and 1976, the Lake County Forest Preserve District collected 7 genera of blue-green algae (*Cyanophyta*), 13 genera of green algae (*Chlorophyta*), and 18 genera of diatoms (*Chrysophyta*). Regarding fish surveys, higher quality fishery resources, greater species diversity, more game species, and more pollution-intolerant species are found in Lake County than in Cook County. An improvement in fish diversity, number of sport fish, and overall abundance was noted between 1979 and 1993.\(^7\)

In general, the aquatic community composition represents a continuum from species adapted to high quality conditions (e.g. northern pike, largemouth bass, spotfin shiner, ephemeropterid insects, and freshwater clams) to those commonly associated with polluted conditions (e.g. carp, green sunfish, white sucker, chironomid insects, oligochaeta worms, and freshwater snails.)\(^8\) In general, this trend follows an upstream to downstream orientation.

Over 600 species of vascular plants have been tallied in the Illinois portion of the basin.

A number of state threatened and endangered species are found in the watershed. In Illinois, twelve bird species, two reptiles, one fish, and twenty-four plant taxa are on the official list of threatened or endangered species. Plant species that are threatened or endangered in Illinois include downy willow herb, bog bedstraw, and common bog arrow grass. The prairie white-fringed orchid is considered federally threatened. State-listed animal species include the veery (*Catharus fuscascens*), Iowa darter (*Etheostoma exile*), northern black-crowned night heron (*Nycticorax nyticorax*), and double-crested cormorant (*Phalacorax auritus*).

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Federally threatened animal species that have not been observed in the Illinois study area, but whose ranges overlap the study area are the peregrine falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), and Indiana bat (*Myotis sodalis*).

*Wisconsin*

Wisconsin surveys found a total diversity of 46 fish species between 1906 through 1980, and 29 species were found in the 1994 survey. Trends indicate a loss of overall species diversity over time, as well as the loss of pollution intolerant species, indicating the degraded condition of water quality.

Ten critical vascular plant species have been identified in the Wisconsin portion of the watershed. The Wisconsin Department of Natural Resources designates two as endangered, three as threatened, and five as special concern, or watch, species. Thirteen species of amphibians and 16 reptile species have been identified, as well as 216 bird species, and 36 mammal species. Fourteen animal species that have been listed as endangered or threatened in the State of Wisconsin occur within the watershed.

*Recreation*

Recreational activities on the upper Des Plaines river are somewhat limited. Impaired water quality, and the lack of sport fish that accompanies it, has driven anglers away from the river to higher quality streams, such as those found in parts of Wisconsin. Though canoeists are attracted to the river’s calm waters, it is likely that an improvement in water quality and related aesthetic conditions would lead to increased use. Canoe ramps have been installed in a number of Lake and Cook County forest preserves. Other recreational activities generally occur in the forest preserves scattered throughout the basin and in preserves and municipal parks along the lower two-thirds of the river.

Much of the river between Melrose Park, Illinois, and the Wisconsin border has been proposed for Scenic and Recreational status in the Nationwide Rivers Inventory by the National Park Service. This indicates scenic and recreational opportunities available to the public. Trails, park facilities, fishing areas, and native habitats have been constructed or restored in this reach of the river.  

*Flooding*

Before European settlement, rain that fell on the landscape often did not run into streams or rivers, but seeped into the ground or collected in wetlands and ponds. Increasing modifications to the landscape for agriculture and urban uses increased the rate and volume of water flowing over the landscape and into stream channels. These channels, unaccustomed to high fast flows, began to overflow with greater frequency, leading landowners to seek solutions to the flooding. Unfortunately, though landowners may have enjoyed minor immediate flood relief, straightening and deepening stream channels to convey flood waters away from the land caused more

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proposed problems than it solved. Changes in stormwater volume and flow rates led to increased flooding downstream, habitat disruption in the modified reaches, and serious erosion and loss of streambank stability.

In spite of the numerous flood control efforts, the Des Plaines River is one of the most flood-prone waterways in the region. According to the U.S. Army Corps of Engineers, damaging floods have occurred once or twice per decade since 1930, with the most recent flooding occurring in 1996. Devastating floods in the late 1980’s in Lake and Cook Counties caused over $100 million in damage. This situation is expected to worsen as more of the watershed is converted to impervious surfaces and urban uses. In coordination with the U.S. Army Corps of Engineers, Lake County Forest Preserve District, Lake County Stormwater Management Commission, Cook County, and the Illinois Department of Natural Resources, the Northeastern Illinois Planning Commission is developing flood control strategies that incorporate not only structural solutions, but also opportunities for non-structural flood control measures that will achieve multiple objectives within the watershed.

Air Quality

In general, air quality has improved for most pollutants in the basin since the mid-1980’s. In the early 1990’s, pollution monitoring stations within the basin recorded only brief and minor violations of federal ozone regulations. The largest contributor to air quality impairment is most likely the use of automobiles and trucks. US Environmental Protection Agency air quality data for Cook, Lake, and Kenosha Counties indicate only a few unhealthful days per year for the past five years.

Lakes

Water quality assessments of 38 lakes in the basin in 1994-95 by IEPA indicated that only four showed moderate impairment due to pollution. Twenty-four of the lakes were judged to fully support the uses for which they are designated, but 16 of the lakes show a declining trend in water quality. IEPA assessments of 71 of the basin’s lakes found that 51 percent are in good condition, 44 percent are in fair condition, and only 5 percent are in poor condition. Major threats to lakes in the upper Des Plaines basin include invasive species, nutrient loading, sedimentation, loss of native submerged and emergent vegetation, and toxic substances, especially those flushed off the agricultural and urban landscape.

Impacts on Natural Resources

Habitat Fragmentation

Remaining habitat in the basin is highly fragmented, broken up into small pieces, by roads, subdivisions, farm fields, and other development. Fragmentation reduces large patches of habitat, which support a variety of species and viable populations, into smaller patches incapable of supporting species diversity and populations. Some species, especially forest and grassland

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10 IDNR
birds, can breed successfully only in large, contiguous habitat blocks. A piecemeal landscape of small natural areas also will not fully support migratory patterns that some species depend on for survival. While some more mobile species can leapfrog from patch to patch, larger connected habitat areas will be necessary to maintain and recover the diversity and health of ecosystems in the upper Des Plaines basin.

Protected floodplain lands along the mainstem of the upper Des Plaines River provide a good example of the contiguity that is essential for protecting adequate habitat. This corridor should be incorporated into a network of protected natural areas within the watershed including the tributaries of the upper Des Plaines and upland habitats.

Fire Suppression

Historically, fire was a natural occurrence in the basin, recycling nutrients and allowing natural ecosystems such as prairies and oak savannas to reproduce and outcompete even the most stubborn invaders. As European settlers began farming and developing the land, fire suppression allowed those ecosystems that were once dependent on fire to be taken over by successional processes. As a result, prairies and savannas have largely disappeared, and forests, once thinned and opened by fire, are now choked with invasive species. Furthermore, wildflowers and wildlife that depend on those habitats have been disappearing as well.

Hydrologic Modification

The hydrology of the river basin has been altered in a number of ways. Many of the original wetlands, at one time covering nearly a quarter of the basin, have been tilled and drained to create agricultural land and to provide a stable substrate to support buildings, roads, and other infrastructure. The water levels of many of the lakes are unnaturally controlled for recreational and flood control purposes. Dams along the main stem and tributaries of the Des Plaines have altered natural water flow patterns and caused other problems such as siltation and degradation of aquatic habitat. Urban and suburban development often alters hydrology necessary to maintain natural communities by increasing or decreasing the quantity of water flowing into the community. Natural flow regimes are so modified that natural low summer flows are artificially supplemented by wastewater inputs, or greatly lowered due to the reduction in natural baseflows, especially in tributaries. Correspondingly, floods and stormwater-related flow velocities are much greater than under pre-settlement conditions. As a consequence of the impacts of hydrologic alteration, plant and animal species that depend on stable, natural hydrologic patterns are disrupted or displaced. In a worst case scenario, these species disappear from the basin altogether.

Subsurface water flow is also affected by human modification of the landscape and affects natural systems such as wetlands and streams that depend on groundwater flow.

Non-native and Invasive Species

Non-native species, originally from outside of the region or country, have invaded the basin. These species, many of them introduced by European settlers or later inhabitants, are highly adaptable to disturbed landscapes, including aquatic systems, where they outcompete and replace
native species. The greater the degree of disturbance caused by human alteration, the more easily these invasive species can take root and spread. To make matters worse, areas in which non-native species have become established often lack natural control mechanisms such as predators and diseases that keep their populations in check.

