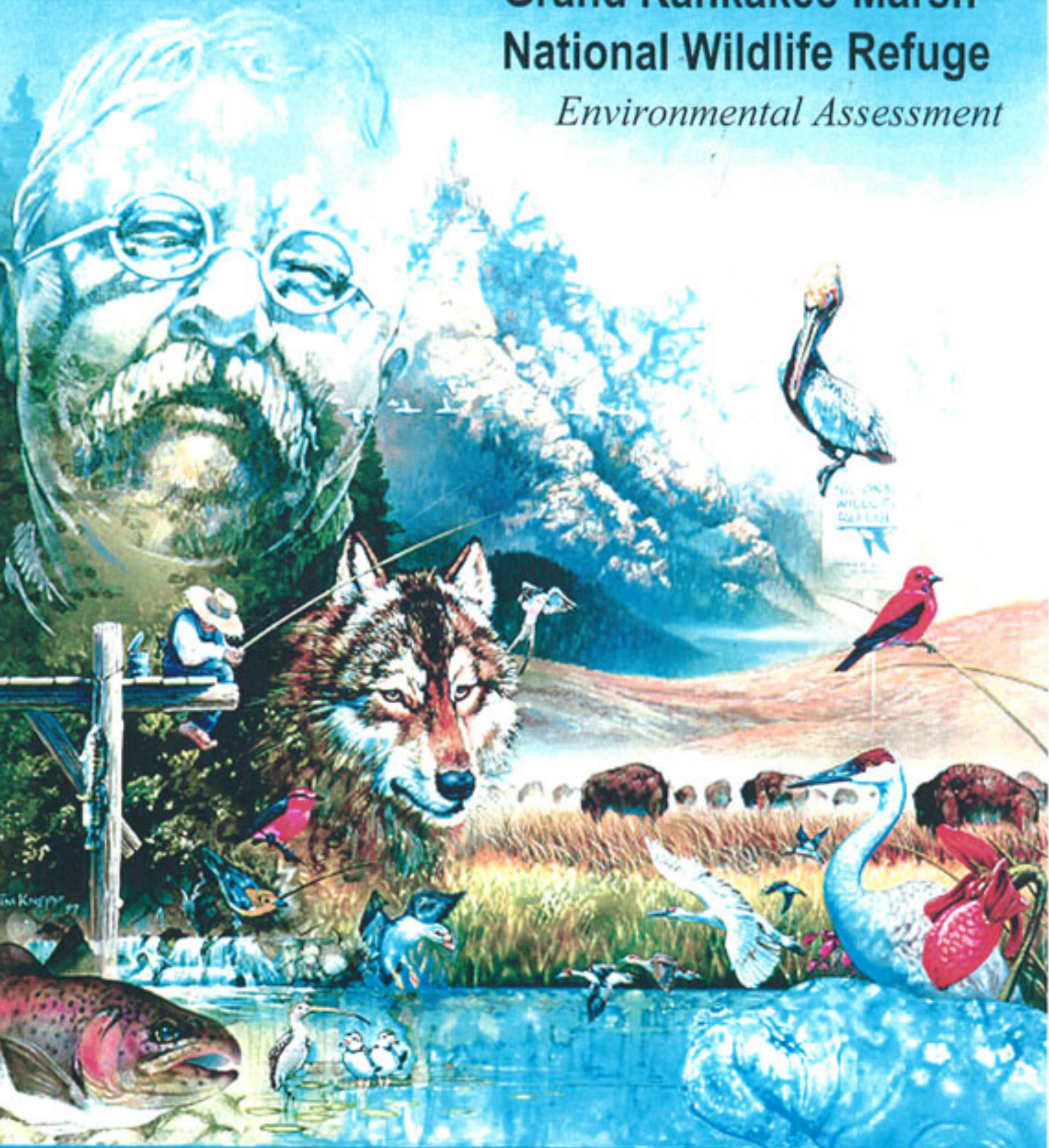


U.S. Fish & Wildlife Service

# Grand Kankakee Marsh National Wildlife Refuge

*Environmental Assessment*



*August 1999*

**RESPONSIBLE AGENCY:**

***United States Department of the Interior  
United States Fish and Wildlife Service***

**RESPONSIBLE OFFICIAL:**

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# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Bishop Henry Whipple Federal Building  
1 Federal Drive  
Fort Snelling, MN 55111-4056

IN REPLY REFER TO:

FWS/ARW/RE-AP

AUG 16 1991

Dear Reviewer:

The U.S. Fish and Wildlife Service (Service) is pleased to provide you with this copy of the Environmental Assessment (EA) and Finding of No Significant Impact for the proposed Grand Kankakee Marsh National Wildlife Refuge located in the Kankakee River Basin (Basin) in northwestern Indiana and northeastern Illinois.

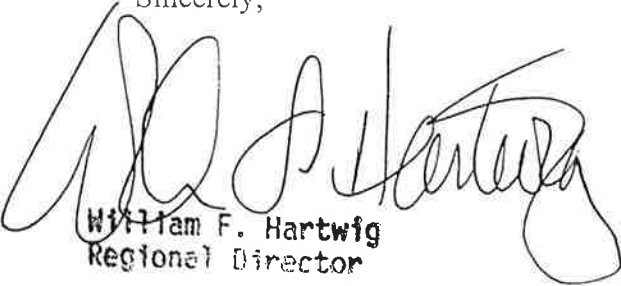
The EA describes and assesses five alternatives, including a "No Action" alternative. The alternatives describe the Service's level of involvement in restoration and preservation of valuable fisheries and wildlife resources and their habitats in the Basin. The Service's proposed action would provide a mixture of activities in habitat management, watershed stewardship, and public use, while providing, to the extent possible, that the widest spectrum of benefits associated with this great area be enhanced and made available to the public.

Included in the front of the EA is the Selection of Alternative and Finding of No Significant Impact, which was based on public input and the analysis of the opportunities and concerns illustrated in the EA.

The Service recognizes that there is rarely total consensus on issues of fish and wildlife resource management, and this project has certainly been no exception. However, we feel this project will provide lasting benefits to fish, wildlife, and the people of this Nation.

We appreciate the efforts of those who contributed to the planning and public involvement process which made this project a reality.

Sincerely,



William F. Hartwig  
Regional Director

Enclosure

*Selection of Alternative  
and  
Finding of No Significant Impact*

*Grand Kankakee Marsh National Wildlife Refuge  
Indiana and Illinois*

An Environmental Assessment (EA) has been prepared to publicly disclose the possible environmental consequences that development of the Grand Kankakee Marsh National Wildlife Refuge in the Kankakee River Basin (Basin) could have on the quality of the physical, biological, and human environment, as required by the National Environmental Policy Act of 1969.

The EA presents and evaluates five alternatives, a “No Action” alternative (maintain the status quo) and four “Action” alternatives. The alternative selected for implementation is Alternative 5.

This Finding of No Significant Impact (FONSI), EA, and supporting material will be made available to the public for 30 days from the date below. During this 30-day period the FONSI will not be final, nor will the U.S. Fish and Wildlife Service implement the selected alternative.

Restoring, preserving, and managing upland, wetland, and riparian habitats by the U.S. Fish and Wildlife Service in the Basin will provide important benefits to threatened and endangered species, waterfowl and other migratory birds, native fish, and resident flora and fauna, as well as provide the public with additional wildlife-dependent recreation and education opportunities.

For reasons presented below and based on an evaluation of the information contained in the Environmental Assessment, we have determined that Alternative 5 is not a major Federal action which would significantly affect the quality of the human environment, within the meaning of Section 102 (2)(c) of the National Environmental Policy Act of 1969.

**Reasons:**

1. Economic impacts will be negligible compared to the overall economic base of the Basin.
2. Land acquisition will be from willing sellers only.
3. Where Service fee-title acquisition is concerned, annual revenue sharing payments will be made to the counties to help off-set potential impacts to the tax base.
4. Cultural resource inventory surveys are planned to ensure protection of archeological, historical, and architectural resources.
5. This action will not have an adverse impact on threatened or endangered species.
6. This action will not adversely impact drainage networks.

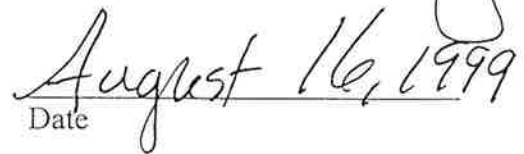
7. This action will not adversely impact floodplains.
8. This action will not adversely impact other planning efforts in the Basin.

**Supporting References:**

Environmental Assessment  
Economic Impact Assessment



Regional Director



Date



Regional Director  
Great Lakes - Big Rivers Region  
Bishop Henry Whipple Federal Building  
Fort Snelling, MN 55111-4056

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# SUMMARY

## Introduction

In 1996 the Service initiated a planning process aimed at evaluating the feasibility of developing a new national wildlife refuge in the Kankakee River Basin (Basin) in northwestern Indiana and northeastern Illinois (Figure 1). The process included a thorough review of opportunities and issues related to fish and wildlife resource management by the Service in the Basin as well as an assessment of roles the Service might take in achieving its mission, that of the National Wildlife Refuge System, and resource objectives for the Region. The planning process was initiated in response to the declining status of numerous Service trust resources in the Basin.

## Project Scoping and Public Involvement

Numerous Federal, state, local, and private entities were involved in the planning process. These include Indiana's and Illinois' Congressional Delegations, the U.S. Department of Agriculture, U.S. Department of Interior, Indiana and Illinois Legislative members representing the counties involved, Indiana Department of Natural Resources, Illinois Department of Natural Resources, representatives from County, Township, and other local governments, representatives of national, state, and local conservation organizations, Farm Bureau, landowners, and many other interested groups and citizens.

Information about the proposed project was provided to the general public through news-releases, presentations, interviews, seven newsletters, one-on-one briefings, and the Internet. Over 5,000 copies of the draft environmental assessment were distributed for a 150-day public review and comment period. The Service coordinated its public involvement effort closely, and corresponded frequently with many of the aforementioned entities. To-date, more than 14,000 people from 44 different states have commented on this Refuge proposal (Figure 7).

Public comments covered a wide range of potential opportunities, issues, and concerns. Many comments encouraged the development of a new national wildlife refuge, while others cited potential conflicts that would need to be addressed before the Refuge proposal moved forward. Some of these opportunities, issues, and concerns included: if developed, what effect would the Refuge have on: 1) biological diversity and abundance; 2) water quality in the Kankakee River; 3) drainage, runoff, and flood control within the Basin; 4) county tax revenues and refuge revenue sharing payments and apportionment; 5) local economies; 6) private property rights; 7) infrastructure, 8) mosquitos; 9) other planning efforts in the Basin; 10) agricultural land, and 11) environmental justice.

## Proposed Action

The Service's proposed action in this environmental assessment is to develop the Grand Kankakee Marsh National Wildlife Refuge *"for the development, advancement, management, conservation, and protection of fish and wildlife resources"* (Fish and Wildlife Act of 1956) and *"for the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..."* (Emergency Wetlands Resources Act of 1986).

The following Refuge mission, vision, guiding principles, goals, objectives, and strategies provide an interim framework for the Refuge until a Comprehensive Conservation Plan has been completed (approximately 12-18 months).



The mission for the Refuge will be to protect, restore, and manage ecological processes within the Kankakee River Basin that benefit threatened and endangered species, migratory birds, native fish, and diverse flora and fauna populations, while providing the public, to the extent possible, high quality wildlife-dependent environmental interpretation, education, and recreation experiences that build an understanding and appreciation for these resources, and the role humankind plays in their stewardship.

The Service's vision for the Refuge is to restore and preserve an ecological system that supplies the needs of migratory waterfowl, neotropical migratory songbirds, native fish, native plant communities, and threatened and endangered flora and fauna. The Refuge and its staff will be leaders in building mutually-beneficial relationships with the public and our partners which will lead to a greater understanding and appreciation of the natural world, and the role humankind plays in its stewardship.

Development and management of the Refuge will be guided by the following principles:

- ☞ *Use an ecosystem approach:* The ecosystem approach is a collaboratively developed vision of desired future conditions that integrates ecological, scientific, economic, and social factors. It is applied within a geographic framework based primarily on ecological factors.
- ☞ *Rely on sound science:* Restoration and preservation of ecological processes will be scientifically sound, ecologically credible, economically and socially acceptable, and legally defensible. Refuge management decisions will be based on sound information from the full range of natural and social sciences.
- ☞ *Use adaptive management processes:* An adaptive management approach features a structured, iterative process that recognizes that most information used in decision making is imperfect and that, as decisions are made, a process is in place to gain better information and to allow managers to make appropriate mid-course corrections.
- ☞ *Results through partnerships:* Partnership initiatives require extensive coordination and communication between federal agencies; state, tribal, and local governments; and stakeholders and customers.
- ☞ *Ensure public involvement:* Refuge planning will include a clear, credible, and meaningful role for public input from the full spectrum of social and cultural backgrounds. Public sentiment and comment at the local, State, and national levels will be considered.

Interim Refuge goals will be consistent with those for the National Wildlife Refuge System. They are:

- ☞ Preserve, restore, and enhance in their natural ecosystems (when practical) all species of animals and plants that are endangered or threatened with becoming endangered;
- ☞ Perpetuate the migratory bird resource;
- ☞ Preserve a natural diversity and abundance of fauna and flora on refuge lands; and
- ☞ Provide an understanding and appreciation of fish and wildlife ecology and humankind's role in their environment and to provide refuge visitors with high quality, safe, wholesome and enjoyable recreational experiences oriented toward wildlife to the extent these activities are compatible with the purposes for which each refuge was established.

Interim Refuge objectives and strategies will include:

Coordination:

- ☞ Provide Service leadership and support to other Federal, state, local, and private agencies for the restoration and preservation of ecological processes in the Basin that benefit migratory birds, threatened and endangered species, native fish, and their habitats (Service trust resources).

- ☞ Foster improved communication and collaboration between Service programs, the states, non-government organizations, and other Federal agencies.
- ☞ Focus Federal, state, and local agencies having related responsibility and/or expertise in the Basin to increase efficiency and develop consistency in natural resource conservation.
- ☞ Accelerate the current status and trends effort toward natural resource restoration and preservation in the Basin through a comprehensive and coordinated system, that complements existing authorities.
- ☞ Intensify and concentrate Federal, state, local, and private habitat restoration and enhancement mechanisms aimed at benefitting Service trust resources in the Basin (such as the Wetland Reserve Program, Conservation Reserve Program, Environmental Quality Incentives Program, Wildlife Habitat Incentives Program, set-aside programs, North American Waterfowl Management Plan, local land trusts, water quality improvement programs, etc.).

#### Planning

- ☞ Provide a comprehensive statement of Refuge management direction through the development of a Comprehensive Conservation Plan (CCP) and associated step-down management plans (the CCP will replace guidance contained in the draft conceptual management plan).
- ☞ Provide avenues for effective coordination, interaction, and cooperation with affected parties, including Federal agencies, state conservation agencies, tribal governments, local governments, non-government organizations, and landowners.

#### Research

- ☞ Support, promote, and coordinate scientific research on, and monitoring of, Service trust resources and their habitat, to improve management decision-making.
- ☞ Use expertise from various agencies, universities, and other sources to develop and disseminate knowledge about natural resources and human uses and values associated with those resources.

#### Habitat Restoration and Management

- ☞ Through a combination of voluntary partnerships, easements, and land acquisition, restore and preserve approximately 30,000 acres of wetlands, prairies, and oak savanna habitat to meet the needs of migratory birds, threatened and endangered species, and aquatic resources in the Basin (willing buyer/willing seller only).
- ☞ Leverage Service restoration and preservation efforts by connecting or enlarging existing managed areas.
- ☞ Restore backwater habitats and reconnect side channels that have been artificially cut-off on the Kankakee River to promote biological diversity and rehabilitate fish spawning, nursery, and overwintering areas.
- ☞ Enhance migratory bird production and use of the area by restoring, enhancing, and managing wetland, savanna, and prairie habitats.
- ☞ Restore and manage areas at the landscape scale to provide the most favorable matrix possible for the refuge and other protected areas (see Noss and Harris 1986, O'Connell and Noss 1992, Missouri Dept. of Conservation 1994).
- ☞ Intensify the Service's Partner's for Fish and Wildlife habitat restoration efforts and identify new opportunities to restore wetlands and grasslands on private lands.

#### Education and Interpretation

- ☞ Expand public awareness, understanding, appreciation, and stewardship of the Basin's natural resources through high quality wildlife-dependent public interpretive and recreation programs.
- ☞ Establish Refuge outreach programs to develop a more involved citizenry in support of fish and wildlife conservation.

Successful Refuge development will rely on partnerships formed with landowners in the Basin, volunteers and interested citizens, farm and conservation organizations, and other government agencies. Restoration and preservation of habitat by the Service would be on a willing buyer/willing seller basis only. Only lands that the Service acquires would become part of the Refuge. All lands acquired by the Service would be managed as units of the Grand Kankakee Marsh National Wildlife Refuge. Funding for Service land acquisition would be the Land and Water Conservation Fund and the Migratory Bird Conservation Fund.

### Alternatives

The Service formulated five alternatives (four Action and one No Action) to develop a new national wildlife refuge in the Basin. For each Action alternative, the Service identified a set of "focus areas" which constitute subsets of the Basin (Figures A, B, C)(see Chapter 2 also). In this regard focus areas are the first cut in a planning process aimed at narrowing down high potential geographic areas with significant resource value in the Great Lakes-Big Rivers Region, ie. ⇔ Kankakee River Basin ⇔ focus area ⇔ individual refuge units. However, focus areas are not Refuge boundaries. Refuge boundaries would ultimately conform to individual land tracts as they are purchased from willing sellers within the focus areas. The aim of all action alternatives is to develop a new national wildlife refuge to restore and preserve Service trust resources through a landscape-scale approach in the Kankakee River Basin. The No Action alternative reflects the current state of conservation activity (status quo) within the Basin.