Non-native species also increase the degree of erosion and sedimentation in the watershed. As deep-rooted native species are replaced by invasive species with much shallower root systems, soil becomes less stable and more susceptible to erosive processes. Ultimately, this has negative impacts on water quality.

Some of the more renowned forest invaders of the region are common buckthorn (*Rhamnus cathartica*) and garlic mustard (*Alliaria petiolata*). Many of the basin’s wetlands are dominated by non-native and invasive species such as purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris arundinacea*), buckthorn, boxelder (*Acer negundo*), eastern cottonwood (*Populus deltoides*), and green ash (*Fraxinus*). While not all of these species are non-native, they all disrupt natural systems.
WATER QUALITY ASSESSMENT

The following assessment of water quality in the upper Des Plaines River (Hydrologic Unit Code Number 07120004) is based on the IEPA’s Illinois Water Quality Report of 1994-1995, the 1998 update to that report, and the professional assessments of NIPC staff. Instances where discrepancies exist are noted. Wisconsin data is not provided.

Indices of Biotic Integrity

(A tabular summary of these indices is provided in Appendix Z.)

The Illinois Department of Natural Resources and Illinois EPA use the following Biological Stream Characterization (BSC) method to ‘grade’ stream quality.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. EPA</td>
<td>Full Support</td>
<td>Full Support</td>
<td>Partial / Minor</td>
<td>Partial / Moderate</td>
<td>Nonsupport</td>
</tr>
<tr>
<td>Biotic Class</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>IBI/AIBI (fish) &amp; PIBI (stream habitat)</td>
<td>60-51</td>
<td>50-41</td>
<td>40-31</td>
<td>30-21</td>
<td>&lt;20</td>
</tr>
<tr>
<td>Water Quality Rating</td>
<td>Good</td>
<td>Good</td>
<td>Fair</td>
<td>Poor</td>
<td>Very Poor</td>
</tr>
<tr>
<td>MBI</td>
<td>&lt;5.0</td>
<td>5.0-5.9</td>
<td>6.0-7.5</td>
<td>7.6-8.9</td>
<td>&gt;9.0</td>
</tr>
</tbody>
</table>

Macrobenthos Biotic Index (MBI) is an indicator of stream conditions based on macroinvertebrate surveys. The MBI scale ranges from 1 (best) to 10 (worst). Figures for the upper Des Plaines range from 4.1 in the lower reaches to 5.9 in the upper reaches (5.4 at the Illinois-Wisconsin border) indicating relatively good conditions.

(Note: The MBI of 4.1 for the lower reaches is based on just one sample. This score, suggesting excellent water quality, is generally not consistent with the water quality data or the IBI figures reported below. Generally, better conditions are found in upper reaches, and conditions decline as one moves downstream. This is to be expected considering the highly urbanized nature of the lower portions of the watershed.)

Index of Biotic Integrity (AIBI) is an indicator of stream conditions and habitat based on fish surveys and ranges from 12 (worst) to 60 (best). In the upper Des Plaines, figures range from a low of 23 in the lower reaches to a high of 44 at the Illinois-Wisconsin border indicating a range of ratings from D to B. Generally, upper reaches were of higher quality than lower reaches.

Potential Index of Biotic Integrity (PIBI) is a predictive index of stream quality based on observed habitat conditions, and ranges from 12 (worst) to 60 (best). Figures for the upper Des Plaines range from 35 to 45 predicting a C or B rated stream, but data was only recorded for upper reaches.
Designated Use

According to the Illinois Environmental Protection Agency, water pollution control programs are designed to protect the beneficial uses, also called designated uses, of the water resources of the state. The Illinois Water Quality Report describes water quality conditions in terms of the degree to which waters attain designated uses:

- **Full Support**: water quality meets the needs of all designated uses protected by applicable water standards.
- **Full Threatened**: water quality is presently adequate to maintain designated uses, but if a declining trend continues, only partial support may be attained in the future.
- **Partial Support/Minor Impairment**: water quality has been impaired, but only to a minor degree. These may be minor exceedences in applicable water quality standards or criteria for assessing the designated use attainment.
- **Partial Support/Moderate Impairment**: water quality conditions are impaired to a greater degree inhibiting the waterbody from meeting all the needs for that designated use.
- **Nonsupport**: water quality is severely impaired and not capable of supporting the designated use to any degree.

Four points along the mainstem of the Des Plaines River above the confluence with Salt Creek were monitored in 1997, and six in 1995, for a total of ten sampling points (summarized in tabular form at the end of this section). The results of the assessments for designated use are as follows (causes and sources of impairment are described below):

- **Overall Use**: Partial support with minor impairment for seven reaches (water quality has been impaired, but only to a minor degree) and full support for three reaches (G22, G07, G08).
- **Fish Consumption**: Full support at the northernmost point (G08—Illinois/Wisconsin border); no data for other points.
- **Aquatic Life**: Partial support with minor impairment for seven reaches (water quality has been impaired, but only to a minor degree) and full support for three reaches (G22, G07, and G08).
- **Swimming Use**: Nonsupport throughout.

Ratings for three points, G22, G07, and G08, improved from partial/minor impairment and threatened to full support for overall and aquatic life support. This is somewhat surprising considering the increasing urbanization of the middle and upper (primarily Lake County) reaches of the river basin. Swimming use support for points G07 and G08 declined from partial minor to nonsupport. Reasons for these changes have not been specified in the IEPA report. In particular, pathogens (e.g., fecal coliform) have not been listed as a cause of swimming impairment, nor have any potential sources of the impairment been identified.

Water quality data collected by the IEPA (15 monitoring points in Lake County) and the Metropolitan Water Reclamation District (4 monitoring points in Cook County) along the upper Des Plaines River and its tributaries are summarized below. While this table presents average
concentration over two time periods, a more meaningful assessment would require some discussion of minimum and maximum figures, as well the frequency with which water quality standards for the listed parameters are exceeded. Nonetheless, this table may be useful for identifying general trends in water quality.

Combined annual mean values for selected water quality parameters for the Upper Des Plaines River, 1976 to 1995.\textsuperscript{12}

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Illinois Standards (mg/L)</th>
<th>Lake Co. Sampling Results (mg/L)</th>
<th>Cook Co. Sampling Results (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissolved Oxygen</td>
<td>5.0</td>
<td>9.4</td>
<td>9.2</td>
</tr>
<tr>
<td>Ammonia Nitrogen</td>
<td>2.5/4.0</td>
<td>0.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>1,500.0</td>
<td></td>
<td>630.0</td>
</tr>
<tr>
<td>Fecal Coliform (cts/100ml)</td>
<td>0.0</td>
<td>2,335.0</td>
<td>166.0</td>
</tr>
<tr>
<td>Fats, Oils and Grease</td>
<td>15.0</td>
<td>1.6</td>
<td>0.7</td>
</tr>
<tr>
<td>Phenols</td>
<td>0.3</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Total Iron</td>
<td>2.0</td>
<td>0.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Total Cyanide</td>
<td>0.1</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Total Copper</td>
<td>1.0</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Total Lead</td>
<td>0.1</td>
<td>0.02</td>
<td>0.1</td>
</tr>
</tbody>
</table>

As this table indicates, dissolved oxygen levels generally decrease from north to south along the river, and fats, oils, and grease levels increase. These trends are consistent with increasing urbanization of the watershed moving downstream from Lake County to Cook County. The significant increase in fecal coliform levels in Lake County are likely due to increasing urbanization of the county, and the significant improvement in these figures for Cook County are due to improved point source pollution control.

Water quality indicators have generally improved in downstream reaches over the past 20 years, including dissolved oxygen, Ammonia-Nitrogen, Total Dissolved Solids (TDS), and Fecal Coliform. This was due to improvements in both combined sewer and wastewater discharges. As indicated in the IEPA 305(b) report, however, many reaches of the river do not fully support designated uses, and many show at least some degree of impairment. For the most part, other water quality indicators used by the IEPA such as Biotic Integrity Indices, as discussed above, indicate poor to good water quality, though most only rank as fair. Stream sediment contamination generally increases moving downstream as well, a result of increasing industrial discharges, municipal wastewater treatment plant discharges, and combined sewer overflows. Based on these figures, the majority of the Des Plaines is of only moderate to limited value for aquatic life support.

Causes and Sources of Water Quality Impairment

Causes and sources of water quality impairment are based largely on the IEPA Illinois Water Quality Report of 1994-95 and the 1998 update to that report. This information is supplemented by additional causes and sources based on the IEPA report and professional judgement of NIPC staff. These additions are marked by an asterisk, and no magnitude is reported. Possible discrepancies between IEPA and NIPC assessments are discussed.

The area of concern for the upper Des Plaines study extends from the Illinois-Wisconsin border to the confluence with Salt Creek near Riverside. The definitions of upper, middle, and lower reaches of the river for the purposes of this summary are roughly based on differences in the sources and causes of water quality impairment at the various monitoring points, and are defined as follows (see Map 1):

- upper reaches--generally the upper _ of Lake County, north of the confluence with Indian Creek (data points G07, G08, G26, G35);
- middle reaches--generally the lower _ of Lake County and northern Cook County to just below the confluence with McDonald Creek (data points G22, G28, G36);
- lower reaches--generally from McDonald Creek south to the confluence with Salt Creek (data points G15, G30, G32).

Upper Reaches

MBI figures range from 5.4 to 5.9 indicating relatively good conditions. AIBI figures range from 33 to 44 indicating a B or C stream. PIBI figures range from 35 to 45 predicting a B or C stream. These figures indicate that while the water quality may be sufficient to support a diversity of macroinvertebrates, the fish community and the habitat conditions to support those fish range from fair to good. This may be due to a number of habitat-related factors, including historical dredging, modification of channel banks, and sedimentation.

The major causes of impairment for the upper reaches of the upper Des Plaines, and the magnitude to which the cause contributes to the use impairment, were identified as follows (numbers in parentheses indicate monitoring point(s) location):

<table>
<thead>
<tr>
<th>Cause of Impairment</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrients</td>
<td>High (G35,G36)</td>
</tr>
<tr>
<td>Habitat Alterations</td>
<td>Moderate (G35)</td>
</tr>
<tr>
<td>Siltation</td>
<td>Moderate (G26,G35)</td>
</tr>
<tr>
<td>Metals</td>
<td>Slight (G35,G26)</td>
</tr>
<tr>
<td>Salinity/TDS/Chlorides</td>
<td>Slight (G26)</td>
</tr>
<tr>
<td>Ammonia</td>
<td>Slight (G35)</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Slight (G35)</td>
</tr>
<tr>
<td>*Pesticides</td>
<td></td>
</tr>
<tr>
<td>*Organic Enrichment/Dissolved Oxygen</td>
<td></td>
</tr>
<tr>
<td>*Pathogens</td>
<td></td>
</tr>
<tr>
<td>*Flow Alteration</td>
<td></td>
</tr>
<tr>
<td>*Filling and Draining</td>
<td></td>
</tr>
<tr>
<td>*Turbidity</td>
<td></td>
</tr>
<tr>
<td>*Suspended Solids</td>
<td></td>
</tr>
</tbody>
</table>
*These additions are based on assumptions about the impacts of land uses present in upper reaches of the upper Des Plaines. Pesticides, organic enrichment, filling and draining, turbidity, and suspended solids are all associated with agricultural and construction (land development) activities. Flow alteration (hydrologic alteration) is a factor in nearly all river systems in northeastern Illinois, including the upper Des Plaines. As discussed above, pathogens are a primary cause of impairment for swimming use.

The sources that contribute to the causes listed above, and the magnitude to which the source contributes to the use impairment, were identified as follows (numbers in parentheses indicate monitoring point(s) location):

<table>
<thead>
<tr>
<th>Source of Impairment</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban runoff/storm sewers</td>
<td>Moderate (G26,G35)</td>
</tr>
<tr>
<td>Municipal point sources</td>
<td>Slight (G26) to moderate (G35)</td>
</tr>
<tr>
<td>Construction (land development)</td>
<td>Slight (G26,G35)</td>
</tr>
<tr>
<td>Agriculture (general)</td>
<td>Slight (G26,G35)</td>
</tr>
<tr>
<td>Agriculture (nonirrigated crop production)</td>
<td>Slight (G26,G35)</td>
</tr>
<tr>
<td>Agriculture (pasture land)</td>
<td>Slight (G26)</td>
</tr>
<tr>
<td>*Hydrologic/Habitat Modification (removal of riparian vegetation)</td>
<td></td>
</tr>
<tr>
<td>*Hydrologic/Habitat Modification (filling and draining)</td>
<td></td>
</tr>
<tr>
<td>*Carp Activity</td>
<td></td>
</tr>
</tbody>
</table>

*Hydrologic/habitat modification is a source of the impairments caused by habitat alterations, flow alteration, filling and draining, turbidity, suspended solids, and siltation. Carp activity has been demonstrated to contribute to turbidity problems.

**Middle Reaches**

MBI of 5.8 (recorded at only one of three sampling points) indicates relatively good conditions, as far as macroinvertebrates are concerned. No AIBI or PIBI figures are available.

The major causes of impairment for the middle reaches of the upper Des Plaines, and the magnitude to which the cause contributes to the use impairment, were identified by IEPA as follows (numbers in parentheses indicate monitoring point(s) location):
Cause of Impairment | Magnitude
--- | ---
Nutrients | High (G28,G36)
Suspended Solids | Moderate (G36)
Siltation | Slight (G28) to moderate (G36)
Salinity/TDS/Chlorides | Slight (G28)
Metals | Slight (G28)
Ammonia | Slight (G28)
*Pesticides* | 
*Organic Enrichment/Dissolved Oxygen* | 
*Flow Alterations* | 
*Pathogens* | 
*Turbidity* | 
*Hydrologic/Habitat Modifications* | (filling and draining)

*It is likely that some pesticides and organic enrichment are impacting aquatic life due to agricultural operations, urban runoff/storm sewers, and point sources. Flow alterations and filling and draining are associated with urbanization and agricultural activities, and also are impacting water quality to some degree. Turbidity is associated with agricultural and development activities, as well as with hydrologic and habitat modifications. Pathogens are an assumed source of swimming use impairment.

The sources that contribute to the causes listed above, and the magnitude to which the source contributes to the use impairment, were identified by IEPA as follows (numbers in parentheses indicate monitoring point(s) location):

| Source | Magnitude |
--- | ---
Other (contaminated sediments) | Moderate (G28)
Urban runoff/storm sewers | Slight (G36) to moderate (G28)
Construction (land development) | Slight (G28) to moderate (G36)
Construction (general) | Slight (G28) to moderate (G36)
Construction (highway/road/bridge) | Slight (G28) to moderate (G36)
Municipal point sources | Slight (G28) to moderate (G36)
Hydrologic/habitat modification (general) | Slight (G28,G36)
Hydro/hab (streambank mod/destabiliz) | Slight (G28,G36)
Combined sewer overflows | Slight (G28)
Other (general) | Slight (G28)
*Agriculture* | 
*Land Disposal* | 
*Hydrologic/Habitat Modification* | (filling and draining)
*Hydrologic/Habitat Modification* | (dam construction)
*Carp Activity* |
Lower Reaches

MBI of 4.1 indicates relatively good conditions, but, as noted earlier, this figure is based on just one sample and is inconsistent with IBI figures and water quality data. AIBI figures range from 23 to 34 indicating a D or C stream. No PIBI figures are available.

The major causes of impairment for the lower reaches of the upper Des Plaines, and the magnitude to which the cause contributes to the use impairment, were identified by IEPA as follows (numbers in parentheses indicate monitoring point(s) location):

<table>
<thead>
<tr>
<th>Cause of Impairment</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrients</td>
<td>High (G30,G32)</td>
</tr>
<tr>
<td>Siltation</td>
<td>Moderate (G32,G30)</td>
</tr>
<tr>
<td>Salinity/TDS/Chlorides</td>
<td>Slight (G15) to moderate (G30,G32)</td>
</tr>
<tr>
<td>Metals</td>
<td>Slight (G30,G32)</td>
</tr>
<tr>
<td>Ammonia</td>
<td>Slight (G30)</td>
</tr>
<tr>
<td>*Oil and Grease</td>
<td></td>
</tr>
<tr>
<td>*Flow Alteration</td>
<td></td>
</tr>
<tr>
<td>*Pathogens</td>
<td></td>
</tr>
<tr>
<td>*Suspended Solids</td>
<td></td>
</tr>
<tr>
<td>*Turbidity</td>
<td></td>
</tr>
<tr>
<td>*Habitat Alterations</td>
<td></td>
</tr>
<tr>
<td>*Organic Enrichment/Dissolved Oxygen</td>
<td></td>
</tr>
</tbody>
</table>

The sources that contribute to the causes listed above, and the magnitude to which the source contributes to the use impairment, were identified by IEPA as follows (numbers in parentheses indicate monitoring point(s) location):

<table>
<thead>
<tr>
<th>Source</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other (contaminated sediments)</td>
<td>Slight (G15) to heavy (G30,G32)</td>
</tr>
<tr>
<td>Combined sewer overflows</td>
<td>Slight (G15) to moderate (G30,G32)</td>
</tr>
<tr>
<td>Urban runoff/storm sewers</td>
<td>Slight (G15) to moderate (G30,G32)</td>
</tr>
<tr>
<td>Municipal point sources</td>
<td>Slight (G15,G32) to moderate (G30)</td>
</tr>
<tr>
<td>Construction (land development)</td>
<td>Slight (G15,G30,G32)</td>
</tr>
<tr>
<td>Other (general)</td>
<td>Slight (G15,G30,G32)</td>
</tr>
<tr>
<td>Other (highway maintenance and runoff)</td>
<td>Slight (G15,G30,G32)</td>
</tr>
<tr>
<td>*Hydrologic/Habitat Modifications (filling and draining)</td>
<td></td>
</tr>
<tr>
<td>*Hydrologic/Habitat Modifications (removal of riparian vegetation)</td>
<td></td>
</tr>
<tr>
<td>*Hydrologic/Habitat Modifications (dam construction)</td>
<td></td>
</tr>
<tr>
<td>*Carp Activity</td>
<td></td>
</tr>
</tbody>
</table>

*Hydrologic and habitat modifications are significant in these highly urbanized reaches of the basin, notably the presence of dams, disturbance of native riparian vegetation, streambank modification and destabilization, stream channelization, and flow alteration. Pathogens, which
contribute to the nonsupport rating for swimming use, result from urban runoff and combined sewer overflows.