Common to all Action alternatives is the development of a Comprehensive Conservation Plan that the Service will complete with partner organizations and the public to determine how best to implement National Wildlife Refuge System projects and programs within the focus areas. In addition to continued public involvement, this step-down planning process will involve hydrologic and ecologic planning with partners such as the Army Corp of Engineers, the U.S. Geological Survey, State DNR's, and others to ensure Service activities will meet habitat and wildlife objectives set for the area, complement other programs and on-going planning efforts, and be responsive to concerns of landowners in the Basin.

Alternative 1 - No Action, the Service would not develop the Grand Kankakee Marsh National Wildlife Refuge. Restoration and preservation activities in the Basin on behalf of Service trust resources would be expected to proceed at the status quo.

Alternative 2 - through voluntary partnerships, easements, and land acquisition, restore and preserve approximately 30,000 acres (primarily wetlands) in the Basin. This alternative would focus mainly on existing and restorable wetland habitats (Figure 9).

Alternative 3 - through voluntary partnerships, easements, and land acquisition, restore and preserve approximately 30,000 acres (primarily prairie and oak savanna) in the Basin. This alternative would focus mainly on existing and restorable grasslands and important oak-savanna habitat (Figure 10).

Alternative 4 - through voluntary partnerships, easements, and land acquisition, restore and preserve approximately 30,000 acres (primarily endangered species habitat) in the Basin. This alternative would focus on the protection of Federally endangered and threatened species habitat (Figure 11).

Alternative 5 - through voluntary partnerships, easements, and land acquisition restore and preserve approximately 30,000 acres within the Basin. Alternative 5 would be a "hybrid" of alternatives 2-4 (select components of Alternatives 2-4) and is the Service's Preferred Alternative (Figure 12).

### Environmental Consequences

Potential environmental consequences or impacts of the No Action alternative and the four Action alternatives with regard to the opportunities and issues are discussed in Chapter 4 of the EA.

# Grand Kankakee Marsh National Wildlife Refuge Focus Areas

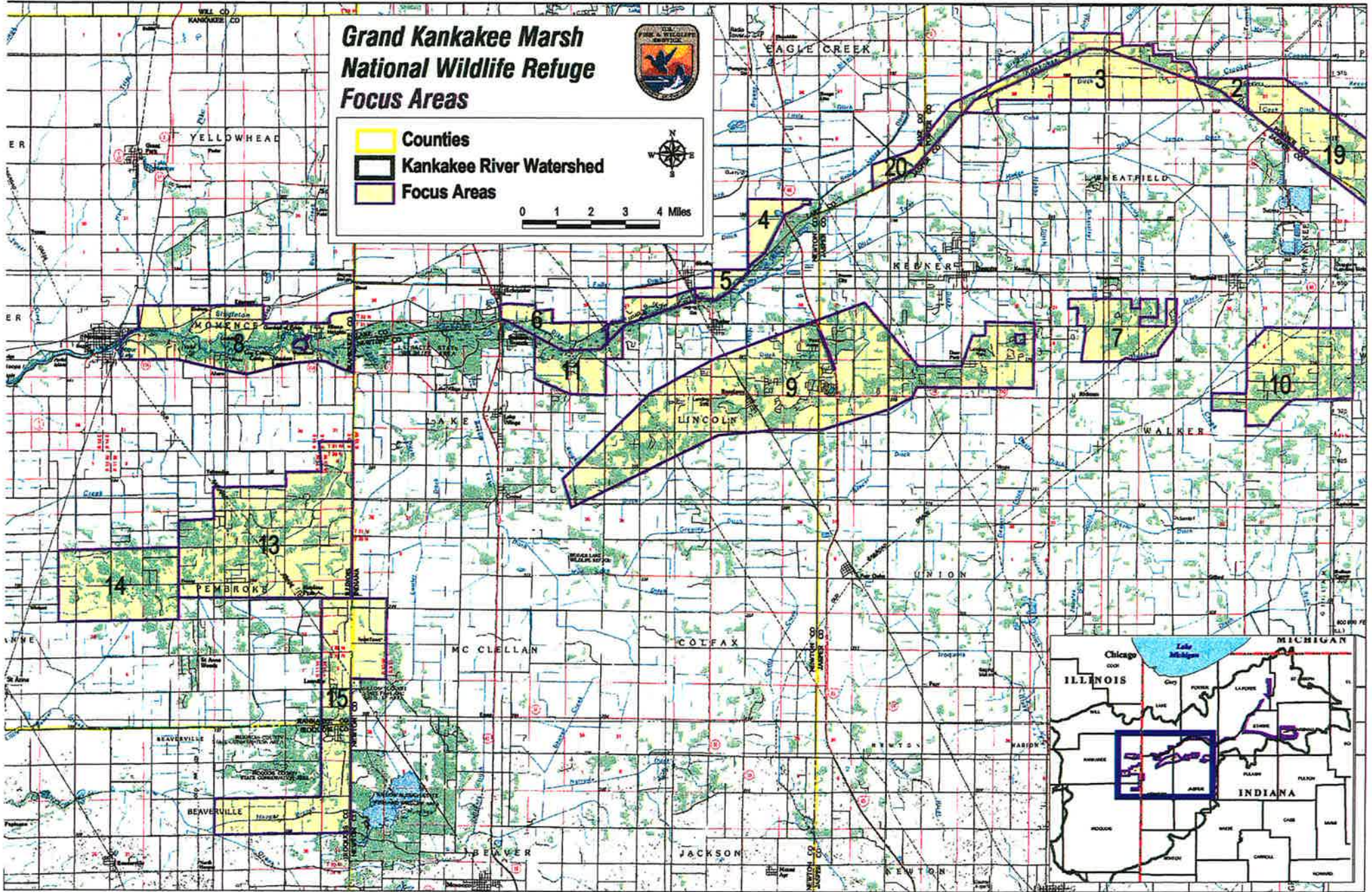


**Counties** (Yellow outline)

**Kankakee River Watershed** (Black outline)

**Focus Areas** (Yellow fill)

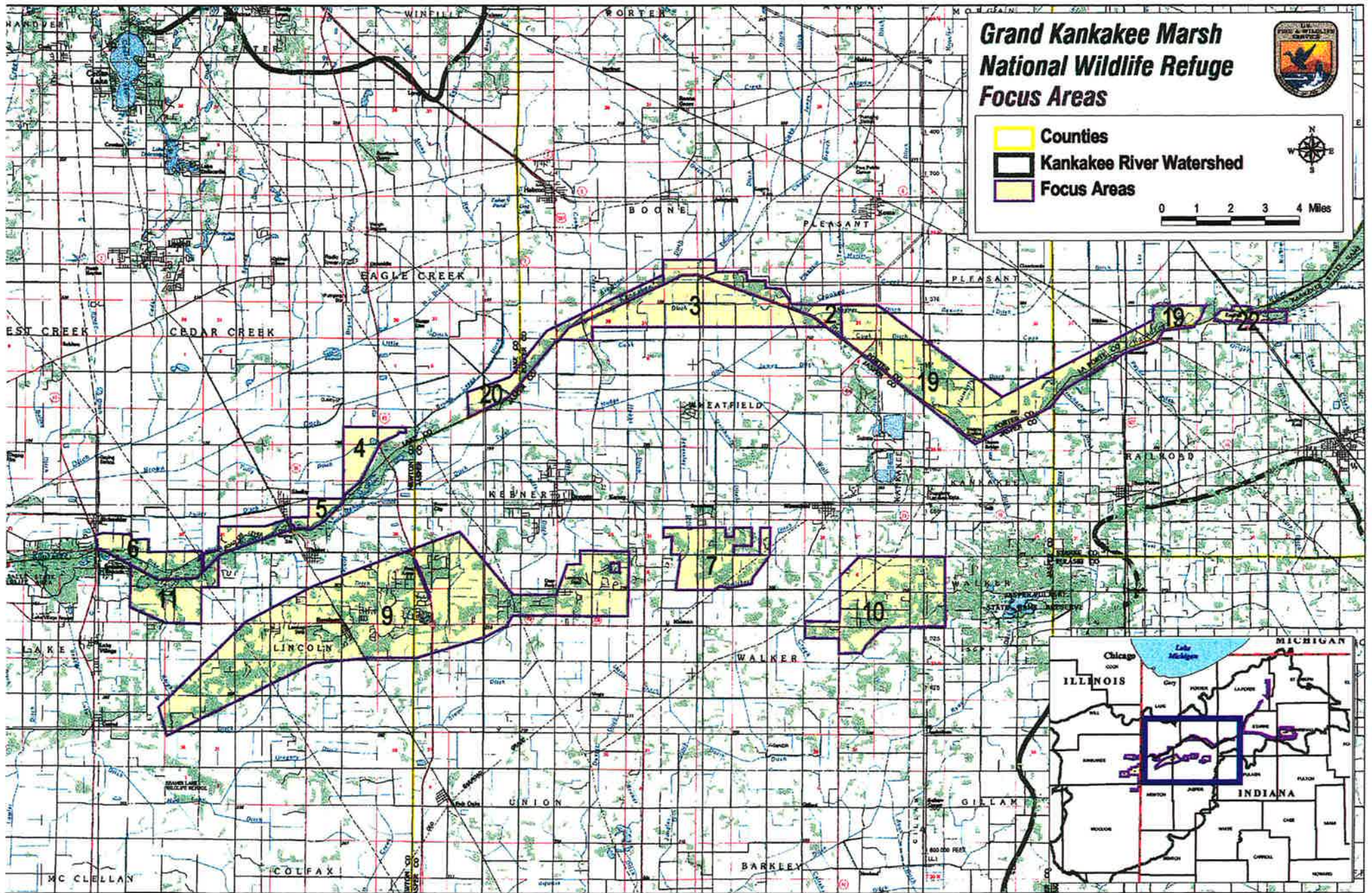
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# Grand Kankakee Marsh National Wildlife Refuge Focus Areas



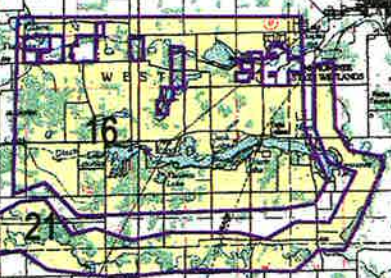
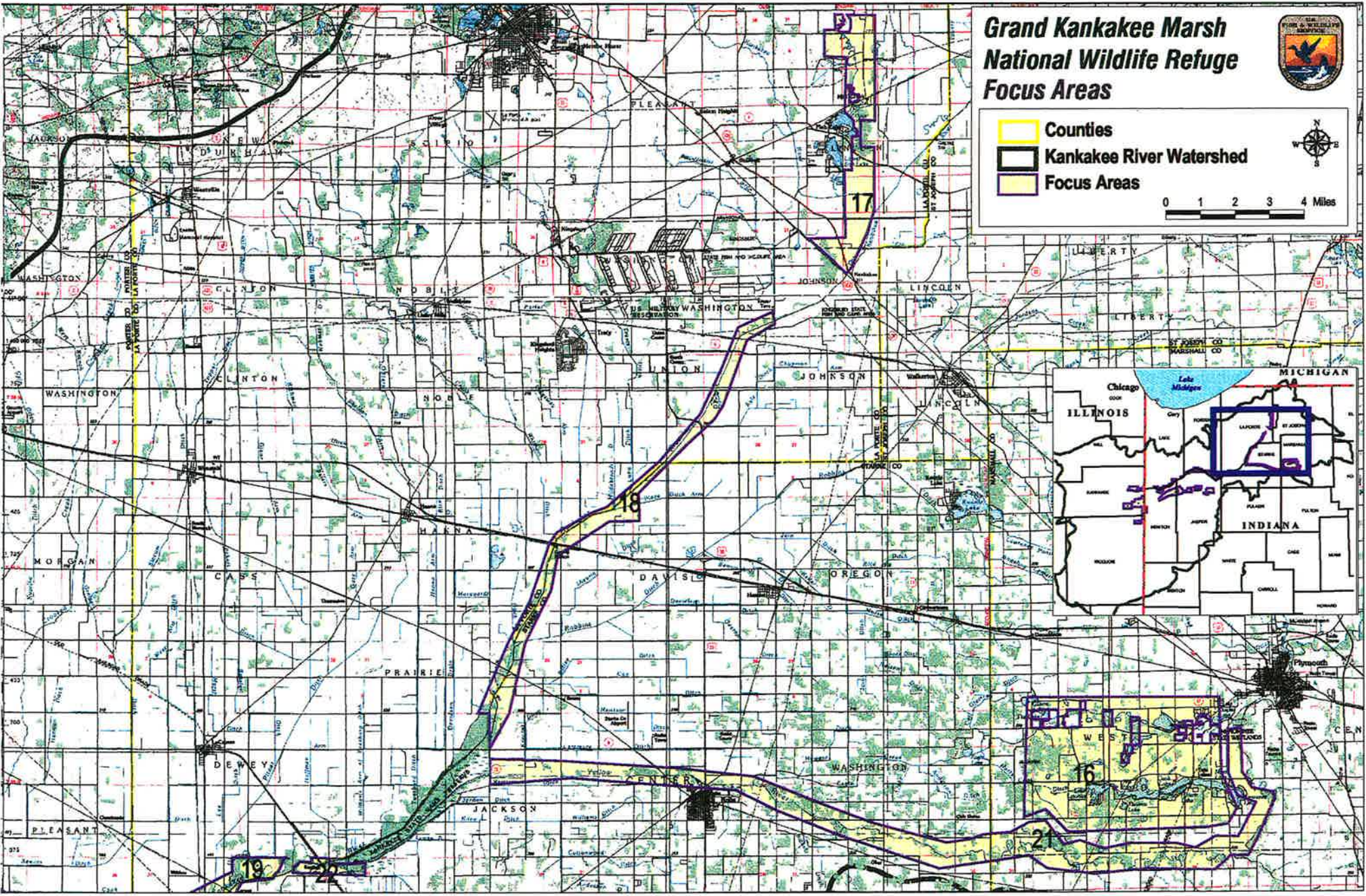
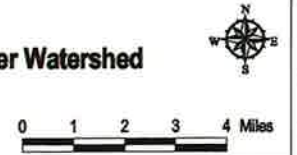
-  Counties
-  Kankakee River Watershed
-  Focus Areas



# Grand Kankakee Marsh National Wildlife Refuge Focus Areas



- Counties
- Kankakee River Watershed
- Focus Areas



# CHAPTER 1 - PURPOSE AND NEED FOR ACTION

## I. PURPOSE

Pursuant to the National Environmental Policy Act of 1969 (NEPA) (P.L. 91-190, as amended), this Environmental Assessment (EA) has been prepared to identify and publicly disclose the possible environmental consequences that development of the Grand Kankakee Marsh National Wildlife Refuge (Refuge) by the U.S. Fish and Wildlife Service (Service) could have on the quality of the physical, biological, and human environment. The Refuge will be located in the 3.3 million acre Kankakee River Basin in northwestern Indiana and northeastern Illinois (Figure 1).

Using the authorities of the Fish and Wildlife Act of 1956 and the Emergency Wetlands Resources Act of 1986, the purpose(s) of the Refuge is “*for the development, advancement, management, conservation, and protection of fish and wildlife resources*” (Fish and Wildlife Act of 1956) and “*for the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions...*”(Emergency Wetlands Resources Act of 1986).



Figure 1 - Kankakee River Basin

## II. BACKGROUND

### 1. The U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service is the Nation’s primary Federal agency responsible for conserving, protecting, and enhancing America’s fish and wildlife resources and their habitats.

#### Authority

The authority of the Director, U.S. Fish and Wildlife Service, as delegated by the Assistant Secretary for Fish, Wildlife, and Parks (U.S. Department of the Interior), is set forth in Part 242 of the Departmental Manual (see Fish and Wildlife Service Manual at our Internet site at [www.fws.gov](http://www.fws.gov).)

#### Mission of the Service

The mission of the Service is *working with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.*

## Goals of the Service

- ◆ *Sustainability of Fish and Wildlife Populations:* Migratory birds, endangered fish and wildlife species, interjurisdictional fish, and marine mammals are conserved, protected, enhanced, or restored. The Service is participating in conservation of other species when its expertise, facilities, or lands can enhance state, tribal, or local efforts.
- ◆ *Habitat Conservation - Network of Lands and Waters:* An ecologically diverse network of lands and waters, of various ownerships, is conserved to provide habitats for marine mammals and migratory, interjurisdictional, endangered, and other species associated with ecosystems conserved in cooperation with others.
- ◆ *Connecting Americans to Wildlife:* The American public understands and participates in the conservation and use of fish and wildlife resources.
- ◆ *Workforce Excellence:* The Service's workforce, scientific capability, and business practices - in cooperation with the Department of Interior's scientific expertise - fully support achievement of the Service mission.

## Objectives of the Service

- ◆ Assist in the development and application of an environmental stewardship ethic for our society, based on ecological principles, scientific knowledge of fish and wildlife, and a sense of moral responsibility.
- ◆ Guide the conservation, development, and management of the Nation's fish and wildlife resources.
- ◆ Administer a national program to provide the public opportunities to understand, appreciate, and wisely use fish and wildlife resources.