**Relationship Between Causes and Sources of Impairment**

Nutrients are a primary listed cause of impairment for all reaches of the upper Des Plaines main stem. Inputs of nutrients generally originate from several primary sources: municipal point sources, urban runoff / storm sewers, and agriculture. Fertilizers and other organic nutrients found throughout the agricultural-urban development continuum flow into waterbodies. Combined sewer overflows also introduce nutrients and organic matter into the water column. Excessive nutrients lead to algal blooms that block sunlight from reaching into deeper portions of the water column, followed by excessive oxygen demand when these plants respire, or when they die and are decomposed by oxygen demanding organisms. Dissolved oxygen depletion also is caused by organic enrichment from the same sources listed above. As these decomposing organisms consume oxygen, water becomes oxygen-depleted, and aquatic animals are unable to breathe.

Siltation, suspended solids, and turbidity also rank high as causes of impairment for all reaches of the main stem. Siltation occurs when soil and other suspended solid particles in the water column settle out on streambeds. Sources of siltation include erosion-induced runoff from agricultural and construction operations, channel erosion, as well as runoff from roads and highways where dirt and dust have settled. Habitat modifications, including streambank modification and destabilization, also contribute to erosion-siltation processes. Another suggested contributor to turbidity is the presence of carp, as documented by research at the Des Plaines River Wetlands Demonstration Project in Wadsworth. Carp are known to stir up bottom sediments via their feeding habits, and also are destructive of desirable rooted aquatic vegetation. Eroded soil increases water turbidity and settles in rivers, streams and wetlands where it is a major contributor to habitat degradation. Sediments that settle out of the water column can bury coarser bottom sediments necessary to support reproductive and feeding cycles of aquatic animals, reduce light penetration into the water necessary to support aquatic plants, and reduce food sources supporting numerous links in the food web.

Toxic substances have numerous deleterious effects on aquatic ecosystems, from death of plants and animals due to poisoning, to genetic disruption and mutation. Water quality impacts that fall within the general category of toxics include metals, oil and grease, salinity/TDS/chlorides, ammonia, chlorine, and pesticides. Metals and salinity/TDS/chlorides primarily come from urban runoff / storm sewers, and are due to automobile use and application of salt on roadways. Ammonia and chlorine are byproducts of the wastewater treatment process and enter the river via municipal point source discharges. Contaminated sediments also contribute to the impact of toxic chemicals on water quality. Pathogens, which are contributed by combined sewer overflows, urban runoff, and pet wastes, prevent the river’s use for swimming.

Habitat modification can be traced to numerous sources, including agriculture and construction, filling and draining of wetlands, modification and destabilization of stream channels, construction of channel dams, and removal or degradation of native riparian vegetation. These activities can lead to flow alteration, thermal modification, turbidity, suspended solids, and
siltation, all of which seriously impact the river’s ability to support a diversity of high quality plants and animals.

**Tributaries**

A number of tributaries of the upper Des Plaines also were monitored with the following results (listed in order from north to south; s=slight, m=moderate, h=high):

- **Mill Creek**, monitored in 1990, rated full support for both overall use and aquatic life. No causes or sources of impairment were reported. MBI=5.4 (good conditions); AIBI=40 (C rating); PIBI=38 (C rating predicted).

- **Bull Creek**, monitored in 1983, rated partial support with moderate impairment for overall use and aquatic life. Causes of impairment include habitat alterations (m), metals (s), nutrients (s), siltation (s), organic enrichment/dissolved oxygen (s), and pathogens (s). Sources of these causes include hydrological/habitat modification (m), channelization (m), municipal point sources (s), agriculture (s), nonirrigated crop production (s), construction (s), land development (s), urban runoff/storm sewers (s), and streambank modification and destabilization (s). MBI=5.3 (good conditions); AIBI=25 (D rating); PIBI=42 (B rating predicted).

- **Indian Creek**, monitored in 1983, rated partial support with minor impairment for overall use and aquatic life. Causes of impairment include habitat alterations (m), metals (s), ammonia (s), chlorine (s), nutrients (s), and siltation (s). Sources contributing to these causes include construction (m), land development (m), hydrologic/habitat modification (m), channelization (m), municipal point sources (s), agriculture (s), nonirrigated crop production (s), construction (s), land development (s), urban runoff/storm sewers (s), and streambank modification and destabilization (s). MBI=5.8 (good conditions); AIBI=32 (C rating); PIBI=42 (B rating predicted).

- **Buffalo Creek**, monitored in 1988, rated partial support with minor impairment for overall use and aquatic life. Causes of impairment include nutrients (h) and salinity/TDS/chlorides (h). The source of these causes was identified as municipal point sources (h). MBI=6.4 (fair conditions).

- **Wheeling Ditch**, monitored in 1995, rated full support for overall use and aquatic life. No causes, sources, MBI, AIBI, or PIBI figures were reported. (Note: this use support rating is surprising in light of the heavily urbanized nature of this watershed.)

- **McDonald Creek** was last monitored in 1976 and rated partial support and moderate impairment for overall use and aquatic life. Causes of impairment were not determined, but urban runoff / storm sewers (m) were identified as sources contributing to impairment. An AIBI of 29 indicates a D rating.

- **Willow Creek**, monitored in 1983, rated partial support with moderate impairment for overall use and aquatic life. Causes of impairment include chlorine (h), nutrients (h), habitat alterations (m), organic enrichment/dissolved oxygen (m), pathogens (m), and oil and grease (m). Sources that contributed to the causes include municipal point sources (m), urban runoff/storm sewers (m), hydrologic/habitat modification (m), removal of riparian vegetation
(m), streambank modification and destabilization (m), and channelization (s). MBI=6.4 (fair conditions); AIBI=28 (D rating).

**Crystal Creek**, monitored in 1995, rated full support for overall use and aquatic life. No causes, sources, MBI, AIBI, or PIBI figures were reported. (Note: this use support rating is surprising in light of the heavily urbanized nature of this watershed.)

**Silver Creek** was last monitored in 1976 and provided partial support and moderate impairment for overall use and aquatic life. Causes of impairment were not determined, but urban runoff / storm sewers (m) were identified as sources contributing to impairment. An AIBI of 23 indicates a D rating.
WATERSHED IMPROVEMENT STRATEGY

The following pages identify general strategies for addressing the following issues in the upper Des Plaines River watershed, which are listed in order of priority as identified by stakeholders in the Upper Des Plaines watershed: watershed coordination, flood mitigation, water quality, and natural resources. These strategies are intended as initial guidance and do not necessarily represent the full range of potential activities that can improve the watershed. More detailed strategies should be identified by watershed stakeholders as part of a long-term watershed planning process.

WATERSHED COORDINATION

In addition to natural resource and flooding concerns, stakeholders identified coordination, leadership, monitoring, and grassroots planning as top watershed priorities. Objectives and actions addressing these priorities will enhance the implementation of the natural resource, water quality, and flood mitigation strategies identified in the following sections. Objectives and actions for watershed coordination fall into four categories:

- institutional and public coordination;
- watershed stewardship and leadership;
- watershed outreach and education; and
- watershed monitoring.

Objective: Improve institutional and public coordination and communication.

1. Improve coordination and communication between states, counties, municipalities, private and non-profit organizations, and residents.

2. Encourage public/private partnerships to implement the watershed restoration strategy, to enhance funding opportunities, and to demonstrate the feasibility of such partnerships.

3. Encourage transition from top-down to bottom-up, grassroots watershed planning and management.
Objective: Encourage watershed and subwatershed leadership, stewardship, and volunteer activities.