## Functions of the Service

- ◆ Acquire, protect, and manage unique ecosystems necessary to sustain fish and wildlife such as migratory birds, resident species, and endangered species.
- ◆ Operate a National Fish Hatchery System in support of the restoration of depleted interjurisdictional fish stocks, the recovery of federally listed threatened and endangered species, and the fulfillment of Federal mitigation responsibilities.
- ◆ Provide protection of fish and wildlife from dislocation or destruction of their habitats, overuse, and industrial, agricultural, and domestic pollutants.
- ◆ Render financial and professional technical assistance to States through Federal Aid programs for the enhancement and restoration of fish and wildlife resources.
- ◆ Conduct programs of enforcement, management, and professional technical assistance to other agencies for the protection of endangered species.
- ◆ Promulgate and enforce regulations for the protection of migratory birds, marine mammals, fish and other non-endangered wildlife from illegal taking, transportation, or sale within the United States or from foreign countries.
- ◆ Conduct programs of planning, evaluation, and professional technical assistance to other agencies for the proper use and protection of fish and wildlife habitat that directly benefit the living natural resource and add quality to human life.
- ◆ Conduct programs of interpretation, education, and recreation to foster a stewardship ethic in the



- ◆ Conduct programs of interpretation, education, and recreation to foster a stewardship ethic in the American public through high quality fish and wildlife oriented experiences.
- ◆ Communicate information essential for public awareness and understanding of the importance of fish and wildlife resources and interprets fish and wildlife changes reflecting environmental degradation that ultimately will affect the welfare of human beings.

The Service manages over 500 national wildlife refuges, 66 national fish hatcheries, and 78 ecological services field offices nationwide. The Kankakee River Basin is located in the Great Lakes-Big Rivers Region (Region) of the Service, which includes the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. The Region manages 1.2 million acres of land and water on 46 national wildlife refuges and 9 wetland management districts, including more than 240,000 acres in waterfowl production areas. The Region also manages 6 national fish hatcheries, 9 fisheries stations, 10 ecological services field offices, and 18 law enforcement field offices (Figure 2).



By law and treaty, the Service has national and international management and law enforcement responsibilities for migratory birds, threatened and endangered species, interjurisdictional fish, and certain marine mammals.

# U.S. Fish and Wildlife Service Ecosystems - Region 3

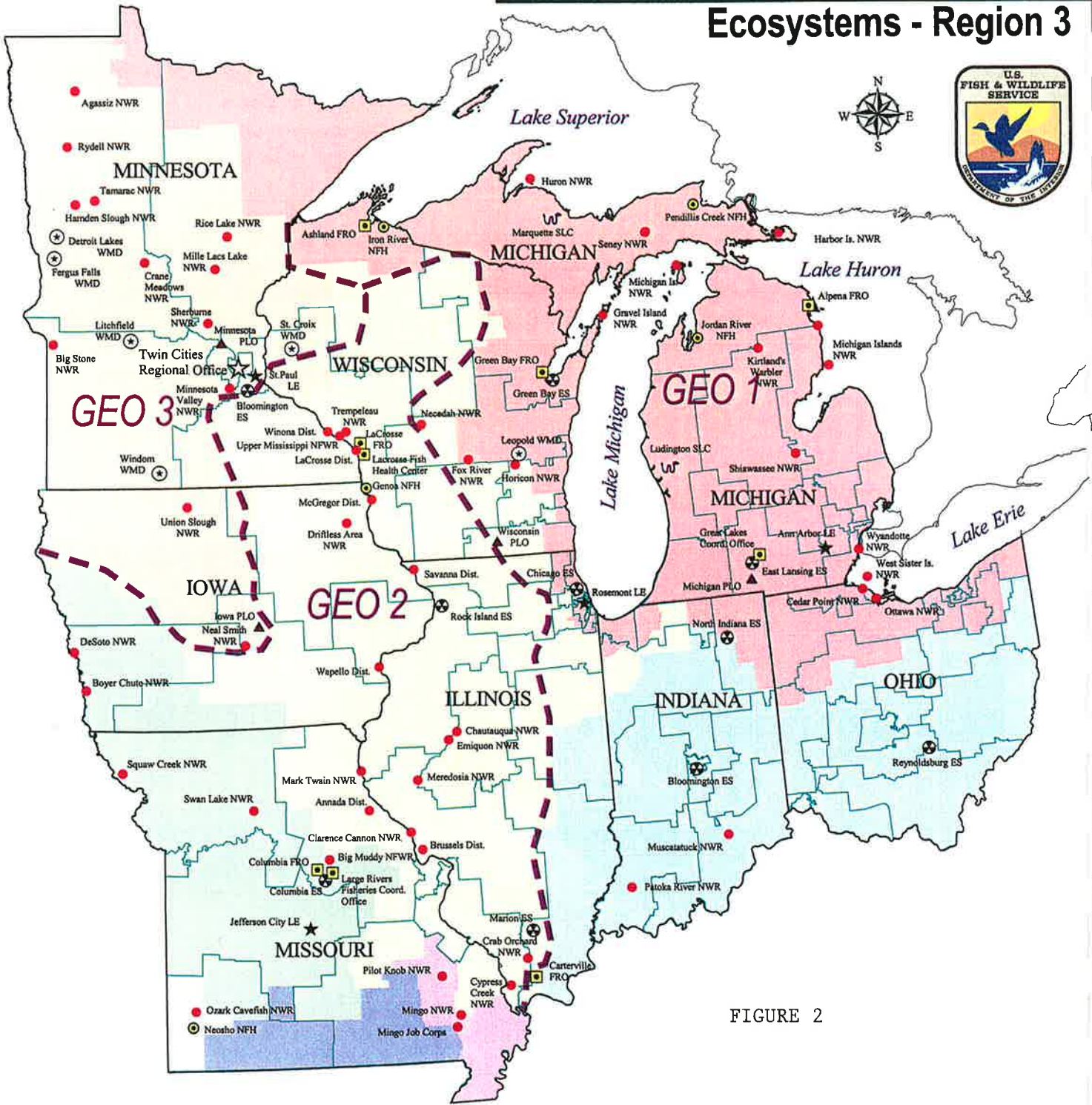


FIGURE 2

|                                     |   |  |                                |
|-------------------------------------|---|--|--------------------------------|
| <b>Ecosystems of USFWS Region 3</b> |   | <b>U.S. Fish and Wildlife Service Facilities</b> |                                |
|                                     | Great Lakes                                 |  | National Wildlife Refuge       |
|                                     | Upper Mississippi River / Tallgrass Prairie |  | Ecological Services            |
|                                     | Mississippi Headwaters / Tallgrass Prairie  |  | Fisheries Resource Office      |
|                                     | Ohio River Valley                           |  | National Fish Hatchery         |
|                                     | Lower Missouri River                        |  | Sea Lamprey Control            |
|                                     | Lower Mississippi River                     |  | Law Enforcement                |
|                                     | Ozark Watersheds                            |  | Private Land Office            |
|                                     | Arkansas / Red Rivers                       |  | Wetland Management District HQ |
|                                     |   |  | Congressional Districts        |

0 100 200 Miles

Map Produced in the Division of Realty - May 1999

## **2. The National Wildlife Refuge System**

The National Wildlife Refuge System is the world's largest and most diverse collection of lands set aside specifically for wildlife. The refuge system began in 1903 when President Theodore Roosevelt designated 3-acre Pelican Island, a pelican and heron rookery in Florida, as a bird sanctuary.

Today, over 500 national wildlife refuges have been established from the Arctic Ocean to the South Pacific, from Maine to the Caribbean. Varying in size from a half-acre parcel to thousands of square miles, they encompass more than 92 million acres of the nation's best wildlife habitats (Figure 3).

Like Pelican Island, many early wildlife refuges were created for herons, egrets, and other water birds. Others were set aside for large mammals like elk and bison. But by far the most have been created to protect migratory waterfowl. This is a result of the United States' responsibilities under international treaties for migratory bird conservation and legislation such as the Migratory Bird Conservation Act of 1929.



**Figure 3** - The National Wildlife Refuge System

National wildlife refuges also play a vital role in preserving endangered and threatened species and their habitats. Among the refuges that are well known for providing endangered species habitat are Aransas in Texas, the winter home of the whooping crane; the Florida Panther refuge, which protects one of the nation's most endangered mammals; and the Hawaiian Islands refuge, home of the Laysan duck, monk seal, and many other unique species.



National wildlife refuges offer the public a wide variety of wildlife-dependent recreational and educational opportunities. Many refuges have fishing and hunting programs, visitor centers, wildlife trails, and environmental education programs.

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*Nationwide, some 34 million visitors annually hunt, fish, observe, and photograph wildlife or participate in wildlife-dependent interpretive activities on Service national wildlife refuges.*

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## Mission of the National Wildlife Refuge System

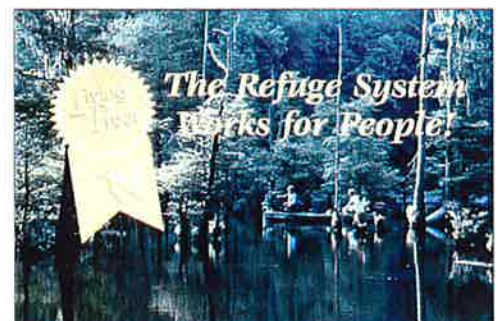
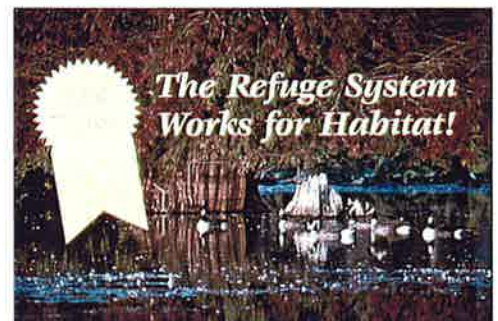
The mission of the National Wildlife Refuge System is to *administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations.*

## Goals of the National Wildlife Refuge System

- ◆ Preserve, restore, and enhance in their natural ecosystems (when practical) all species of animals and plants that are endangered or threatened with becoming endangered;
- ◆ Perpetuate the migratory bird resource;
- ◆ Preserve a natural diversity and abundance of fauna and flora on refuge lands; and
- ◆ Provide an understanding and appreciation of fish and wildlife ecology and humankind's role in their environment and to provide refuge visitors with high quality, safe, wholesome and enjoyable recreational experiences oriented toward wildlife to the extent these activities are compatible with the purposes for which each refuge was established.

## National Wildlife Refuge System Guiding Principles

- USF *Habitat:* Fish and wildlife will not prosper without high quality habitat, and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitat within refuges.
- USF *Public Use:* The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation.
- USF *Partnerships:* America's sportsmen and women were the first partners who insisted on protecting valuable wildlife habitat with wildlife refuges. Conservation partnerships with other Federal agencies, state agencies, tribes, organization, industry, and the general public can make significant contributions to the growth and management of the Refuge System.
- USF *Public Involvement:* The public should be given full and open opportunity to participate in decisions regarding the acquisition and management of our national wildlife refuges.



### III. NEED FOR ACTION

The need for fish and wildlife restoration, preservation, and management in the Basin by the Service has been made clear by the declining status of numerous Service trust resources and studies that indicate habitat loss and degradation are common causal factors in those declines.

#### 1. Grasslands and Associated Species Declines

The Great Plains, once the continent's largest biome, has become functionally non-existent over the last 150 years. The original tallgrass prairie, which extended from western Indiana to the eastern part of Kansas, Nebraska, and North and South Dakota and south to Oklahoma and Texas, has been virtually eliminated throughout its historic range. Recent surveys suggest that 82.6 to 99.9 percent declines in the acreage of tallgrass prairie have occurred in twelve states and one Canadian province since European settlement. Loss and fragmentation of prairie landscapes combined with changes in natural processes have had negative consequences for many grassland plants and associated animals



Tallgrass prairie habitat once dominated the landscape from western Indiana to the eastern portions of Kansas, Nebraska, and North and South Dakota and south to Oklahoma and Texas. Today less than 1 percent of original tallgrass prairie remains in the Basin.

For years following the initial conversion of native Midwestern prairies, many prairie-dependent wildlife species remained relatively stable through their ability to colonize agricultural grasslands. However, 20<sup>th</sup> century agricultural grassland loss has followed a similar path of decline as native prairie loss in the 19<sup>th</sup> century. In many parts of the Basin, agricultural grassland are at their lowest level in more than 100 years (Figure 4).

Consequently, grassland-dependent birds have shown steeper, more consistent, and geographically more widespread declines (25-65%) than any other group of North American birds (Samson and Knopf 1994).

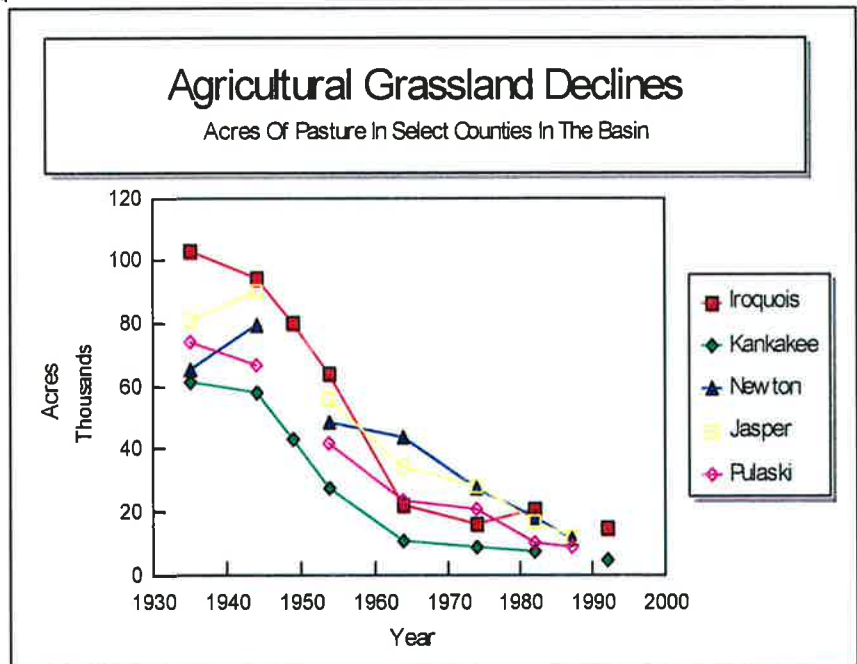


Figure 4 - Agricultural grasslands (on average) have declined throughout the Basin over the past 50 years.



The bobolink is one of several migratory grassland bird species that have shown severe declines in recent years as a result of habitat loss and degradation in the region.

Other grassland associated mammals, insects, and microorganisms are threatened with a similar fate. Currently there are 55 grassland species in the U.S. considered threatened or endangered (Samson and Knopf 1994).

Breeding Bird Surveys for the Great Lakes-Big Rivers Region indicate that grassland-nesting non-game species such as the grasshopper sparrow (-5.5%), dickcissel (-3.6%), bobolink (-3.3%), Henslow's sparrow (-7.6%), vesper sparrow (-1.7%), savannah sparrow (-1.1%), lark sparrow (-2.7%), field sparrow (-3.0%), eastern meadowlark (-2.9%) and western meadowlark (-4.0%) have shown significant average annual declines since the mid-1960's (National Biological Survey 1995).

Until the 1950's, many remnant prairie tracts were surrounded by agricultural grasslands (haylands/pasture) which helped support their natural structure and function. Today, few of these agricultural grasslands remain (Figure 4), causing many prairie remnants to become islands surrounded by row-crop fields and other development. Further, much of the remaining tallgrass prairie habitat in the Basin is highly fragmented and dominated by human activity (the process by which habitats are broken up into smaller isolated parcels is called habitat fragmentation). Without proper management, these

areas will continue to degrade due to their size, isolation, absence of natural processes such as fire and hydrologic cycle maintenance, and inadequate buffers protecting them from surrounding agricultural and urban land uses. Habitat fragmentation diminishes habitat suitable for area-sensitive species, like the bobolink. Herkert (1991) considered 10-30 ha the bobolink's minimum area requirements (minimum amount of contiguous grassland habitat required before an area will be occupied by a species). Habitat size, shape, and amount and type of edge are important factors in the reproductive success of many grassland birds. Restoration and preservation of ecosystem structure and function requires management actions to mitigate or reverse the effects of human-induced influences.



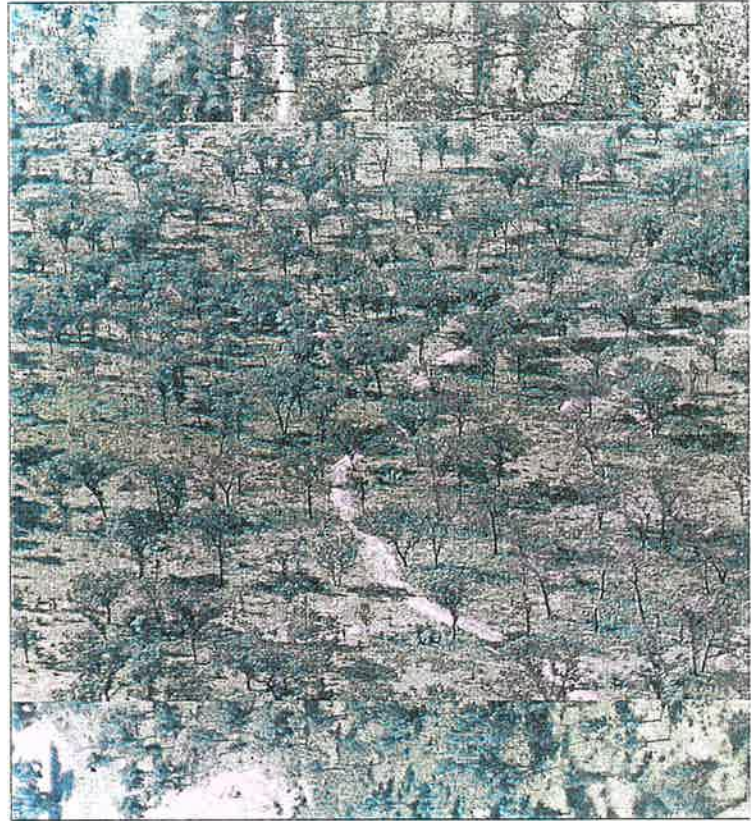
Red fox and other predators prey extensively on birds, their eggs, and their young.

Ground nesting birds that utilize these remaining prairie areas must now concentrate their nesting effort in small scattered parcels of habitat with large amounts of linear edge, where predators such as red fox, striped skunk, and raccoon easily forage. Large native predators (wolves, cougar and bear) which historically preyed on bison, deer, and livestock, have been eliminated from the area and naturally replaced by medium-sized predators (fox, skunk, raccoon) that prey extensively on birds, their eggs, and their young. Further, fire control and woody plantings have favored increases in numbers of forest-edge birds, historically only present in mid-western oak and eastern deciduous forests (Samson and Knopf 1994), thus adding to the competition for remaining habitat.

## 2. Oak Savanna and Associated Species Declines

Prior to European settlement, oak savanna covered approximately 27-32 million acres of the Midwest (Nuzzo 1985). This same author indicates that in 1985, only 113 sites (2,607 acres) of high-quality oak savanna remained. Historically, nearly 1,605,500 acres or 7.5% of Indiana was either prairie or oak-savanna, most of which occurred in the Grand Prairie Natural Region (Betz 1978) (Figure 5). Over 99 percent of the original savanna has been lost, and mid-western oak savanna are among the rarest ecosystems in the world. Development has destroyed, fragmented, and disrupted natural processes needed to maintain quality oak savanna ecosystems. Despite this, the Kankakee River Basin contains among the greatest concentrations anywhere of what remains.

Associated species of concern to the Service found in this habitat type in the Basin include the red-headed woodpecker, northern flicker, and loggerhead shrike.

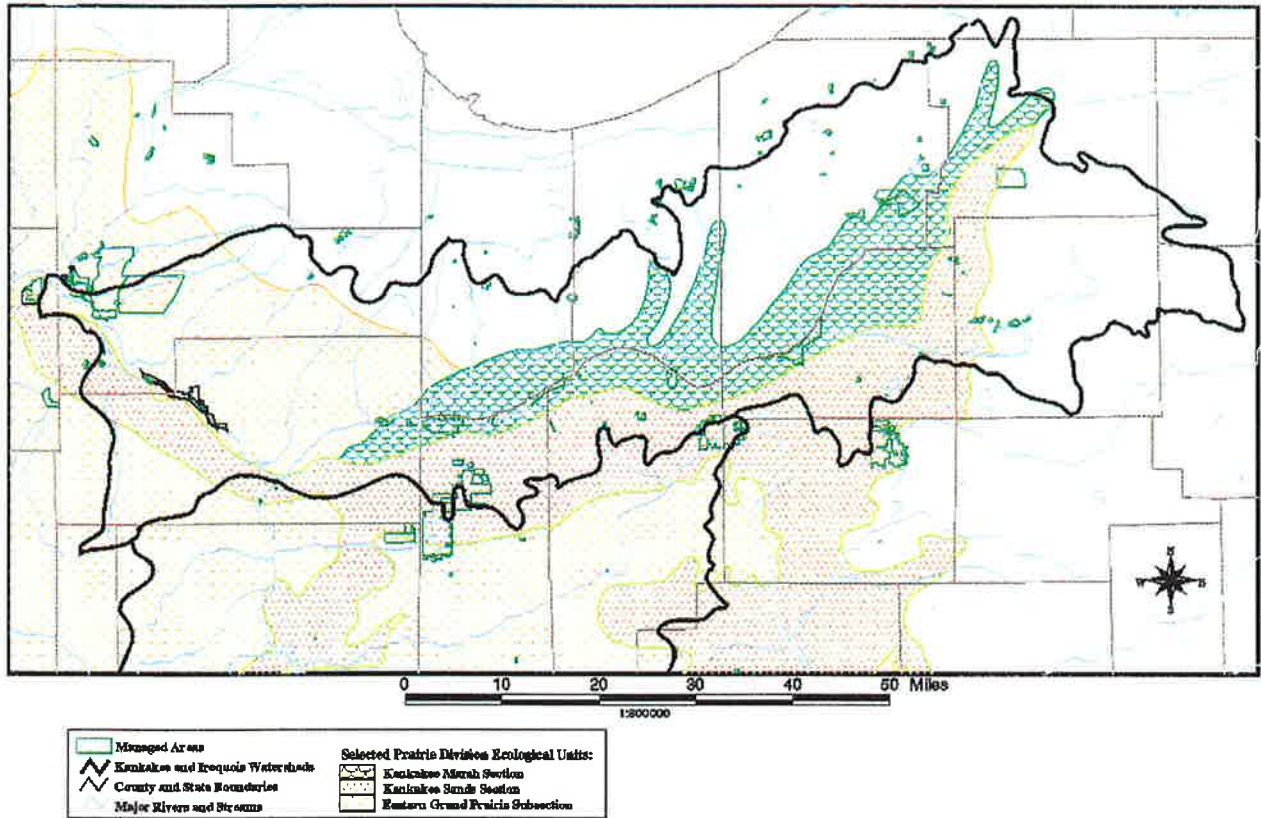


Remnant oak savanna in Indiana. Oak savanna in the Basin constitutes among the best and most concentrated Midwest oak savanna anywhere.



Midwest oak savannas are among the world's most threatened communities (Anderson, et al. 1993). Oak savanna remains among the most vulnerable to loss in the Basin, especially from development.

## Selected Prairie Division Ecological Units within and near the Kankakee Watershed



**Figure 5** - The occurrence of the Grand Marsh within the eastern peninsula of the tallgrass prairie juxtaposed wetlands, tall-grass prairie, and oak savanna in one watershed.

### 3. Wetlands and Associated Species Declines

Of the estimated 221 million acres of wetland habitat present in the lower 48 states at the time of colonial America, only 103 million acres remain (47%). Draining, dredging, filling, leveling, and flooding have reduced wetlands by 50% or more in 22 states, and 10 states have lost 70 percent or more (Dahl 1990). The recent trend in wetland loss across America developed in three phases. From the 1950's to the mid - 1970's, agricultural conversions accounted for 87 percent of all wetland losses. Much of this drainage work was subsidized with Federal funds to encourage increased production of commodity crops. From the mid - 1970's to the mid - 1980's, wetland losses were more evenly distributed between agricultural land use and "other" land use with agriculture accounting for an estimated 54 percent of wetland losses. During this period, the average annual loss of wetlands was approximately 290,000 acres (Dahl, 1991). Since the mid-1980's, indications are that wetland losses are slowing due to programs protecting wetlands and a growing public recognition of the values of wetlands.

Of the 8,212,000 acres of wetlands that existed in Illinois, only 15 percent remain. With intensifying agriculture, rapidly expanding urban pressures, and increasing industrialization, both the quantity and



quality of wetland habitat continue to decline in Illinois. Likewise, of the estimated 5,600,000 acres of wetlands that existed in Indiana prior to European settlement, a mere 13 percent remain (Rolley, 1991). Historically, about 85 percent of the wetland loss in Indiana has been for agricultural purposes with the remainder attributable to urban and industrial development (Indiana DNR, 1988). Currently, the Indiana Division of Fish and Wildlife and the Service estimate an annual loss of 5 percent of remaining wetlands.

Of the wetlands remaining in Indiana and Illinois, only a small percentage remain as they existed 200 years ago, and few support their original complement of plants and animals. This biological diversity has been degraded as a result of impacts to water quality, alterations of water levels and upstream watersheds, and other surface disturbances. The seriousness of this loss is best recognized by the fact that in Indiana over 120 different plants that occur naturally in wetlands and over 60 species of wetland-dependent animals are listed as either endangered, threatened, or of special concern by the Indiana Department of Natural Resources (IDNR). Of all wetland types, the palustrine-forested wetlands (bottomland hardwoods) have been identified in Indiana as the "state wetland priority type." This means priority for protection is based on the historical pattern of loss and alterations occurring in Indiana and the multiple value they have to fish, wildlife, and plant resources (Indiana DNR, 1988).

Historically, the Kankakee River Basin was among the most important freshwater wetland ecosystems in the world, supporting a rich and diverse composition of fish, wildlife, and plants. This unique landscape was important for its diverse plant life, breeding grassland-dependent species, and was internationally renowned for its abundance of waterfowl and other wetland-dependent wildlife. Historical records indicate marshes along the Kankakee River comprised nearly a million acres, ranging from 1 to 14 miles in width and spread over two distinct areas: the "grand marsh", which included about 400,000 acres and remained flooded throughout most of the year, and the "upper marsh", which included about 600,000 acres that was frequently, but not permanently flooded. Today only remnants remain, and few of these support the full array of plants and animals which existed in this habitat originally.

Wetlands are important because they provide habitat for about one-third of our Federally listed threatened or endangered plant and animal species. They provide essential nesting, migratory, and wintering areas for more than 50 percent of our Nation's migratory bird species. Over one third of our Nation's biological organisms are found in wetlands, yet wetlands occupy a mere 3 percent of our Nation's land surface.

Associated species of concern to the Service found in this habitat type in the Basin include the Mitchell's satyr butterfly, sedge wren, veery, black tern, American bittern, and the eastern massasauga rattlesnake.



American bittern with young

#### 4. Threatened And Endangered Species

Several Federally endangered and threatened species occur in the Kankakee River Basin. These include the Mitchell's Satyr butterfly (*Neonympha mitchellii*), Indiana bat (*Myotis sodalis*), copperbelly watersnake (*Nerodia erythrogaster neglecta*), Mead's milkweed (*Asclepias meadii*), and eastern prairie-fringed orchid (*Platanthera leucophaea*). The Hine's emerald dragonfly (*Somatochlora hineana*) is a Federally listed species that may occur in the Basin although no populations have been documented. The eastern massasauga (*Sistrurus catenatus catenatus*) is a species currently under review for listing. Both the Mitchell's satyr and the Indiana bat inhabit sites within the Basin. In addition, counties that contain focus areas include more than 75 state-listed species. For example, in the Kankakee River or its tributaries in Illinois, six species of mussels and 6 fish species are listed as either state threatened or state endangered. In Indiana, grassland adapted mammals like the plains pocket gopher (*Geomys bursarius*) and Franklin's ground squirrel (*Spermophilus franklinii*) are state-listed species.



Mitchell's Satyr butterfly, one of several endangered species found in the Basin.

#### 5. Urban Sprawl

Urban sprawl is a principal threat to both agriculture and natural systems in the Kankakee River Basin. The human population within the region is rapidly expanding, introducing greater development pressures on undeveloped lands and making opportunities for future habitat restoration and preservation more scarce and costly. Many existing natural areas within the Basin face increasing threats to their naturalness from air and water pollution, exotic species, and particularly habitat fragmentation caused by development. Population growth, sedimentation, runoff, and urban development are all expected to increase in the Basin.

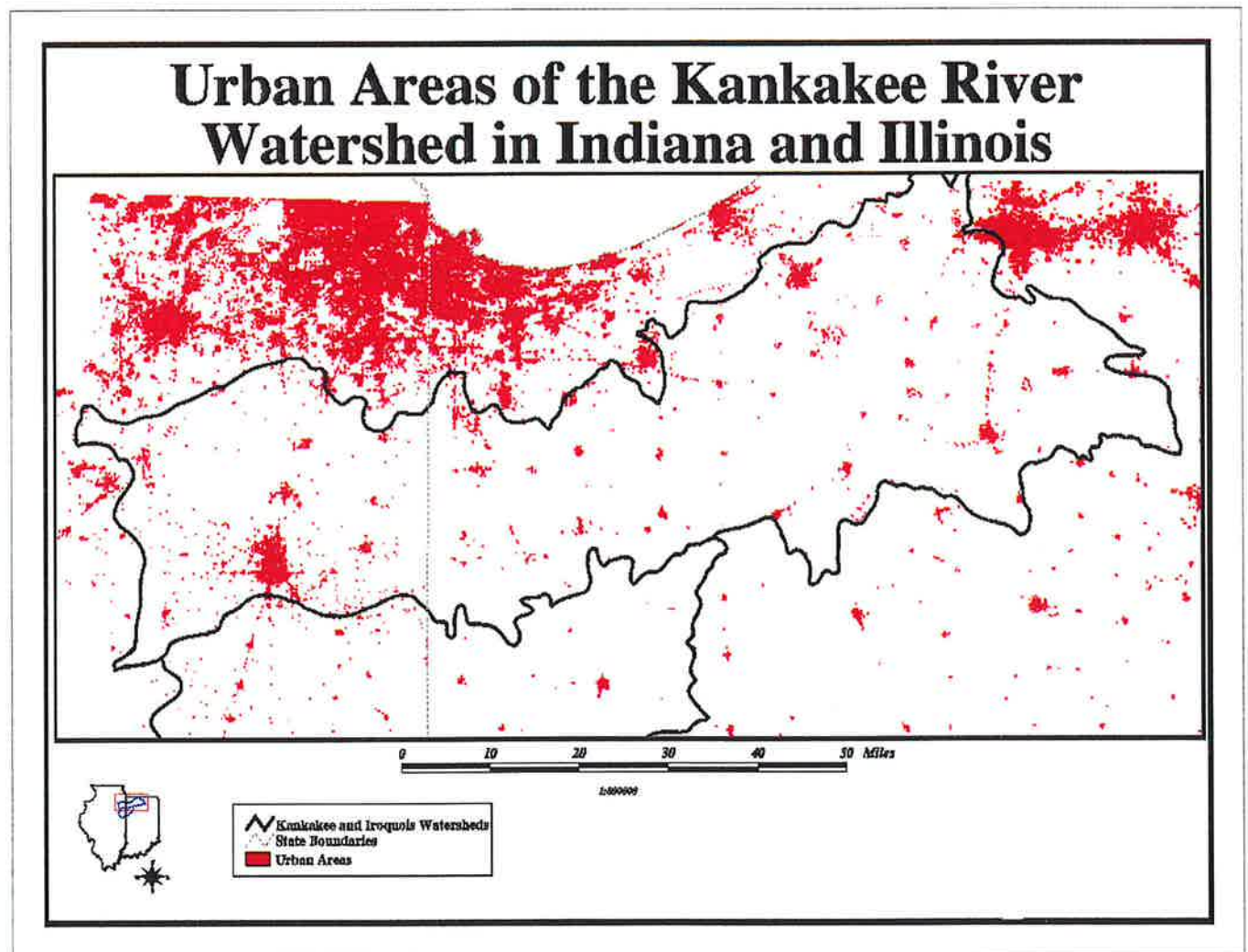
The U.S. population of 266.5 million is growing by about 2.5 million persons per year. The Census Bureau projects that the U.S. population will reach 347 million by 2030 if current trends continue. The Basin has a current population of approximately 1.6 million. This population is expected to increase significantly as more people move southward from Chicago metropolitan areas.

According to a recent study just released by the Chicago-based Openlands Project, the Chicago metropolitan region is predicted to double in size over the next 30 years. It is estimated that the population will grow by 48% during the next 30 years, but land development will increase by a whopping 165%. Moreover, the authors of the report contend that without concerted efforts to contain growth, urban sprawl threatens to reach north to Milwaukee, west to Dekalb, south to Kankakee, and east to South Bend, Indiana.

Similarly, the comprehensive plan for Kankakee County, Illinois, states: "residential growth for the most part has taken place in or near the urban areas of the county. However, in recent years another trend has

become prevalent, that is, small, scattered subdivision and metes and bounds divisions in outlying areas." (Kankakee County Regional Planning Commission 1992). Over time, these development processes could increase flood peaks, increase runoff and sedimentation, and subject more property to damage at higher monetary costs. Demands for certain types of recreation could also intensify, putting many important biological resources at higher risks.

Land use within the Basin has changed enormously from pre-settlement wetlands, prairies, and oak savannas to intensive agriculture. The Basin is currently undergoing a second generation of human-induced change from agricultural ecosystems to a more densely developed state aptly called "rurbanization" (Figure 6). It is this type of development that particularly threatens the remaining oak-savanna habitat in this region. The effect of rurbanization on species dependent on the existing landscape could produce impacts as significant as those that resulted from the change from natural to agricultural ecosystems. An emerging concept in conservation biology is discontinuity and synergism which suggests that stresses to the environment can work in concert to produce rapid and unexpected environmental consequences (Myers 1996). Not only the most conservative species, but species that we cannot anticipate could be extirpated as the Basin changes from rural to urban.



**Figure 6** - Urban sprawl approaching the Basin. The Chicago-based Openlands Project predicts the Chicago metropolitan region will double in size over the next 30 years.

## **6. High Restoration Potential**

The Kankakee River Basin has the biological foundation necessary for a highly significant contribution to the conservation of fish and wildlife resources of continental importance.

First, the Basin's historic importance to waterfowl, other migratory birds, and fish is well documented. As stated earlier, the occurrence of the grand marsh within the eastern peninsula of the tallgrass prairie juxtaposed wetlands, tall-grass prairie, and oak savanna in one watershed (Figure 5).