4. Identify watershed and subwatershed leaders to direct and coordinate activities.
5. Develop subwatershed plans with detailed strategies for specific subwatershed problems and conditions.
6. Reward watershed improvement efforts with recognition, awards, events, and publicity.

Objective: Educate the public and public officials about their impact and their role in protecting natural resources.

7. Develop and distribute resident information brochures.
8. Provide technical assistance to local governments and community groups.
9. Encourage natural landscaping practices throughout the watershed.
10. Utilize demonstration projects to promote and educate the public, local officials, and developers.
11. Encourage school group and citizen participation in stream monitoring, clean-up, and management efforts.
12. Encourage broader community education efforts.
13. Develop public relations strategies to educate, involve, and invigorate the public and community leaders, including watershed awareness events and the use of the media.

Objective: Increase watershed monitoring quality and frequency.

14. Collect current baseline scientific data for the entire watershed, including information on the location, capacity, and impact of retention/detention within the watershed.
15. Develop detailed short and long term watershed monitoring strategies and a standard list of indicators.
16. Involve the public in monitoring efforts and opportunities.
FLOOD MITIGATION

The initial task is to identify projects and activities that will provide specific flood prevention and remediation benefits in the upper Des Plaines River watershed. Objectives and techniques to address natural resource impairments are discussed below.

➢ Objective: Reduce flooding and flood damages in the upper Des Plaines basin. (Additional recommendations for stormwater detention are identified in the water quality objectives.)

17. Develop comprehensive watershed management, land use, and flood hazard mitigation plans for all significant tributaries.

18. Adopt floodplain protection ordinances such as protective zoning, subdivision regulations, building codes, and ‘stand-alone’ ordinances throughout the watershed.

19. Reduce stormwater runoff rates and volumes by minimizing impervious surfaces, increasing infiltration, and using naturalized detention basins.

20. Assess repetitively damaged structures not protected by flood control structures, and remove, relocate, elevate, or floodproof damaged structures.

21. Discourage new building and roadway development within the floodplain.

22. Acquire and protect the floodplain for flood prevention, open space, and environmental enhancement along the mainstem and tributaries.

23. Raise the height of bridges and roadways that are overtopped or damaged during floods.

24. Identify potential floodwater storage sites in Illinois and Wisconsin, designed to be natural-looking and aesthetic, an enhancement to the environment, and with recreational and water quality benefits.

25. Maintain stream channel conveyance capacity through channel maintenance and measures to reduce soil erosion and sedimentation.

26. Restore degraded and drained wetlands throughout the watershed for stormwater detention benefits.
**WATER QUALITY**

The initial task in improving water quality is to identify projects and activities that will address specific impairments in the upper Des Plaines River watershed. Projects and activities that address these impairments can be categorized as follows:

- mitigation of nonpoint source impacts due to urban and agricultural development; and
- reduction of point source pollution from municipal wastewater treatment plants and combined sewer overflows.

Objectives and techniques to address natural resource impairments are discussed below.

➢ **Objective: Reduce nonpoint source pollution due to runoff from urban, agricultural, and developing landscapes.**

   **Local ordinances**

27. Adopt and enforce local zoning and subdivision regulations that require environmentally friendly stormwater designs and that minimize impervious surface area and soil compaction during and following construction.

28. Provide flexibility in local ordinances to allow adaptable, non-traditional designs for stormwater management and nonpoint source pollution reduction measures.

   **Natural Drainage and Infiltration**

29. Reduce and disconnect impervious area by utilizing alternative parking lot designs, reduced street widths, reduced building-to-street setbacks, and cluster development.

30. Utilize natural drainage measures such as swales and vegetated filter strips to reduce runoff volumes, to filter pollutants from runoff water, and to improve infiltration of stormwater into the ground.

31. Encourage natural infiltration practices, such as infiltration trenches and basins, to encourage stormwater to seep into the ground rather than flow over the surface of the ground.

32. Utilize permeable paving blocks for low traffic parking areas, emergency access roads, and driveways to increase infiltration and reduce runoff volumes and pollutant loads.

33. Utilize deep-rooted natural vegetation instead of turf grass and ornamental plants to increase stormwater infiltration, reduce the need for pesticides and fertilizers, filter pollutants from runoff, and provide habitat for native species.

34. Utilize natural vegetation buffers along all water bodies to filter out damaging pollutants, to allow natural streamflow, and to protect stream banks from erosion. Development within buffer areas should be strictly limited. Land or conservation easements for buffers may need to be purchased to ensure adequate protection.
35. Maintain, restore, and enhance natural drainage and storage systems that can serve multiple objectives such as stormwater conveyance, storage, and habitat.

*Stormwater Detention*

36. Utilize wet bottom or wetland detention basin designs and retrofit existing detention basins to reduce pollutant loads, and to provide habitat and passive recreation opportunities.

37. Restrict discharge rates from detention basins to mimic natural instream flow rates.

38. Monitor and maintain stormwater detention facilities to ensure effective operation and provide maximum detention and habitat.

*Soil Erosion and Sediment Control*

39. Utilize soil erosion and sediment controls to minimize exposed soil, to minimize mass grading, to stabilize exposed and disturbed soils as soon as possible, and to filter and trap sediments out of stormwater before it leaves a development site.

40. Avoid or minimize construction in sensitive areas such as steep slopes, stream corridors, shorelines, wetlands, woodlands, natural areas, and unique habitats.

41. On agricultural lands, use soil conservation techniques, such as windbreaks, vegetated swales, terraces, natural buffers (filter strips), and conservation tillage practices and crop residues to reduce erosion and to filter pollutant runoff from agricultural landscapes.

*Land Management and Maintenance Practices*

42. Improve road maintenance practices to remove potential pollutants, such as through regular street sweeping, and reduce the use of road salt in winter.

43. Monitor and maintain landfills and other land disposal sites to prevent leakage and contamination of ground and surface water.

44. Monitor and maintain septic systems to prevent contamination of ground and surface water.

45. Encourage landowners and business owners to utilize sustainable lawn care practices and to properly use and dispose of household chemicals and wastes.

46. Encourage reduced use of pesticides and fertilizers on agricultural lands.
Objective: Reduce point source pollution from combined sewer overflows, municipal wastewater facilities, and septic systems.

47. Monitor point sources monthly for compliance with established water quality standards and report results.

48. Encourage wastewater authorities to exceed established water quality standards, especially for nutrients.

49. Avoid new or expanded discharges to low-flow or high-quality waterbodies by utilizing existing regional treatment facilities, or by discharging to high-flow, high-volume waterbodies.

50. Where new or expanded discharges can not be avoided, use facility designs that ensure discharge of high-quality effluent that will not disrupt habitat and natural processes.

51. Promote the use of alternative wastewater treatment/disposal methods such as constructed wetlands, land treatment, and wastewater reuse.

52. Remediate or replace problem septic systems.

53. Eliminate illicit sanitary/industrial/commercial connections to storm sewers.

54. Eliminate or address combined sewer overflows to reduce frequency of overflow events.

55. Reduce infiltration/inflow to sanitary sewers to minimize overflows and bypasses.
The initial task in improving natural resources is to identify projects and activities that will address specific impairments in the upper Des Plaines River watershed. Projects and activities that address these impairments can be categorized as follows:

- open space preservation and increased recreational opportunity and access; and
- aquatic and terrestrial habitat protection and restoration.

Objectives and techniques to address natural resource impairments are discussed below.

- **Objective: Increase and enhance open space and recreational opportunities within the upper Des Plaines River watershed.**
  
  56. Utilize the *Northeastern Illinois Regional Greenways Plan* and the *Water Trails Plan* developed by NIPC and Openlands Project as a guide for recreational development and coordination.
  
  57. Encourage creation and adoption of a watershed open space plan to assist municipalities in prioritizing and implementing open space and natural resource protection programs.
  
  58. Identify areas for recreational opportunity enhancement and expansion, such as abandoned railroad and road rights-of-way, utility and private easements, as well as improved parking and access to these resources.
  
  59. Promote natural resource-based recreational activities, including non-motorized boating, fishing, hiking, and wildlife observation and photography.
  
  60. Enhance recreational amenities and facilities such as canoe launch sites, portages, road crossings, hiking trails, interpretive signage, and trailhead facilities such as parking lots and comfort stations.
  
  61. Enhance and promote trails, trail access, and alternative transportation networks by connecting mainstem trails to residential areas, trails along tributaries, and protected natural areas.

- **Objective: Protect and restore terrestrial and aquatic habitat quality and quantity within the watershed, including natural hydrology.** (Additional recommendations for aquatic habitat protection are covered in the water quality objectives.)

  Planning and Development

  62. Encourage municipalities and counties to clearly identify and designate habitat areas as conservation areas in comprehensive plans, and to coordinate preservation programs with neighboring communities.