Second, high quality remnant and restorable wetlands, oak savanna, and prairie habitat remain there. Most of the existing wetlands once formed part of the grand marsh, a wetland area of continental importance that covered numerous counties in 2 states. The oak savanna in the Basin constitutes among the best and most concentrated Midwest oak savanna anywhere. While very little prairie has persisted, there is an opportunity to protect and enhance the small "islands" that endure. Some pieces of the puzzle are left, some will have to be remade, and a broad partnership will be required to put the puzzle together.

Third, the Basin still has a comparatively sparse human population, although development is underway and is expected to increase significantly. One of the most compelling arguments for pursuing a bold plan to restore an important part of this watershed now is that the opportunity to achieve landscape scale restoration and protection exists now. It is conceivable that in a few decades or less, because of more intensive landuse, the chance to work across the watershed restoring ecosystem structure and function will be lost forever.

Fourth, the Kankakee River corridor links multiple managed core areas of habitat. The Service recognizes that outstanding conservation work has already occurred in the Basin. The proposed Refuge provides another mechanism to augment existing protection and restoration efforts in a larger context. A useful analogy might be assembling a bicycle. The wheels, the pedals, the handlebars, and the seat are there, but they require a frame to make the bicycle function. The proposed Refuge can be seen as the frame that holds these critical parts together.

Finally, there are several influential conservation partnerships currently working in the Basin, such as the U.S. Army of Corps of Engineers, the U.S. Department of Agriculture, the Illinois and Indiana DNR's, The Nature Conservancy, and several effective local groups. The challenge for the Service is to provide a compelling vision of landscape scale restoration in the Kankakee that will inspire a cooperative effort to achieve it. The Service has demonstrated through its Partners for Fish and Wildlife program and the North American Waterfowl Management Plan (NAWMP) the feasibility of working with the states, other partners, and private landowners to restore wetlands and native grasslands in the Basin. By continuing this effort, the Service can provide the leadership necessary for a comprehensive and coordinated approach to ecosystem restoration in the Basin

The Service's proposed action in this EA is to develop the Grand Kankakee Marsh National Wildlife Refuge "for the development, advancement, management, conservation, and protection of fish and wildlife resources" (Fish and Wildlife Act of 1956) and for "the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." (Emergency Wetlands Resources Act of 1986). The Service's aim is to expand and accelerate past and present efforts of the Grand Kankakee Marsh Restoration Project of the North American Waterfowl Management Plan, a multi-partner conservation coalition which has been restoring wetlands and associated uplands in the Basin for several years. The following Refuge mission, vision, guiding principles, goals, objectives, and strategies provide an interim framework for the Refuge until a Comprehensive Conservation Plan has been completed (approximately 12-18 months).

### **Refuge Mission Statement**

The mission for the Refuge will be to protect, restore, and manage ecological processes within the Kankakee River Basin that benefit threatened and endangered species, migratory birds, native fish, and diverse flora and fauna populations, while providing the public, to the extent possible, high quality wildlife-dependent environmental interpretation, education, and recreation experiences that build an understanding and appreciation for these resources, and the role humankind plays in their stewardship.

### **Refuge Vision Statement**

The Service's vision for the Refuge is to restore and preserve an ecological system that supplies the needs of migratory waterfowl, neotropical migratory songbirds, native fish, native plant communities, and threatened and endangered flora and fauna. The Refuge and its staff will be leaders in building mutually-beneficial relationships with the public and our partners which will lead to a greater understanding and appreciation of the natural world, and the role humankind plays in its stewardship.

### **Guiding Principles**

Development and management of the Refuge will be guided by the following principles:

- ☞ *Use an ecosystem approach:* The ecosystem approach is a collaboratively developed vision of desired future conditions that integrates ecological, scientific, economic, and social factors. It is applied within a geographic framework based primarily on ecological factors.
- ☞ *Rely on sound science:* Restoration and preservation of ecological processes will be scientifically sound, ecologically credible, economically and socially acceptable, and legally defensible. Refuge management decisions will be based on sound information from the full range of natural and social sciences.
- ☞ *Use adaptive management processes:* An adaptive management approach features a structured, iterative process that recognizes that most information used in decision making is imperfect and that, as decisions are made, a process is in place to gain better information and to allow managers to make appropriate mid-course corrections.
- ☞ *Results through partnerships:* Partnership initiatives require extensive coordination and communication between Federal agencies; state, tribal, and local governments; and stakeholders and customers.

- ☞ *Ensure public involvement:* Refuge planning will include a clear, credible, and meaningful role for public input from the full spectrum of social and cultural backgrounds. Public sentiment and comment at the local, State, and national levels will be considered.

## **1. Interim Refuge Goals**

Interim Refuge goals will be consistent with those for the National Wildlife Refuge System. They are:

- ◆ Preserve, restore, and enhance in their natural ecosystems (when practical) all species of animals and plants that are endangered or threatened with becoming endangered;
- ◆ Perpetuate the migratory bird resource;
- ◆ Preserve a natural diversity and abundance of fauna and flora on refuge lands; and
- ◆ Provide an understanding and appreciation of fish and wildlife ecology and humankind's role in their environment and to provide refuge visitors with high quality, safe, wholesome and enjoyable recreational experiences oriented toward wildlife to the extent these activities are compatible with the purposes for which each refuge was established.

## **2. Interim Refuge Objectives and Strategies:**

### **Coordination:**

- ☞ Provide Service leadership and support to other Federal, state, local, and private agencies for the restoration and preservation of ecological processes in the Basin that benefit migratory birds, threatened and endangered species, native fish, and their habitats (Service trust resources).
- ☞ Foster improved communication and collaboration between Service programs, the states, non-government organizations, and other Federal agencies.
- ☞ Focus Federal, state, and local agencies having related responsibility and/or expertise in the Basin to increase efficiency and develop consistency in natural resource conservation.
- ☞ Accelerate the current status and trends effort toward natural resource restoration and preservation in the Basin through a comprehensive and coordinated system, that complements existing authorities.
- ☞ Intensify and concentrate Federal, state, local, and private habitat restoration and enhancement mechanisms aimed at benefitting Service trust resources in the Basin (such as the Wetlands Reserve Program, Conservation Reserve Program, Environmental Quality Incentives Program, Wildlife Habitat Incentives Program, set-aside programs, North American Waterfowl Management Plan, local land trusts, water quality improvement programs, etc.).

### **Planning**

- ☞ Provide a comprehensive statement of Refuge management direction through the development of a Comprehensive Conservation Plan (CCP) and associated step-down management plans by 2001 (the CCP will replace guidance contained in the draft conceptual management plan which was included with the draft EA)(see appendix V for planning process and schedule).
- ☞ Provide avenues for effective coordination, interaction, and cooperation with affected parties, including Federal agencies, state conservation agencies, tribal governments, local governments, non-government organizations, and landowners.

## **Research**

- ☞ Support, promote, and coordinate scientific research on, and monitoring of, Service trust resources and their habitat, to improve management decision-making.
- ☞ Use expertise from various agencies, universities, and other sources to develop and disseminate knowledge about natural resources and human uses and values associated with those resources.

## **Habitat Restoration and Management**

- ☞ Through a combination of voluntary partnerships, easements, and land acquisition, restore and preserve approximately 30,000 acres of wetlands, prairie, and oak savanna habitat to meet the needs of migratory birds, threatened and endangered species, and aquatic resources in the Basin (willing buyer/willing seller only).
- ☞ Leverage Service restoration and preservation efforts by connecting or enlarging existing managed areas.
- ☞ Restore backwater habitats and reconnect side channels that have been artificially cut-off on the Kankakee River to promote biological diversity and rehabilitate fish spawning, nursery, and overwintering areas.
- ☞ Restore and manage areas at the landscape scale to provide the most favorable matrix possible for the refuge and other protected areas (see Noss and Harris 1986, O'Connell and Noss 1992, Missouri Dept. of Conservation 1994).
- ☞ Intensify the Service's Partner's for Fish and Wildlife habitat restoration efforts and identify new opportunities to restore wetlands and grasslands on private lands.

## **Education, Interpretation, and Recreation**

- ☞ Expand public awareness, understanding, appreciation, and stewardship of the Basin's natural resources through high quality wildlife-dependent public education, interpretation, and recreation programs on Refuge lands.
- ☞ Establish Refuge outreach programs to develop a more involved citizenry in support of fish and wildlife conservation.

Successful development of this Refuge will rely on partnerships formed with landowners in the Basin, volunteers and interested citizens, farm and conservation organizations, and other government agencies. Restoration and preservation of habitat by the Service would be on a willing buyer/willing seller basis only. Only lands that the Service acquires would become part of the Refuge. All lands acquired by the Service would be managed as units of the Grand Kankakee Marsh National Wildlife Refuge. Funding for Service land acquisition would be the Land and Water Conservation Fund using the authority of the Fish and Wildlife Act of 1956, and the Migratory Bird Conservation Fund using the authority of the Migratory Bird Conservation Act.

## **V. PROJECT INCEPTION**

The Service has long been aware of the tremendous natural resource value of the Basin. The following Federal, state, local, and private entities, resource management plans, and conservation initiatives helped

provide background and a framework for the Service's proposed action. Appendix V contains an outline of the planning process the Service followed for this project.

In 1986, to address the declining status of North American waterfowl populations, the United States and Canada signed the *North American Waterfowl Management Plan (NAWMP)*. The purpose of the NAWMP is to restore a continental breeding population of 62 million ducks, including 8.7 million mallards, 6.3 million pintails, and a fall flight of 100 million ducks during years of average environmental conditions. Habitat objectives for the *Upper Mississippi River and Great Lakes Region Joint Venture - Kankakee River Basin Focus Area* in Indiana include "permanently protect, enhance, restore, and/or create 28,000 acres of wetland and associated uplands on public and private lands by the year 2012." In Illinois, the 1,900-acre Momence wetlands are part of the Northeastern Illinois Focus Area, representing one of the last good examples of the historic Grand Kankakee Marsh.

In 1986, the U.S. Congress authorized the Emergency Wetlands Resources Act to protect critical wetlands and promote wetland conservation. One of the requirements of the Act was the preparation of a national plan to identify high priority wetlands for protection. In 1989 the Department of the Interior developed the *National Wetlands Priority Conservation Plan*, as directed by the Act.

The *Kankakee River Master Plan* (SEG Engineers and Consultants, Inc. 1989) was developed through funding from the Indiana Legislature. The Plan proposed 30 miles of setback levees on each side of the Kankakee River to contain the 100 year flood, alleviate land-use conflicts, and address environmental concerns in the Indiana portion of the Kankakee River Basin.

In 1990, the Service developed a *Regional Wetlands Concept Plan* for the Great Lakes-Big Rivers Region (Illinois, Indiana, Minnesota, Iowa, Missouri, Wisconsin, Michigan, and Ohio). The purpose of the plan was to identify wetlands that were valuable for protection in conformance with the Emergency Wetlands Resources Act of 1986. One of the recommendations in the Regional Wetland Concept Plan for the States of Illinois and Indiana was restoration and protection of palustrine-emergent and palustrine-forested wetland habitat within the Kankakee River Basin.

The *Corps of Engineers* recently completed a "Reconnaissance study" of the Kankakee River Basin that evaluates measures to integrate flood control, ecological protection and restoration, and recreational enhancement within the Basin. That report recommended a more detailed "Feasibility Level" study that would investigate flood damage problems along the Kankakee River and provide recommendations for implementable measures fostering flood control, ecological values, and recreational opportunities. Objectives of that study are to 1) reduce over-bank flood damages along the Kankakee River and its tributaries in Indiana and Illinois, 2) adhere to state of Indiana and Illinois storm water management ordinances and regulations, 3) preserve and/or enhance the social, cultural, ecological, and recreational resources in the Basin, 4) where possible, guide plan formation efforts to be compatible with, and integrate into, existing and future Federal, state, county, and local facilities and flood control projects, and 5) protect, enhance, and restore natural resources and recreational facilities within the Basin.

On April 16, 1999, the Service and U.S. Army Corps of Engineers signed an interagency partnership agreement (appendix III) to work together on Refuge planning and flood control through ecosystem restoration activities within the Basin. As part of that agreement, the Service made a commitment not to adversely impact flood control efforts of the U.S. Army Corp of Engineers.



On April 16, 1999, the Service and U.S. Army Corps of Engineers signed an interagency partnership agreement (appendix III) to work together on Refuge planning and flood control through ecosystem restoration activities within the Basin. As part of that agreement, the Service made a commitment not to adversely impact flood control efforts of the U.S. Army Corp of Engineers.

The *Illinois DNR* has developed a list of Priorities for the Kankakee Sand Area Section in Illinois. These include management of the floodplain forest along the Kankakee River, protection of the high quality aquatic environment of the Kankakee River ecosystem from Indiana to the confluence with the Des Plaines River, protection of the sand savanna and sand prairie of this Grand Prairie Natural Division (particularly the southeastern Kankakee County/northeastern Iroquois County area), and linking the Iroquois State Fish and Wildlife Area in Illinois and the Willow Slough Fish and Wildlife Area in Indiana (William Glass, Illinois Dept. of Natural Resources, 3 July 1996, personal communication).

Likewise, the *Indiana DNR* manages several nodes of habitat along the Kankakee River and is similarly interested in protection of important natural features, particularly wetlands and sand savanna/prairie in the Basin.

Earlier this year, *The Nature Conservancy* purchased approximately 7,200 acres of historic wetlands, prairie and oak savanna with the goal of implementing a long-term restoration project. This site lies immediately south of the Kankakee River in Newton County, Indiana.

## **VI. SCOPING AND PUBLIC INVOLVEMENT**

Scoping is the process of identifying opportunities and issues related to a proposed action. The Service publicly announced it was evaluating the feasibility of developing a new National Wildlife Refuge in the Kankakee River Basin in June 1997. Prior to that, the Service held informational briefings on the project for congressional members and staff, Federal, state, and local partners, and many others at their request.

Numerous Federal, state, local, and private entities were involved in the scoping process. These include Indiana's and Illinois' Congressional Delegations, the U.S. Department of Agriculture, U.S. Department of Interior, Indiana and Illinois Legislative members representing the counties involved, Indiana Department of Natural Resources, Illinois Department of Natural Resources, representatives from County, Township, and other local governments, representatives of national, state, and local conservation organizations, Farm Bureau, landowners, and many other interested groups and citizens. Information about the proposed project was provided to the general public through news-releases, presentations, interviews, seven newsletters (appendix VI), one-on-one briefings, and the Internet.

In June 1997, the Service hosted three public meetings in Knox and Enos, Indiana, and Bradley, Illinois, to exchange information on the Refuge proposal. In total, approximately 300 people attended those meetings.

In March 1998, the Service issued a Draft Environmental Assessment to publicly disclose the possible environmental consequences that development of the Refuge by the Service could have on the quality of the physical, biological, and human environment.

On May 26 and 27, 1998, the Service held public hearings in Wheatfield, Indiana, and Kankakee, Illinois, to encourage additional public comment. Approximately 600 people attended the Wheatfield meeting and approximately 60 attended the meeting in Kankakee.

On August 20, 1998, the Service closed a 150-day comment period on the Draft Environmental Assessment prepared for the project.

The Service coordinated its scoping effort closely, and corresponded frequently with many of the aforementioned entities. To-date, more than 14,000 people from 44 different states (Figure 6) have inquired and/or commented on the refuge proposal.

Comments have covered a wide range of potential opportunities and concerns. Many comments encouraged the development of a new national wildlife refuge, while others cited potential conflicts that would need to be addressed before the Refuge proposal moved forward.



**Figure 7** -Distribution of comment letters received by the Service regarding the proposed Refuge since planning was initiated in June 1997.

From questions raised in conversations and correspondence with individuals and organizations, the Service identified several opportunities and issues facing this Refuge proposal, namely: If developed, what effect would the Refuge have on:

- 1) Biological diversity and abundance
- 2) Water quality in the Kankakee River
- 3) Agricultural land
- 4) Drainage, runoff, and flood control within the Basin
- 5) County tax revenues and refuge revenue sharing payments and apportionment
- 6) Local economies
- 7) Private property rights
- 8) Infrastructure (roads and road maintenance/sewer and water systems)
- 9) Mosquitos
- 10) Other planning efforts in the Basin
- 11) Environmental justice

The Service addressed these and other opportunities and concerns in Chapter 4 of this EA, the appended Economic Impact Assessment prepared by Purdue University (appendix I), the appended “Frequently Asked Questions” (appendix II), and through several of the project Newsletters (appendix VI).

Management and administration of the Refuge will be mandated by a number of laws (Acts) and Executive Orders (EO's). Some of these include:

- ✓ *National Wildlife Refuge System Improvement Act of 1997* (Refuge Administration Act). This Act defines the National Wildlife Refuge System and authorizes the Secretary to permit any use of a refuge provided such use is compatible with the major purposes for which the refuge was established. The Refuge Improvement Act clearly defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority wildlife-dependent public uses (hunting, fishing, wildlife observation and photography, or environmental education and interpretation); establishes a formal process for determining compatibility; established the responsibilities of the Secretary of Interior for managing and protecting the System; and requires a Comprehensive Conservation Plan for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.
- ✓ *National Wildlife Refuge System Administration Act of 1966*. This Act defines the National Wildlife Refuge System as including wildlife refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas. The Secretary is authorized to permit any use of an area provided such use is compatible with the major purposes for which such area was established. The purchase consideration for rights-of-way go into the Migratory Bird Conservation Fund for the acquisition of lands. By regulation, up to 40 percent of an area acquired for a migratory bird sanctuary may be opened to migratory bird hunting unless the Secretary finds that the taking of any species of migratory game birds in more than 40 percent of such area would be beneficial to the species. The Act requires an Act of Congress for the divestiture of lands in the system, except (1) lands acquired with Migratory Bird Conservation Commission funds, and (2) lands can be removed from the system by land exchange, or if brought into the system by a cooperative agreement, then pursuant to the terms of the agreement.
- ✓ *Refuge Recreation Act of 1962*. This Act authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the areas' primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public use.
- ✓ *National Wildlife Refuge System Volunteer and Community Partnership Act of 1998*. The purpose of this Act is to 1) encourage the use of volunteers to assist the Service in the management of refuges within the NWRS; 2) facilitate partnerships between the NWRS and non-Federal entities to promote public awareness of the resources of the NWRS and public participation in the conservation of those resources; and 3) encourage donations and other contributions by persons and organizations to the NWRS.
- ✓ *Fish and Wildlife Improvement Act of 1978*. This act was passed to improve the administration of fish and wildlife programs and amends several earlier laws including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of

1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out a volunteer program.