32
63. Adopt and enforce ordinances and programs that protect natural areas from new
development and human activities such as clearing, compaction, draining, filling,
dredging, straightening, and hydrologic modification. This may include zoning
regulations, subdivision regulations, conservation development techniques, zoning
overlays, natural buffers, and acquisition programs.

64. Adopt and implement appropriate recommendations of Chicago Wilderness’ *Biodiversity
Recovery Plan* throughout the watershed.

65. Mitigate all unavoidable disturbances of natural areas.

*Natural Area Protection, Management, and Restoration*

66. Identify, protect, expand, and enhance high quality habitat sites, including Illinois Natural
Areas Inventory sites, within the watershed.

67. Identify and protect large habitat patches and connecting greenways, especially along
rivers, streams, and other water features. Provide passage and remove barriers to wildlife
movement throughout and between habitat areas, such as highways, dams, and weirs.

68. Expand protected land holdings within the forest preserve systems, private conservation
initiatives, and other public agencies such as park districts.

69. Restore ecosystems that have been highly degraded, including those that are unique,
threatened, or endangered, and those that support threatened and endangered species.
Pay special attention to opportunities for restoring prairie and savanna ecosystems.

70. Actively manage natural areas and riparian zones by controlling non-native and invasive
plant species, planting native vegetation, using prescribed burning where necessary, and
avoiding the use of environmentallly damaging pesticides.

71. Utilize upland natural areas to help preserve and restore natural hydrology wherever
possible.

72. Work closely with landowners to enhance habitat on private properties through the use of
natural landscaping and other means.

*Aquatic Habitat Protection*

73. Establish minimum setbacks and buffers for all water features to protect from the impacts
of development and other human activities.

74. Minimize channel modifications such as straightening and dredging, and restore stream
channels, streambeds, and aquatic habitats that have been modified or degraded to natural
conditions. This includes instream habitat features such as natural meanders and pool-
riffle sequencing.
75. Protect riparian vegetation and stabilize streambanks using environmentally-friendly bioengineering techniques such as native vegetation, A-Jacks, lunkers, fiber rolls, geotextile mats, etc.

76. Acquire, protect, restore, and/or construct wetlands and wetland hydrology within the watershed to provide habitat, floodwater detention capacity, and water cleansing. This may include removal of flood control structures and wetland drainage tiles.

77. Provide technical and financial assistance to landowners in the floodplain and along water bodies to help protect these resources.

Watershed Improvement Strategy Implementation

In addition to identifying the actions necessary to achieve watershed improvements, implementation of this Watershed Restoration Action Strategy requires more detailed information as to who should implement the actions, and when those actions should be implemented to achieve the stated objective. In order to collect this information, survey forms were mailed to a number of watershed stakeholders. Responses are summarized in Appendix A.

Conclusion

This Watershed Restoration Action Strategy for the upper Des Plaines River watershed provides a general assessment of the conditions and impairments existing in the basin related to water quality, flooding, natural habitats and hydrology, open space, and recreation. The WRAS also provides the foundation of a comprehensive strategy to address the multiple impacts and impairments to watershed resources. Though much greater detail is necessary at a subwatershed scale to adequately assess and address use impairments, this document is intended to begin the planning and implementation process for protecting, enhancing, and restoring the upper Des Plaines River basin to a healthy state.
APPENDIX A:  WRAS IMPLEMENTATION STRATEGY SUMMARY

Watershed stakeholders were asked to identify all parties from the list below that should be responsible for implementing recommended actions. Stakeholders also were asked to indicate in which time frame an action was needed in order to achieve stated objectives: 0-2 years, 2-5 years, or 5-10 years. For a number of actions respondents indicated a need for ongoing action rather than action within a specific time frame. These actions received a tally in each of the three time frames.

Key to implementing parties:
- Citizen Groups (CG)
- Counties (CO)
- Developers (D)
- Ecosystem Partnership (EP)
- Forest Preserve Districts (FP)
- Illinois Department of Natural Resources (IDNR)
- Illinois Department of Transportation (IDOT)
- Illinois Environmental Protection Agency (IEPA)
- Illinois Tollway Authority (IT)
- Metropolitan Water Reclamation District (MWRD)
- Municipalities (M)
- Natural Resources Conservation Service (NRCS)
- Northeastern Illinois Planning Commission (NIPC)
- Private Landowners (P)
- Soil and Water Conservation Service (SWCD)
- Southeastern Wisconsin Regional Planning Commission (SEWRPC)
- Stormwater Management Commission (SMC)
- United States Army Corps of Engineers (USACE)
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## Upper Des Plaines River Watershed Restoration Action Strategy

### WRAS Implementation Strategy Summary

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Appendix B: Potential Funding Sources for Watershed Restoration Activities

U.S. Army Corps of Engineers (ACE)

The Army Corps’ Civil Works programs involve the planning, design, construction management, operation and maintenance of water resources projects to meet the nation's flood and storm damage reduction, navigation, environmental restoration, hydropower, recreation and other water related needs.

- **Challenge 21**: focuses on non-structural, sustainable approach to flood protection, including watershed-based planning, conservation of wetlands, relocation of buildings out of the floodplain, riparian restoration, and pre-disaster mitigation planning.

- **Continuing Authorities Program**: the continuing authorities program provides the Corps with the authority to respond quickly to water resources problems. Some of the legislative authorities of the program are included below.
  - *Aquatic Ecosystem Restoration (Section 206)*: to restore degraded ecosystem structure, function, and dynamic processes to a more natural condition.
  - *Environmental Dredging (Section 312)*: available to dredge contaminated sediments outside authorized navigation channels.
  - *Environmental Restoration (Section 1135)*: available to directly modify structures and/or operations of water resources projects constructed by the Corps, or in situations where Army Corps projects have resulted in environmental degradation to wetlands and floodplain habitat.
  - *Flood Mitigation and Riverine Restoration Program (Section 212)*: to conduct flood damage reduction projects that conserve, restore, and manage the natural functions and values of floodplains.
  - *Habitat Protection, Enhancement and Restoration Associated with Dredging/Aquatic Habitat and Wetlands (Section 204)*: may be used in connection with post-flood dredging of navigation projects to create, restore or protect wetlands.
  - *Snagging and Clearing for Flood Control (Section 208)*: clearing and excavating channels to reduce flood damages.

- **Emergency Advance Measures for Flood Prevention (PL 84-99)**: to perform activities prior to flooding that would assist in protecting against loss of life and damages to property due to flooding.

- **Flood Plain Management Services Program (Section 206)**: technical assistance to identify areas subject to flooding and flood losses from streams and lakes; can be used as a basis for planning to reduce flood damages.

- **Nonstructural Alternatives to Structural Rehabilitation of Damaged Flood Control Works (PL 84-99)**: provides planning and construction assistance for activities as mentioned in program title. May be used to repair levees and to acquire flooded land that is supposed to be protected by the levee.

- **Planning Assistance to States (Section 22)**: technical assistance for the development, utilization, and conservation of water and related land resources. Typical activities studied under this program are flood damage reduction, water supply, water conservation, water quality, conservation and restoration, floodplain management, erosion, and wetlands evaluation.

- **Protection, Clearing and Straightening Channels**: to protect waterway corridors and restore channels by removal of unreasonable obstructions for purposes of navigation and flood control.
- **Protection of Essential Highways, Highway Bridge Approaches, and Public Works (Emergency Bank Protection):** to provide bank protection of highways, highway bridges, essential public works, churches, hospitals, schools, and other non-profit public services endangered by flood-caused erosion.

- **Watershed Management Technical Assistance:** to develop watershed-wide flood loss reduction strategies.

- **Wetland Restoration Fund:** wetland and riparian restoration projects in metro Chicago region.

**FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)**

- **Flood Mitigation Assistance (FMA):** pre-disaster mitigation planning and mitigation projects including elevation, relocation, demolition, acquisition of insured structures and property, floodproofing, and minor structural projects that reduce the risk of flood to insured structures.

- **Hazard Mitigation Grant Program (HMGP):** this program is used to implement long-term hazard mitigation measures following a major disaster declaration. Used in Illinois for post-disaster floodplain building buy-outs, elevation, relocation, retrofit, and demolition on public or private land.

- **Project Impact:** for the implementation of a pre-disaster mitigation program by states and communities in reducing risk to the population, the costs and disruption caused by severe property damage, and the cost to all taxpayers of Federal disaster relief efforts. Funded projects include: acquisition, relocation, elevation, and strengthening of structures, development of standards to protect structures from disaster damage, and drainage improvement projects.

**U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)**

- **Better America Bonds:** to help communities reconnect with their land and water, preserve green space for future generations, protect water quality, clean up brownfields, and provide attractive settings for economic development.