- ✓ *National Environmental Policy Act of 1969 (NEPA)*. The purposes of the NEPA are to: declare a national policy which will encourage productive and enjoyable harmony between man and his environment; promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; enrich the understanding of the ecological systems and natural resources important to the Nation; and establish a Council on Environmental Quality.
- ✓ *The Endangered Species Act of 1973, as amended*. This Act ensures that projects not affect the continued existence of any endangered or threatened species in the project area or result in destruction or adverse modification of their critical habitats.
- ✓ *Migratory Bird Conservation Act of 1929*. The Act established the Migratory Bird Conservation Commission which consists of the Secretaries of the Interior (chairman), Agriculture, and Transportation, two members from the House of Representatives, and an ex-officio member from the state in which a project is located. The Commission approves acquisition of land and water, or interests therein, and sets the priorities for acquisition of lands by the Secretary for sanctuaries or for other management purposes. Under this Act, to acquire lands, or interests therein, the state concerned must consent to such acquisition by legislation. Such legislation has been enacted by most states.
- ✓ *Emergency Wetlands Resources Act of 1986*. This Act recognizes the importance of wetlands and their role in providing public benefits.
- ✓ *Fish and Wildlife Act of 1956*. Under this Act, the Secretary of Interior is authorized to take such steps as may be required for the development, advancement, management, conservation, and protection of fish and wildlife resources including but not limited to research, development of existing facilities, and acquisition by purchase or exchange of land and water or interests therein. The Act also authorizes the Service to accept gifts of real or personal property for its benefit and use in performing its activities and services. Such gifts qualify under Federal income, estate, or gift tax laws as a gift to the United States.
- ✓ *Land and Water Conservation Fund Act of 1965*. This Act provides funding through receipts from the sale of surplus Federal land, appropriations from oil and gas receipts from the outer continental shelf, and other sources for land acquisition under several authorities. Appropriations from the Fund may be used for matching grants to states for outdoor recreation projects and for land acquisition by various Federal agencies, including the Service.
- ✓ *Refuge Revenue Sharing Act of 1935, as amended*. This act requires revenue sharing provisions to all fee-title ownerships that are administered solely or primarily by the Secretary through the Service.

- ✓ *Uniform Relocation and Assistance and Real Property Acquisition Policies Act of 1970, as amended.* This Act provides for uniform and equitable treatment of persons who sell their homes, businesses, or farms to the Service. The Act requires that any purchase offer be no less than the fair market value of the property.
- ✓ *The Archeological Resources Protection Act of 1979.* Section 14 of the Archaeological Resources Protection Act of 1979 requires an inventory program of all Federal lands. This Act expands upon the Antiquities Act to protect all archeological sites more than 100 years old on Federal land, and to ensure that archeological investigations on Federal land are performed in the public interest by qualified persons.
- ✓ *The National Historic Preservation Act of 1966, as amended; Executive Order 11593 (Protection and Enhancement of the Cultural Environment); and Title 36, Code of Federal Regulations, Part 800 (Protection of Historic Properties).* Section 106 of the National Historic Preservation Act of 1966 requires Federal agencies to consider the effects of their undertaking on properties meeting criteria for the National Register of Historic Places. The regulations in 36 CFR Part 800 describe how Federal agencies are to identify historic properties, determine effect on significant historic properties, and mitigate adverse effects. Section 110 of the 1966 Act codifies the salient elements from E.O. 11593, “to ensure that historic preservation is fully integrated into ongoing programs and missions of Federal agencies.” Section 110 also requires each Federal agency to establish a program leading to inventory of all historic properties on its lands.
- ✓ *Archaeological and Historic Preservation Act of 1974.* This Act amends the Reservoir Salvage Act of 1960 to expand its provisions to the preservation of historic and archaeological data in all Federal or Federally assisted or licensed construction projects that might otherwise be lost. This Act directs Federal agencies to notify the Secretary of the Interior whenever they find a Federal or Federally assisted, licensed or permitted project may cause loss or destruction of significant scientific, prehistoric or archaeological data. Funds may be appropriated, donated and/or transferred for the recovery, protection and preservation of such data.
- ✓ *The Native American Graves Protection and Repatriation Act of 1990.* Directs Federal agencies to protect Native American human remains and associated burial items located on or removed from Federal land.
- ✓ *Federal Farmland Protection Policy Act of 1981, as amended.* This Act is intended to “minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses, and too assure that Federal programs are administered in a manner that, to the extent practicable, will be compatible with State, unit of local government, and private programs and policies to protect farmland.”
- ✓ *Clean Water Act (Section 401 and 404).* Section 404 of the Act is intended to protect access to and quality of the nation’s waters by preventing the unnecessary loss of wetlands and other sensitive aquatic areas. Section 401 of the Act requires water quality certification prior to the issuance of a 404 permit and for other activities discharging into a water body.

- ✓ *Rivers and Harbor Act (Section 10 of 1899)*. Section 10 of this Act regulates the placement of fill in navigable waters of the United States.
- ✓ *Executive Order 11988*. E.O. 11988 directs Federal agencies to (1) avoid development in the floodplain unless it is the only practical alternative, (2) reduce the hazards and risks associated with floods, (3) minimize the impact of floods on human safety, health, and welfare, and (4) restore and preserve the natural and beneficial values of the floodplain.
- ✓ *Executive Order 11990*. E.O. 11990 directs Federal agencies to (1) minimize destruction, loss, or degradation of wetlands and (2) preserve and enhance the natural and beneficial values of wetlands when a practical alternative exists.
- ✓ *Executive Order 12372 (Intergovernmental Review of Federal Programs)*. In compliance, the Service will send copies of the CCP/EA to State Planning Agencies for review.
- ✓ *Executive Order 12996 (Management and General Public Use of the National Wildlife Refuge System)*. E.O. 12996 provides directives to the Secretary of the Interior on compatible wildlife-dependent recreational activities (hunting, fishing, wildlife observation, photography, environmental education, and interpretation).

## **VIII. DECISION FRAMEWORK**

In compliance with the National Environmental Policy Act of 1969, the Regional Director for the Great Lakes-Big Rivers Region of the Service will use this Environmental Assessment to select 1 of 5 alternatives (Chapter 2) and determine if the alternative selected will significantly impact the quality of the human environment. Following this decision and a 30-day public review, a final decision will be made by the Regional Director on whether to carry out the alternative selected.

## CHAPTER 2 - DESCRIPTION OF ALTERNATIVES

### I. INTRODUCTION

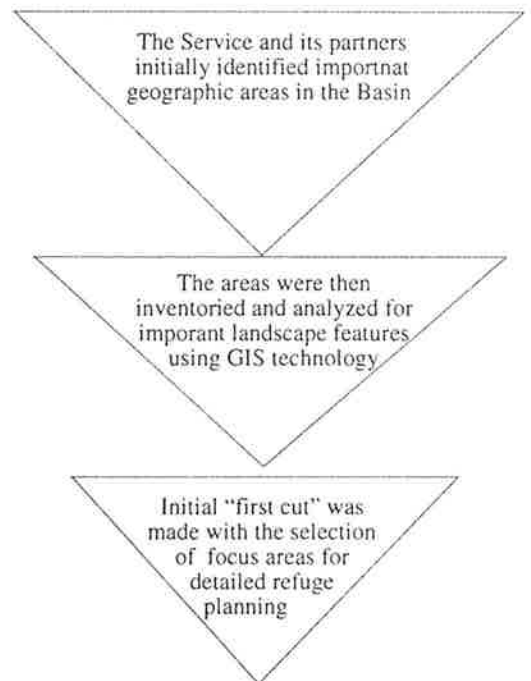
The purpose of this chapter is to present the alternative formulation process and then describe four "Action" and one "No Action" alternatives with respect to the proposed new Refuge.

### II. FORMULATION OF ALTERNATIVES

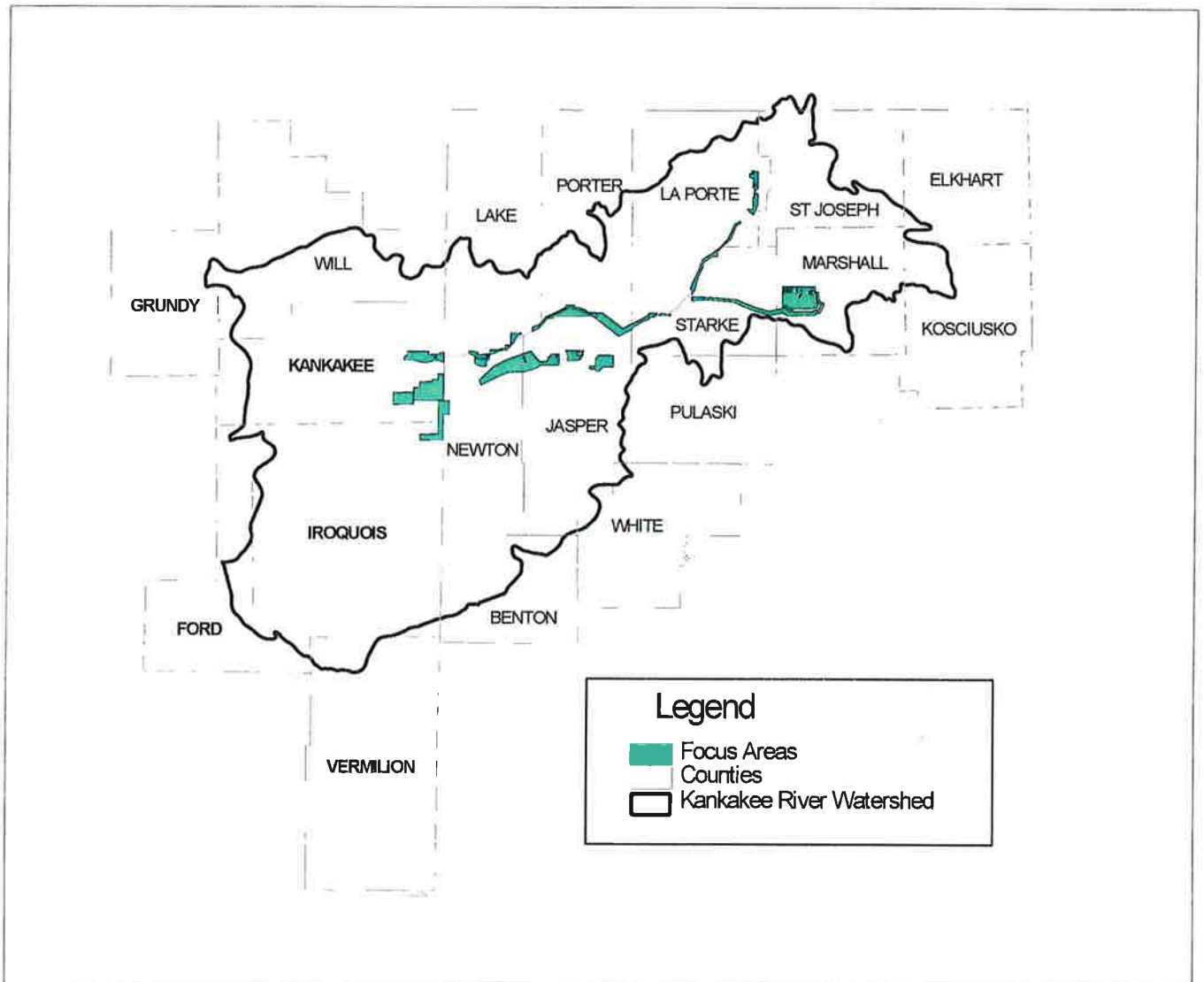
The Service formulated alternatives for the proposed Refuge in conjunction with its partners in both Illinois and Indiana. The No Action alternative reflects the current state of conservation activity (status quo) within the Basin. The Action alternatives would provide the opportunity for a coordinated effort among the citizens of the Basin and agencies and organizations working in the Basin to restore and preserve migratory birds, fisheries, and biological diversity.

The process of developing the Action alternatives involved input from partner organizations and the use of Geographic Information System (GIS) technology provided in part through the Indiana Gap Analysis project, the Illinois Natural History Survey, and the Illinois and Indiana Departments of Natural Resources. These data were used to identify a set of "focus areas" (Figure 8) which constitute subsets of the Basin from St. Joseph County, Indiana, to Iroquois County, Illinois.

It is important to understand that focus areas do not correspond directly to specific areas identified by the Service for acquisition. Rather, focus areas are the initial "first cut" in a process aimed at narrowing down potential Refuge areas within the Basin, ie. ie. ⇔ Kankakee River Basin ⇔ focus area ⇔ individual refuge units. Focus areas typically involve greater than 30,000 acres in each of the Action alternatives. This is because focus areas represent refuge design at its broadest conceptualization. Identifying focus areas larger than the 30,000 acres gives the Service flexibility to address both ecological and social concerns in developing the Refuge, and helps to delineate a landscape where Service partners could work cooperatively to manage lands for the benefit of natural resources. The Service will continue to refine the site selection process based on biological and non-biological criteria as well as public input in order to identify potential sites for a new refuge.



Land acquisition would be under the authority of the Fish and Wildlife Act of 1956 and the Emergency Wetlands Resources Act of 1986 and would occur over approximately 20-40 years. Land acquisition would be by donation, exchange, trade for other Federal lands, conservation easements, and fee-title purchase from willing sellers.



**Figure 8** - Focus Areas for the four Action alternatives (alternatives 2-5). Note: focus areas are not Refuge boundaries. Refuge boundaries would conform to individual land tracts as they are purchased from willing sellers within the focus areas.

Management of the proposed Refuge would be consistent with Service policies concerning its National Wildlife Refuges and the aforementioned goals. The Action alternatives embrace the goals of protecting and restoring habitat in order to prevent additional species in the Basin from becoming listed under the Endangered Species Act; providing additional opportunities for wildlife-dependent recreation; improving water quality in the Basin; providing opportunities for environmental education; and where feasible, alleviating local flooding problems within the Basin. Common to all Action alternatives is the development of a Comprehensive Conservation Plan which will provide long-range guidance and management direction for the Refuge to accomplish its purpose, contribute to the mission of the National Wildlife Refuge System, and to meet other relevant mandates.

## 1. Identification of Focus Areas



## 1. Identification of Focus Areas

In order to begin the process of identifying the most important areas for the conservation of Service trust resources in the Basin, the Service formulated focus areas using an Expert Workshop approach (Johns and Soule 1995) and the best available data using GIS-aided reserve design methodology. For each Action alternative, the Service identified focus areas through the analysis of land cover, threatened, endangered and other species distribution, hydrography, wetlands, anthropogenic landscape features, and other data acquired through the Illinois DNR, Indiana DNR, The Nature Conservancy, Service, and Illinois Natural History Survey through the Gap Analysis projects in Indiana and Illinois, respectively.

The land use classes used in the focus area analysis were developed from comparatively coarse satellite data and have not been subjected to formal accuracy assessment. The reader is cautioned not to use the maps included in this report to evaluate individual parcels. The Service will not rely on these data for site-specific planning.

The process for identifying focus areas included:

1. Service meetings with partner agencies in late 1996 and 1997. In these meetings, the partner organizations broadly-defined geographic areas that met their ecological criteria for importance.
2. These geographic areas were transferred to United States Geological Survey (USGS) 7.5 minute topographic maps and then on-screen digitized into the GIS using USGS Digital Raster Graphics (DRG's) of the same 7.5 minute topographic sheets.
3. Important GIS data layers for analyses were collected for designing the proposed Refuge including: a "cross-walk" of land cover maps from the Indiana Gap Analysis project and the Illinois Natural History Survey (mostly 1992 Thematic Mapper (TM) satellite images); National Wetland Inventory (NWI) maps for the watershed; data from the Illinois and Indiana Heritage Programs (endangered, threatened, and rare communities and species); Managed Areas from the Indiana Gap Analysis project; transportation from USGS 1:100,000 Digital Line Graphs (DLG's); hydrography (rivers and streams) also from USGS 1:100,000 DLG's; and Meyer's map of the historic Grand Marsh.
4. Visual analysis of the data was conducted with respect to:

### A. *The Kankakee River Corridor*

- |        |   |
|--------|---|
| STEP 1 | Evaluate an appropriate corridor based on the occurrence of historic forested wetland according to Meyer and on the expanse of existing forested wetlands based on NWI. |
| STEP 2 | Visually select and on-screen digitize lines along the Kankakee River mainstem emphasizing important habitat blocks and continuity of the riparian corridor.            |

*B. Concentrations of Primary Ecosystems*

- STEP 1 Visually inspect the land cover data, NWI, and DRG's for concentrations of wetlands, grasslands, and probable savanna.
- STEP 2 On-screen digitize areas around concentrations including adjacent potential restoration or management lands.