- **Brownfields Economic Redevelopment Initiative/Brownfield Pilots Cooperative Agreements:** grants and technical assistance for projects including constructed wetlands if used as a filtering mechanism. Brownfield mitigation to correct or prevent water quality problems may be eligible for Clean Water State Revolving Fund and may include abatement of polluted runoff or control of stormwater runoff.

- **Clean Water Act Section 319 Grants:** funds for activities that reduce polluted runoff, including floodplain restoration. Priorities include water quality protection or correction, comprehensive local watershed management, and enhancing aquatic, riparian, and wetland ecosystems. Specific programs under the section 319 umbrella include the following:
  - **Section 319 National Monitoring Program:** supports watershed projects nationwide that meet a minimum set of project planning, implementation, monitoring, and evaluation requirements designed to lead to successful documentation of project effectiveness with respect to water quality protection or improvement.
  - **Watershed Restoration Grants:** nonpoint source focus.
  - **Non Point Source Implementation Grants:** grants to assist states in implementing section 319 statewide nonpoint source management programs. These grants can be used for funding watershed resource restoration activities which include wetlands and other aquatic habitat.
- **Clean Water Action Plan (CWAP):** new initiative to coordinate existing watershed planning assistance and implementation; funds riparian and wetland protection and restoration.

- **Clean Water State Revolving Loan Funds:** initially designed for wastewater treatment plant upgrades, the loans may be available for other watershed, nonpoint source control, and estuary protection plans. This can include projects such as agricultural and urban runoff control, wet weather flow control including stormwater and sewer overflows, buffers, wetland protection, and habitat restoration. Encourages community-based comprehensive watershed management.

- **Community Based Environmental Protection:** community-based approaches for land use, brownfields, open space, and wetland projects.

- **Five Star Restoration Challenge Grants:** this program brings together citizen groups, corporations, youth groups and students, landowners, and government agencies to undertake projects that restore streambanks and wetlands. Projects must include a strong on-the-ground wetland or riparian restoration component, and should also include education, outreach, and community stewardship.

- **Great Lakes Habitat Protection/Restoration:** grants, technical assistance and education for protection and restoration of priority areas through the Great Lakes National Program Office. Relevance to the Lake Michigan Basin ecosystem or the quality of Lake Michigan water is necessary.

- **National Pollutant Discharge Elimination System Related State Program Grants (Water Quality Cooperative Agreements):** to assist public or nonprofit organizations in developing, implementing, and demonstrating innovative approaches relating to the National Pollutant Discharge Elimination System (NPDES) program, such as watershed approaches for combined sewer overflow and storm water discharge problems, waste treatment program activities, and alternative ways to measure the effectiveness of point source programs.

- **Pollution Prevention Incentives for States/Pollution Prevention Grants Program (PPIS):** for innovative solutions for pollution prevention. Activities can include technical assistance, data collection and dissemination, education, outreach, and training, environmental auditing, technology transfer, demonstration projects, and integration of pollution prevention into regulatory programs.

- **Sustainable Development Challenge Grants (SDCG):** this program funds projects that improve the environment, build sustainable futures and well-being for communities, help local economies, and encourage partnerships.

- **Water Pollution Control-State and Interstate Program Support Grants:** assists in prevention, reduction, and control of pollution to ground and surface waters. Will fund water quality planning, monitoring, water quality assessments, permitting, pollution control studies, planning, surveillance and enforcement, advice and assistance to local agencies, training, and public information.

- **Water Quality Grants:** to stimulate creation of new and unique approaches to meeting stormwater, combined sewer overflow, sludge, and pretreatment requirements.

- **Water Quality Management and Planning:** water quality assessments and planning projects to promote healthy aquatic ecosystems and control point and non-point source pollution.

- **Watershed Assistance Grants:** makes grants to local watershed partnerships to support their organizational development and long-term effectiveness.

- **Wetlands Protection–State Development Grants:** to develop new wetland protection, management, and restoration programs or refine existing programs; not for implementation.
Housing and Urban Development (HUD)

- Community Development Block Grants (CDBG) and Community Development Assistance Program: projects must improve community welfare, specifically in moderate or low-income areas. Program can be used for property acquisition and relocation of flood-prone homes.

- Economic Development Initiatives (EDI) Grants: competitive project grants for eligible activities including acquisition of real property, rehabilitation of publicly-owned real property, housing rehabilitation, economic development activities, construction reconstruction, or installation of public facilities.

- Entitlement Grants: grants to develop viable urban communities, by providing decent housing and a suitable living environment, and by expanding economic opportunities, principally for persons of low and moderate income. Specific activities that can be carried out include acquisition of real property, relocation and demolition, rehabilitation of residential and nonresidential structures, and the provision of public facilities and improvements, such as water and wastewater treatment facilities.

- States Grants Program Non-entitlement Grants: specific activities include acquisition of real property, relocation and demolition, rehabilitation of residential and nonresidential structures, and the provision of public facilities and improvements, such as water and wastewater treatment facilities.

- HOME Investment Partnership Program: can fund home relocation for frequently flooded property and/or floodplain management areas.

U.S. Department of Agriculture (USDA)

- The Flood Risk Reduction Program: established to allow farmers who voluntarily enter into contracts to receive payments on lands with high flood potential. These contract payments provide incentives to move farming operations from frequently flooded land.

- Transfers of Inventory Farm Properties to Federal and State Agencies for Conservation Purposes: can assist in wetland and floodplain restoration to lessen severity of future flooding. Qualified land includes wetlands, floodplains, riparian zones, historical sites, and endangered species habitat.

- Water and Waste Disposal Systems for Rural Communities: may be used for storm drainage facilities in rural areas with towns of 10,000 or less.

- Watershed Protection and Flood Prevention Loans: funds may be used to help fund or provide the local share of the cost of projects for flood prevention, drainage, water quality management, sedimentation control, fish and wildlife development, water based recreation, and water storage.

Natural Resource Conservation Service (NRCS)

- Community Assistance and Urban Conservation: financial and technical assistance to protect natural resources in non-agricultural settings.

- Conservation Reserve Enhancement Program (CREP): program matches state and federal easement funds to offer long-term and perpetual easements to floodplain farmers. Intended to improve water quality, control erosion, and improve wildlife habitat, with emphasis on addressing nonpoint source water pollution and wildlife habitat restoration.
• **Conservation Reserve Program (CRP):** this voluntary program offers annual rental payments, incentive payments of certain activities, and cost-share assistance to remove highly erodible cropland or sensitive acres from crop production. Program encourages farmers to plant long-term resource-conserving vegetative covers to improve soil, water, and wildlife resources. Eligible practices include riparian buffers along streams, ditches, lakes, wetlands, and ponds, grass or contour filter strips, and windbreaks. Funds also may be used to retire agricultural floodplain land.

• **Cooperative River Basin Program:** funds studies to appraise water and related land resources and formulate alternative plans for conservation use and development. Plans may include management and land treatment measures, nonstructural measures, structural measures, or combinations thereof.

• **Environmental Quality Incentives Program (EQIP):** financial and technical assistance for farmers, communities, watershed groups—any entity with natural resource problems that impact soil, water, and related natural resources, including grazing lands, wetlands, and wildlife habitat management.

• **Emergency Watershed Protection Program (EWP):** provides assistance to reduce hazards to life and property in watersheds from erosion and flooding due to severe natural events. May be used for establishing vegetative cover, opening restricted channels, repairing diversions and levees, and to purchase floodplain easements on flooded land in non-urban areas.

• **Emergency Wetland Reserve Program:** to protect and restore wetlands on private property, and natural floodplains along rivers and streams, damaged as a result of a catastrophic natural event, or excessive rainfalls.

• **National Conservation Buffer Initiative:** funds farmers to install vegetative buffers along waterways.

• **Resource Conservation and Development Program:** planning and installation of projects for land conservation, water management, community development, and environmental enhancement.

• **River Basin Surveys and Investigations:** research, monitoring, technical assistance, and planning assistance for water and land resources programs. Priorities are flooding of rural communities, water quality and agricultural nonpoint sources, wetland preservation, and strategic water resource plans.

• **Small Watershed Projects:** grants for small-scale watershed flood damage reduction and restoration projects including runoff reduction.

• **Soil and Water Conservation Program:** technical assistance for resource conservation to improve water quality and natural resources and to reduce point and non-point source pollution.

• **Technical Assistance:** available for soil investigations; GIS; water quality planning; community planning; natural resource info and data; soil erosion and sediment control; wetland delineation, mitigation and restoration; greenway, stream corridor, and open space management and planning; stormwater management and planning; rural and economic development; soil bioengineering.

• **Urban Resources Partnership – Technical Assistance and Grants Program:** a program to provide technical assistance to urban communities for riverfront revitalization and other natural resource issues through local community based partnerships; emphasis on citizen involvement and education.

• **Water Bank Program:** to conserve surface waters, preserve and improve wetlands, and increase migratory waterfowl habitat.

• **Watershed and River Basin Planning and Installation:** technical and financial assistance is provided to plan and install watershed-based projects on private lands. Projects may include watershed protection, flood prevention, water quality improvements, soil erosion reduction, water supply, sedimentation control, fish and wildlife habitat enhancement, and wetlands creation and restoration.
• **Watershed Planning Technical Assistance**: stakeholder / grass-roots planning assistance.

• **Watershed Surveys and Planning**: for appraising water and related land resources and formulating alternative plans for conservation use and development, flood recovery, and floodplain management. Plans may include land treatment measures, nonstructural measures, and structural measures.

• **Watershed Protection and Flood Prevention Program**: watershed plan development and implementation in small watersheds (<250,000 acres) including structural, conservation, and non-structural watershed protection, flood prevention, erosion and sediment control, water quality, habitat enhancement, wetland creation and restoration, and public recreation.

• **Wetlands Reserve Program**: provides funds to purchase easements or assist in a cost-share agreement with landowners to restore wetlands and floodplain habitat on private land.

• **Wildlife Habitat Incentives Program (WHIP)**: funding and technical assistance for private landowners to develop and improve fish and wildlife habitat.

**U.S. FOREST SERVICE (USFS)**

• **Forest Legacy**: to acquire land or permanent conservation easements in important forest areas threatened by conversion to nonforest uses; prioritizes private forest lands.

• **Stewardship Incentives Program**: for conservation objectives on private forest land to improve water quality including forest stewardship plan development, reforestation and afforestation, forest improvement, soil and water protection and improvement, riparian and wetland protection and improvement, fisheries and wildlife habitat enhancement, and forest recreation enhancement.

**NATIONAL PARK SERVICE (NPS)**

• **Challenge Cost-Share Program (CCSP)**: to manage, enhance and restore fish and wildlife resources. Projects include trail improvements, water quality, habitat, resource studies, inventories, and monitoring, site stabilization or restoration, and erosion controls.

• **Federal Land Transfer/Federal Land-to-Parks Program/Disposal of Federal Surplus Real Property for Parks, Recreation, and Historic Monuments**: to encourage the establishment of public park and recreation opportunities and open space for state and local governments.

• **Land and Water Conservation Fund (LAWCON)**: provides funds to states and localities for park and recreational land planning, acquisition, and development.

• **North American Waterfowl Management Plan**: provides grants to restore waterfowl populations through habitat conservation.

• **Rivers and Trails Program**: technical assistance by a national network of conservation and recreation-planning professionals who assist communities in managing and conserving river and trail corridors, restoring significant cultural and historic assets, recycling abandoned railways into trails that link neighborhoods and communities, and preserving open spaces.

• **Rivers, Trails and Conservation Assistance Program**: provides technical assistance to support partnerships between government and citizens to increase the number of rivers and landscapes protected and trails established nationwide. Program can assist with trails, greenways, river resources, open space, and partnerships.
• Urban Park and Recreation Recovery program: provides assistance for rehabilitation of recreation facilities, as well as local planning and operation and maintenance of recreation programs, sites, and facilities.

U.S. FISH AND WILDLIFE SERVICE (USFWS)

• Challenge Grant Program: wildlife habitat restoration, streambank stabilization, and education.

• Endangered Species Conservation Fund: project grants to conserve endangered species, including projects such as animal, plant, and habitat surveys, research, planning, monitoring, management, land acquisition, protection, and public education.

• Federal Aid in Wildlife Restoration Program: activities include land acquisition, development, research, and coordination for the selection, restoration, rehabilitation and improvement of wildlife habitat with state fish and wildlife agencies to restore or manage wildlife populations and the provision of public use of those resources.

• Federal Aid in Sport Fish Restoration: formula grants for habitat acquisition and management.

• Fish and Wildlife Management Assistance: assistance to help conserve fish and wildlife resources.

• Habitat Conservation--National Coastal Wetlands Conservation Grants Program (Coastal Wetlands Planning, Protection and Restoration Act): for the acquisition, restoration, management or enhancement of coastal wetlands. Great Lakes States are eligible.

• Habitat Conservation--Project Planning: this cooperative program encourages partnerships to protect, restore, and enhance fish and wildlife habitats.

• Land Acquisition for National Wildlife Refuge System: to purchase land or easements for habitat protection.

• North American Wetlands Conservation Fund/Grants: to encourage voluntary, public-private partnerships to protect, restore and manage North American wetland ecosystems. May be used for acquisition, restoration, management, or enhancement of a wetland ecosystem to benefit wildlife.

• Northeastern Illinois Wetlands Conservation Account: restoration, enhancement, and/or replacement of wetland functions and values which have been degraded or destroyed as a result of activities conducted in violation of the Clean Water Act. Also funds activities that promote understanding, appreciation, and stewardship of wetlands.

• Partners for Fish and Wildlife Programs: a program to establish voluntary flexible partnerships between the USFWS and private landowners offering technical and financial assistance to restore wetlands, floodplains, and riparian fish and wildlife habitats on private land.


• Refuges Challenge Cost Share Program: to manage, enhance, and restore fish and wildlife resources, and to enhance wildlife-oriented educational opportunities on USFWS lands.

• Service Challenge Grant: habitat restoration or enhancement.

• Wildlife Conservation and Appreciation Program: project grants can fund wildlife and habitat inventories, population studies, impact evaluation, conservation measures, and public enjoyment of wildlife through nonconsumptive activities.
U.S. Department of Transportation (DOT)

- *Congestion Mitigation and Air Quality Improvement Program*: to fund projects designed to lessen highway congestion and improve air quality in areas afflicted with high levels of air pollution. Eligible activities can include trails and other pedestrian-oriented or non-motorized transportation.

- *National Recreational Trails Funding Program*: for recreational trail development.

- *Surface Transportation Program (STP)*: to creatively integrate transportation facilities into their surrounding communities and the natural environment.

- *Transportation Enhancement Program (TEA-21)*: projects can include control technologies to prevent polluted highway runoff from reaching surface water bodies; landscaping, scenic easements, and beautification; preservation of abandoned railway corridors; pedestrian and bicycle trails; and wetland mitigation efforts including mitigation banking, wetland preservation and restoration, wetland planning, and natural habitats.
  
  - *Recreational Trails Program* (part of TEA-21): to develop and maintain recreational trails, trailhead facilities, easement and property acquisition, and educational programs.

  - *Bicycle Transportation and Pedestrian Walkways Program (TEA21)*: hiking and biking trails.

  - *Wetland Mitigation (TEA21)*: to ensure that improvements developed for the surface transportation system do not adversely affect wetlands.

  - *Mitigation of Water Quality Impacts from Highway Stormwater Runoff (TEA21)*: to improve/protect water quality from potential adverse effects of nonpoint source discharges/stormwater runoff from highway and transit facilities.

Illinois Department of Natural Resources (IDNR)

- *Conservation 2000--Ecosystems Program Grants*: to support watershed-based ecosystem partnerships with an emphasis on watershed restoration plans and stream and wetland restorations.


- *Illinois Trails Grant Program*: acquiring or constructing non-motorized bicycle and snowmobile paths and facilities.

- *Illinois Wildlife Preservation Fund*: for management, site inventories, or on-going education programs.

- *Office of Water Resources*: General Assembly appropriations for tributary studies and project feasibility investigations with a focus on structural flood control solutions.

- *Small Projects Fund (Office of Water Resources)*: to reduce stormwater related damages by alleviating local significant drainage and flood problems.

- *Open Space Lands Acquisition and Development Program (OSLAD)*: public parks and open space acquisition and development.

- *Urban and Community Forestry Grant Program*: to create or enhance local forestry programs in communities with a local forestry ordinance.
OTHER STATE OF ILLINOIS

• Northeastern Illinois Wetlands Conservation Account (USFWS and The Conservation Fund): to restore, enhance, or replace wetland functions and values following activities conducted in violation of the Clean Water Act.

• Priority Lake and Watershed Implementation Program (IEPA): protection/restoration practices that improve water quality.

• Conservation 2000 – Streambank Stabilization and Restoration Program: may fund vegetative streambank stabilization practices.

REGIONAL/LOCAL

• Chicago Urban Resources Partnership—Technical Assistance and Grants Program: funds projects in the Chicago metro area that restores or enhances natural ecosystems through local community based partnerships, emphasis on citizen involvement and education.

• North American Wetlands Conservation Council—Small Grants Program: funds long-term acquisition, restoration, and/or enhancement of natural wetlands.