*C. Corridors Among Managed Areas*

- STEP 1 Visually inspect potential corridors of natural vegetation among managed areas focusing on riparian corridors, blocks of habitat, and linear habitat features.
- STEP 2 Evaluate opportunities to enlarge existing areas with similar ecosystem types, and buffer (safeguard) where appropriate.
- STEP 3 On-screen digitize large blocks or continuities of habitat among managed areas emphasizing largest and most complete corridors and considering existing connectivity among managed areas.

*D. Distribution of Threatened (T) and Endangered (E) Species*

- STEP 1 Visually evaluate distribution of T and E species and rare communities in relation to managed areas and partner priority areas.
- STEP 2 Evaluate existing habitats for T and E species to see if there are gaps in existing managed areas or priority areas.
- STEP 3 On-screen digitize important areas based on the location, type, and number of Heritage Data points.

*E. Anthropogenic Features*

- STEP 1 Visually evaluate the location of roads, cities, and other developed features in relation to existing managed areas and priority areas.
- STEP 2 Eliminate some areas from consideration based on proximity to developed areas, lack of feasibility for restoration because of developed features, or lack of connectivity based on developed features.

Additional analysis and refinement of focus areas will be completed during the CCP process. The CCP process will include a detailed evaluation of the focus areas, although sites outside the focus areas could be evaluated should they meet the criteria for achieving Refuge goals, and should willing sellers exist. Features critical to Service goals, such as the occurrence of wetlands, grassland, oak savanna, and threatened and endangered species will form the basis of the site selection process. GIS-based algorithms will generate a list of parcels that best achieve Refuge goals and objectives (Pressey, Johnson, and Wilson 1994). This site-selection process has the flexibility to provide both alternative sites and to project a new suite of sites as lands are acquired. The presence of willing sellers will ultimately determine any acquisition for the proposed new Refuge.

It should be noted that development of this Refuge is controlled by a number of factors. They include: land availability, land ownership, topography, climate, water availability, water quality and temperature, water rights, potential for competitive water use, soil - chemistry, permeability, compaction, texture, natural resource value - endangered, threatened, candidate species; special habitats, adjacent land use, proximity to supporting infrastructure, access - roads, bridges, etc., potential and severity of major climatic disturbances, local political, social and economic factors, regulations, environmental constraints, security, upland use, and pollution, to name a few.

### **III. ALTERNATIVE CONSIDERED BUT ELIMINATED FROM DETAILED STUDY**

Many suggestions and comments were received during the public scoping process and a wide range of management options were identified. For example, numerous individuals stated that the Service should restore and preserve the former "grand marsh." Others argued that intensifying management of existing managed areas or expanding the Service's Partners for Fish and Wildlife program would meet Service objectives for the area. While each of these management options have merit, we did not recommend them for additional evaluation for the following reasons.

Restoration and preservation of the former 500,000 acre grand marsh was eliminated from consideration after careful review of land uses such as crop land and home sites, costs associated with restoring the land, and input received during meetings with the public, local officials, and landowners.

Intensifying management on existing managed areas was not recommended for further evaluation because managed lands within the Basin are already undergoing intensive management to maintain productive habitat for wildlife. Although more intensive management could perhaps increase the amount and diversity of wildlife on existing managed lands, this alternative would not result in a net gain of habitat preserved and managed, substantially improve waters entering the Kankakee River, or contribute to the long-term recovery of many Service trust resources. Therefore, due to its limited potential, this alternative was removed from further consideration.

Energetic promotion of the Service's Partners for Fish and Wildlife program may indeed generate wetland restoration projects on private lands within the Basin, which is a primary objective of this project. However, no restoration of a functioning riparian ecosystem complex, including bottomland hardwood forests and associated uplands, could be obtained or secured for present and future generations. Parcels of land that would be enrolled in private lands agreements would largely be disjointed and small, limited to where historical wetland basins occurred, and limited by a 10 year agreement. Limited protection of existing natural resources within the Basin would be afforded. There would be no active management or plan for management of Service trust species or other natural areas in the Basin. Any potential for these lands to contribute to education, research, water-based and/or wildlife-dependent recreation would be limited to the private landowner of the properties enrolled in the agreement. The Basin's water quality would not be substantially improved by this piecemeal approach. Therefore due to its limited potential, this alternative was eliminated from further consideration also.

## **IV. DESCRIPTION OF ALTERNATIVES**

### **Alternative 1 "No Action"**

Under the No Action alternative, the Service would not develop a new National Wildlife Refuge in the Basin. The No Action alternative would continue the conservation status quo. The No Action alternative would not result in the complete cessation of habitat conservation and restoration in the Basin. The No Action alternative, however, would result in less coordination among the various conservation organizations. This inefficiency could have at least two possible consequences. The first is less effective conservation of biodiversity. The second is the need to manage a larger percentage of land in the watershed to achieve biodiversity conservation goals. In the meantime, opportunities to work at the landscape scale in the Kankakee watershed rapidly disappear. Most of the threats to the watershed have been realized over the past 150 years. However, a substantial amount of oak savanna was lost in the last 20 years when several thousand acres in the Indiana portion of the watershed were cleared for a now defunct ranching operation. The southeastern Kankakee County/northeastern Iroquois County area in Illinois is similarly vulnerable.

### **Alternative 2 - Wetlands**

The wetlands alternative focuses on the protection and restoration of important wetland areas along the mainstem of the Kankakee River and its tributaries. Figure 9 indicates that both protection of existing resources and restoration would occur primarily within the riparian zone of the Kankakee and Yellow Rivers. This Action alternative would function to protect and restore forested, shrub-scrub, and emergent wetlands for the migratory bird and associated species that depend on them.

Alternative 2 would potentially link the Momence Wetlands Conservation Area in Illinois with LaSalle Fish and Wildlife Area, Grand Kankakee Marsh County Park, NIPSCO Savanna Wetlands, Kankakee Fish and Wildlife Area, and Kingsbury Fish and Wildlife Area in Indiana. It would also establish a corridor from the Menominee Wetland Conservation Area in Marshall County along the Yellow River to Kankakee Fish and Wildlife Area on the Kankakee River.

The reason for the wetland scenario in the Basin is clear: the Grand Kankakee Marsh was among the most important wetland ecosystems in the continental United States. It was important for numerous species of plants and animals including waterfowl and other wetland-dependent birds, herpetofauna, hydrophytic plants, and other biota. In addition, wetland functions such as flood water storage, ground water recharge, and water quality improvement have significant value to society.

The Grand Marsh, however, has been almost completely drained and the resulting hydrology will present numerous restoration challenges. Important considerations with respect to implementing alternative 2 include: restoring hydrology on refuge lands without affecting neighboring landowners; restoring wetlands that functionally and biologically represent pre-drained wetland types; restoring sufficient area (considering the Grand Marsh covered up to 1 million acres and the proposed Refuge would only total 30,000 acres) to return a functioning landscape; and restoring wetlands that provide multiple values important to refuge clients.

**TABLE 2.1**  
**Existing Land Use by Focus Area (in acres) in the Wetland Alternative**

| FOCUS AREA # | TOTAL  | WETLAND | GRASSLANDS/<br>PASTURE | UPLAND<br>FOREST | AGRICULTURE | URBAN |
|--------------|--------|---------|------------------------|------------------|-------------|-------|
| 2            | 1434   | 497     | 41                     | 186              | 710         | 0     |
| 3            | 3829   | 289     | 92                     | 64               | 3376        | 8     |
| 4            | 988    | 40      | 10                     | 30               | 889         | 19    |
| 5            | 431    | 108     | 20                     | 22               | 281         | 0     |
| 6            | 2027   | 727     | 172                    | 230              | 867         | 31    |
| 8            | 5807   | 2172    | 897                    | 708              | 1995        | 35    |
| 11           | 1695   | 483     | 152                    | 232              | 822         | 6     |
| 16           | 11856  | 969     | 387                    | 2937             | 7498        | 65    |
| 18           | 4121   | 939     | 127                    | 640              | 2401        | 14    |
| 19           | 7129   | 1491    | 291                    | 609              | 4724        | 14    |
| 20           | 1420   | 379     | 20                     | 191              | 830         | 0     |
| 21           | 9893   | 1967    | 180                    | 1009             | 6726        | 11    |
| 22           | 421    | 175     | 16                     | 61               | 169         | 0     |
| <b>TOTAL</b> | 50,382 | 10,236  | 1,736                  | 6,919            | 31,288      | 203   |

### Alternative 3 - Grassland

The grassland scenario focuses on the protection and restoration of important areas of grassland and oak savanna. Under this scenario, the Service would protect, restore, and enhance existing oak savanna and prairie habitat, degraded habitat, and likely work cooperatively with private landowners to manage some non-native grassland habitat. Figure 10 indicates the location of the focus areas for this alternative occur about equally in Illinois and Indiana. Leach and Ross, 1995, suggest an appropriate target for protection of oak savanna may be 2% to 3% of the land in each physiognomic province. The area of both the Central Till Plains Section (15,326,281 acres) and the smaller Grand Prairie Subsection (4,797,090 acres) were established using GIS and the digital U.S. Forest Service map of Ecological Units of the Eastern United States (Keys, et al. 1995). It is not entirely clear which of these corresponds with the physiognomic province suggested by Leach and Ross. However, if we use the smaller Grand Prairie Subsection, and generously estimate the amount of oak savanna potentially protected by the Refuge at about one-third of the 30,000 acre refuge total, only about 0.2% as a percentage of the Subsection is protected.

Alternative 3 has two main purposes: The first is to establish large blocks of contiguous grassland working with partner conservation organizations and private landowners. The second is to protect the last important remnants of the oak-savanna ecosystems. Protecting large blocks of savanna and grasslands with a focus on migratory grassland birds, which are declining faster even than forest interior species, and rare ecosystem conservation are the reasons for the grassland scenario.

**TABLE 2.2**  
**Existing Land Use by Focus Area (in acres) in the Grassland Alternative**

| FOCUS AREA # | TOTAL  | WETLAND | GRASSLANDS/<br>PASTURE | UPLAND FOREST | AGRICULTURE | URBAN |
|--------------|--------|---------|------------------------|---------------|-------------|-------|
| 7            | 2504   | 15      | 228                    | 708           | 1550        | 3     |
| 9            | 16545  | 65      | 2393                   | 4206          | 9540        | 341   |
| 10           | 4368   | 52      | 495                    | 1092          | 2724        | 5     |
| 13           | 10053  | 56      | 4903                   | 1412          | 3572        | 110   |
| 14           | 4353   | 43      | 2300                   | 244           | 1703        | 63    |
| 15           | 6736   | 71      | 2172                   | 217           | 4137        | 139   |
| <b>TOTAL</b> | 44,559 | 302     | 12,491                 | 7,879         | 23,226      | 661   |

The Kankakee River Basin and its adjacent landscape are part of the Grand Prairie Natural Region that crosses northern Illinois and juts into northwestern Indiana. The prairies and savannas associated with this region are significant ecosystems in terms of their rarity, flora, and dependent fauna. The proposed Refuge could contribute significantly to the conservation of area-sensitive migratory grassland birds with its focus on protecting or restoring large habitat blocks. We also have the opportunity to conserve other grassland fauna and rare plant species associated with savannas and prairies. Although the traditional nature preserve approach of acquiring small, high quality areas may be more efficient and effective for plant conservation, the proposed Refuge could contribute to the stability of nature preserves by buffering them and providing connectivity.

Challenges in implementing alternative 3 include: the rarity of existing undeveloped savanna; the expansion of urban sprawl into these areas and the related costs of acquiring them; the acquisition and restoration cost for grasslands; the long-range management implications of replacing the natural disturbance of fire in the ecosystem; and, technical issues in restoring native grassland. A technical problem associated with grassland restoration in light of the scarcity of existing prairie, is acquiring sufficient prairie seeds. Efforts are underway to address this problem. In 1993, the IDNR in cooperation with the Service and The Nature Conservancy (TNC) initiated a prairie nursery using seeds collected primarily from Indiana remnant prairie to provide locally collected genotypes for small-scale restoration projects. More recently, the Indiana TNC has begun a concerted effort to acquire local genotype prairie seed for the Fair Oaks farm site.

#### **Alternative 4 - Endangered Species**

The endangered species scenario focuses on the protection of federally listed species and on Indiana and Illinois state listed species. The protection of federally endangered and candidate species could be an important contribution of the proposed Refuge (Figure 11).

The federally endangered Mitchell's Satyr butterfly is restricted to a few sites mostly in Indiana and Michigan. One of the areas currently populated by Mitchell's satyr is a wetland complex in the eastern part of the watershed. The Indiana DNR and TNC currently protect some of this area, but a large portion remains in private ownership. Federally endangered Indiana bats have been located and presumably

continue to use the riparian corridor of the Kankakee River and tributary streams. The federally endangered Hine's Emerald dragonfly may also occur within the watershed although no sites are currently known. Action alternative 4 would protect essential riparian habitat along the Kankakee and Yellow Rivers for these species.

**TABLE 2.3**  
**Existing Land Use by Focus Area (in acres) in the Endangered Species Alternative**

| FOCUS AREA # | TOTAL  | WETLAND | GRASSLANDS/<br>PASTURE | UPLAND FOREST | AGRICULTURE | URBAN |
|--------------|--------|---------|------------------------|---------------|-------------|-------|
| 2            | 1434   | 497     | 41                     | 186           | 710         | 0     |
| 4            | 988    | 40      | 10                     | 30            | 889         | 19    |
| 5            | 431    | 108     | 20                     | 22            | 281         | 0     |
| 6            | 2027   | 727     | 172                    | 230           | 867         | 31    |
| 8            | 5807   | 2172    | 897                    | 724           | 1995        | 35    |
| 17           | 3574   | 822     | 326                    | 488           | 1911        | 27    |
| 18           | 4121   | 939     | 127                    | 640           | 2401        | 14    |
| 19           | 7129   | 1491    | 291                    | 609           | 4724        | 14    |
| 20           | 1420   | 379     | 20                     | 191           | 830         | 0     |
| 21           | 9893   | 1967    | 180                    | 1009          | 6726        | 11    |
| 22           | 421    | 175     | 16                     | 61            | 169         | 0     |
| <b>TOTAL</b> | 37,061 | 9,317   | 1,900                  | 4,190         | 21,503      | 151   |

One important goal for protected areas in highly modified and rapidly changing landscapes is to protect common species from becoming rare and rare species from extinction. Land use within the Kankakee River watershed has changed enormously from pre-settlement conditions, primarily from natural vegetation to agriculture. It is currently undergoing a second generation anthropogenic change from agricultural ecosystems to a more densely developed state aptly called "rurbanization" (Figure 8).

The effect of rurbanization on species dependent on the existing landscape could produce impacts as significant as those that resulted from the change from natural to agricultural ecosystems. An emerging concept in conservation biology is discontinuity and synergism which suggests that stresses to the environment can work in concert to produce rapid and unexpected environmental consequences (Myers 1996). Not only the most conservative species, but species that we cannot anticipate, could be extirpated as the watershed changes from rural to urban. The endangered species scenario would protect habitat in order to prevent species from becoming federally listed within the 2 states.

### **Alternative 5 - Hybrid Alternative (PREFERRED ALTERNATIVE)**

The Hybrid scenario combines sites that would partly or completely achieve goals within the wetlands, grassland, and endangered species alternatives (Figure 12). The Hybrid alternative Focus Areas were selected from Focus Areas in alternatives 2 through 4. Alternative 5 addresses 4 of the 6 ecotypes

selected as focus areas in the Upper Mississippi/Tallgrass Prairie Ecosystem Action Plan (EAP). These include: prairie wetland and associated habitats; tallgrass prairie and associated habitats; oak savanna and forest lands, and riparian woodland corridors and associated habitats. This alternative and the EAP also agree in terms of proposing a landscape approach to the management of oak savannas. The process by which the Hybrid alternative Focus Areas were selected involved informally scoring each Focus Area using criteria A - G listed below.

The criteria are loosely weighted with A receiving the most weight and H the least.

A = FEDERALLY ENDANGERED SPECIES HABITAT

B = AREA SENSITIVE MIGRATORY GRASSLAND BIRD HABITAT

C = FUNCTIONS TO COMPLETE KANKAKEE RIVER CORRIDOR

D = CONNECTIVITY WITH EXISTING MANAGED AREAS

E = SWEEP OF STATE LISTED SPECIES

F = RATIO OF EXISTING TO RESTORABLE HABITAT

G = ABSENCE OF INTERNAL FRAGMENTATION BY DEVELOPMENT

H = FIT WITH OTHER FOCUS AREAS FOR LANDSCAPE MANAGEMENT

The Hybrid alternative is the Service preferred alternative because it gives the Service the greatest opportunity to both address trust resources and contribute to the conservation of biodiversity in the watershed. Since the Hybrid alternative spans the proposal study area, it also gives the Service great flexibility to: 1) work with partners and cooperators to manage at the landscape scale, and 2) work with willing sellers to acquire refuge land.

All of the challenges listed for alternatives 2 through 4 apply to the Hybrid alternative. Other challenges include: determining a measure of vulnerability in order to prioritize among sites offered by willing sellers, managing dispersed units, managing disparate ecosystem types, and cooperating with landholding agencies in the watershed. The Service has begun to address those issues critical to implementing the Hybrid alternative.



**TABLE 2.4**  
**Existing Land Use by Focus Area (in acres) in the Hybrid Alternative**

| FOCUS AREA # | TOTAL  | WETLAND | GRASSLAND/<br>PASTURE | UPLAND<br>FOREST | AGRICULTURE | URBAN |
|--------------|--------|---------|-----------------------|------------------|-------------|-------|
| 2            | 1434   | 497     | 41                    | 186              | 710         | 0     |
| 4            | 988    | 40      | 10                    | 30               | 889         | 19    |
| 5            | 431    | 108     | 20                    | 22               | 281         | 0     |
| 6            | 2027   | 727     | 172                   | 230              | 867         | 31    |
| 7            | 2504   | 15      | 228                   | 708              | 1550        | 3     |
| 8            | 5807   | 2172    | 897                   | 708              | 1995        | 35    |
| 10           | 4368   | 52      | 495                   | 1092             | 2724        | 5     |
| 13           | 10053  | 56      | 4903                  | 1412             | 3572        | 110   |
| 15           | 6736   | 71      | 2172                  | 217              | 4137        | 139   |
| 17           | 3574   | 822     | 326                   | 488              | 1911        | 27    |
| 18           | 4121   | 939     | 127                   | 640              | 2401        | 14    |
| 19           | 7129   | 1491    | 291                   | 609              | 4724        | 14    |
| 20           | 1420   | 379     | 20                    | 191              | 830         | 0     |
| 22           | 421    | 175     | 16                    | 61               | 169         | 0     |
| <b>TOTAL</b> | 51,013 | 7,544   | 9,718                 | 6,594            | 26,760      | 397   |

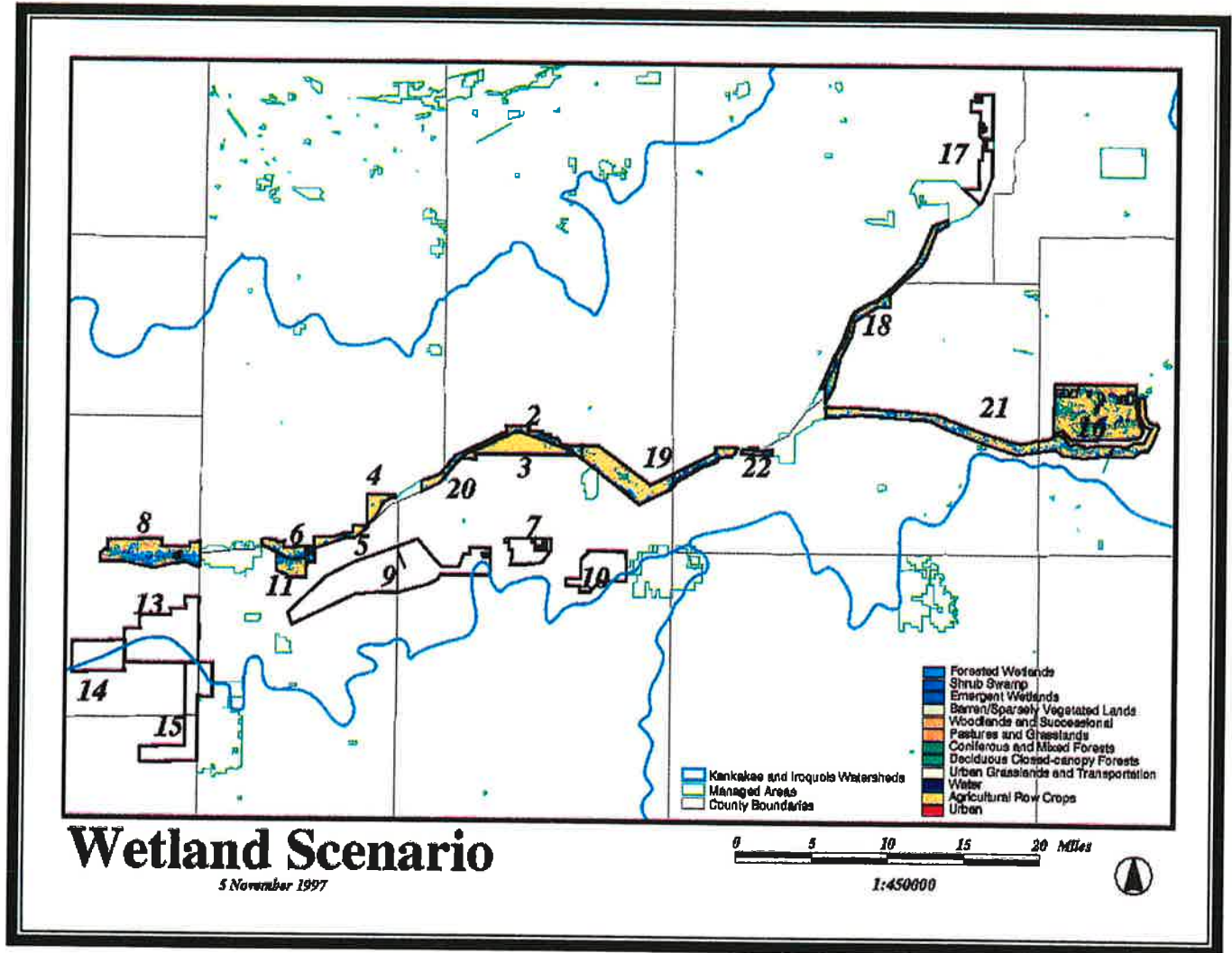


Figure 9 - Alternative 2

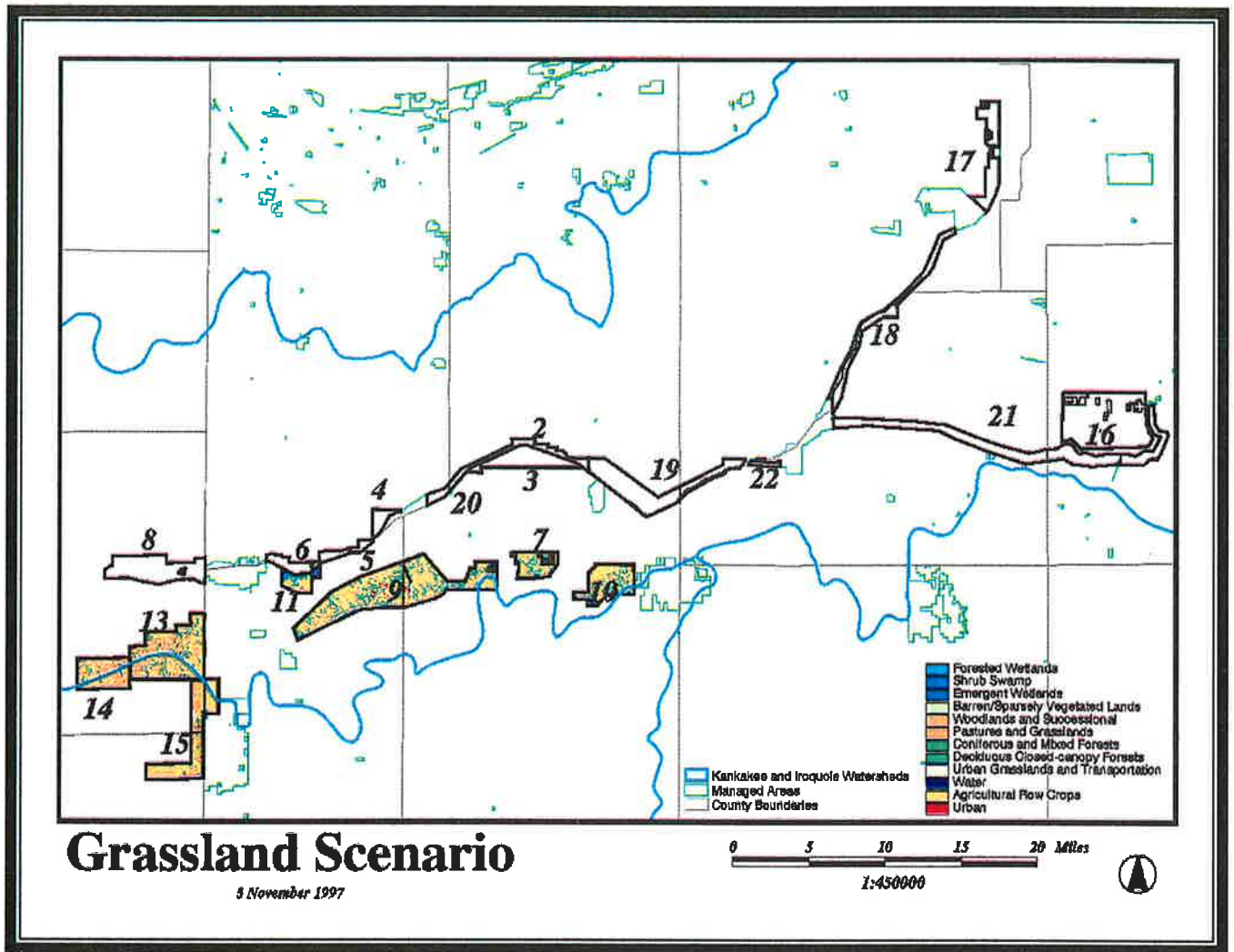


Figure 10 - Alternative 3

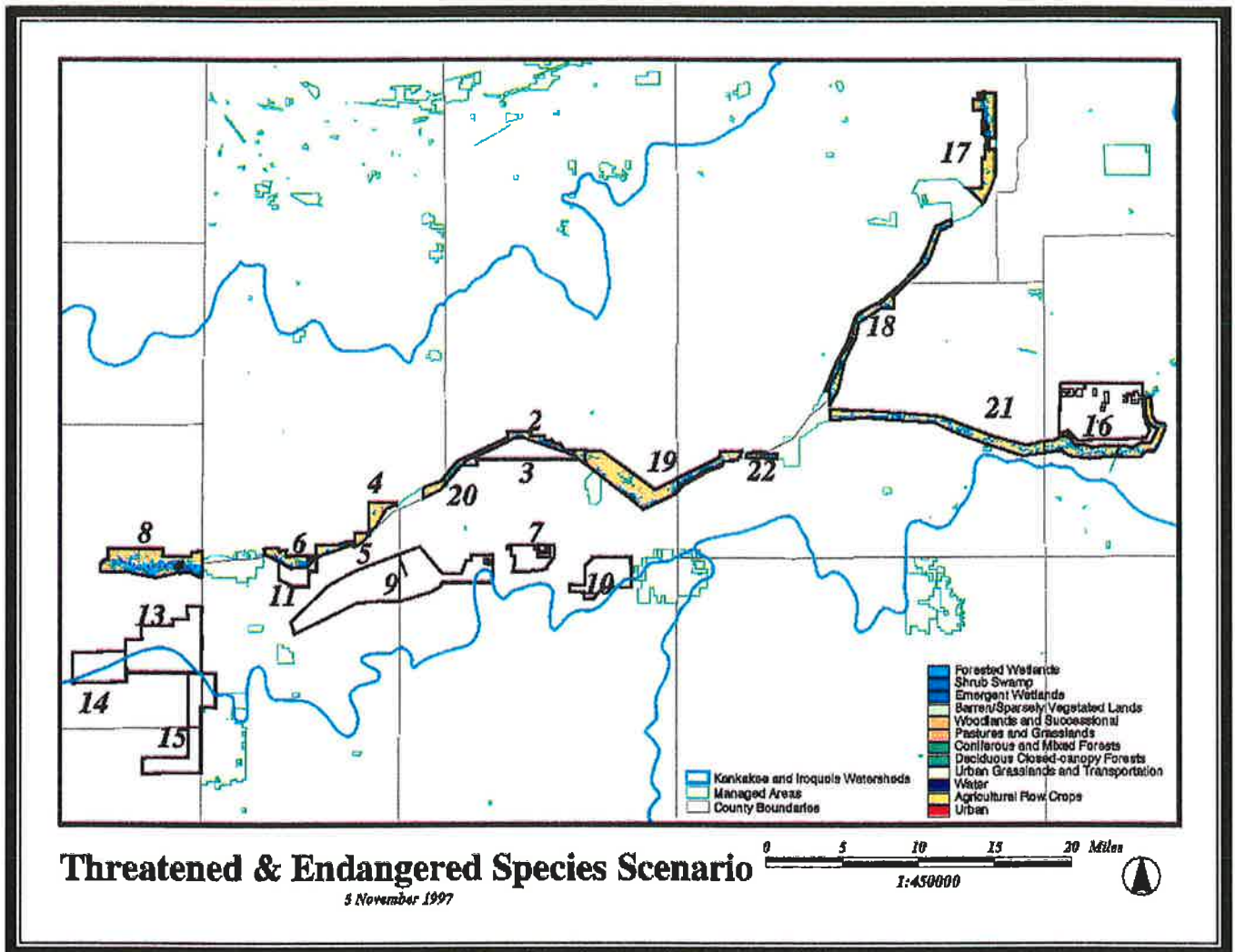


Figure 11 - Alternative 4

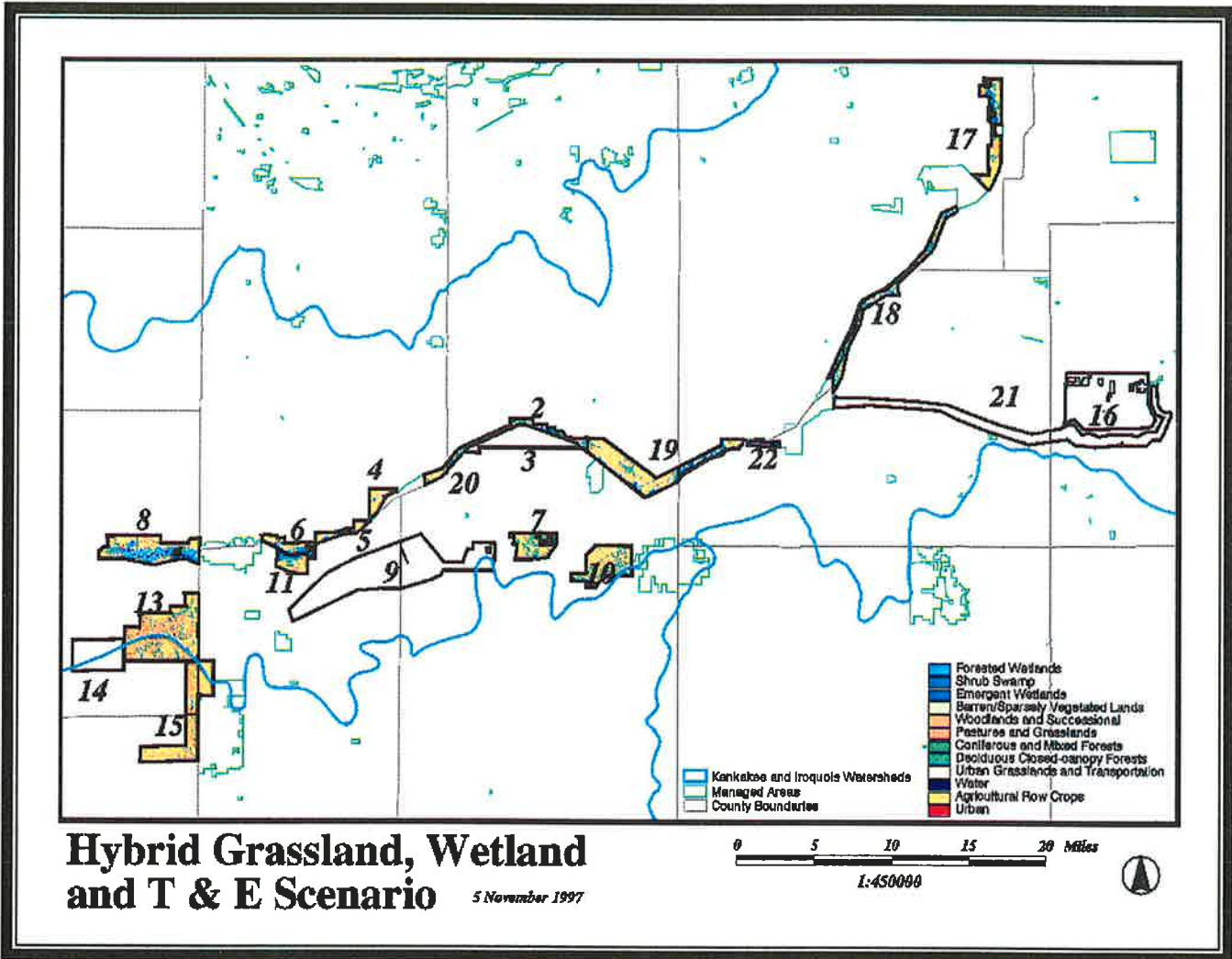


Figure 12 - Alternative 5

## CHAPTER 3 - THE AFFECTED ENVIRONMENT

### I. THE PHYSICAL ENVIRONMENT

#### 1. Project Location and Description of the Area

The Kankakee River Basin covers an area about 3.3 million acres (Figure 1) including all or portions of Ford, Grundy, Iroquois, Kankakee, Vermillion, and Will counties in Illinois and Benton, Elkhart, Jasper, Kosciusko, Lake, LaPorte, Marshall, Newton, Porter, Pulaski, St. Joseph, Starke, and White counties in Indiana, and Berrien county in Michigan.

From its source near South Bend, Indiana, the Kankakee River flows for nearly 150 miles through Indiana to its mouth at the Illinois River near Channahon, Illinois. In Indiana it flows southwest through seven artificial channels until it reaches the Illinois-Indiana border. For the next 9.5 miles the river regains its natural character and meanders through a mature floodplain forest on both sides of the river with old meanders functionally intact. It flows across a sandy bottom until it reaches Momence where there is small dam and the river begins to flow over limestone bedrock. From Momence to Aroma Park the river is less meandering and flows over a mixture of substrates alternately sand, cobble and bedrock. At Aroma Park, the Kankakee River is joined by the Iroquois River and turns north again flowing over mixed substrates and bedrock until it reaches the dam at Kankakee. The 12 foot high dam at Kankakee creates a 4.7 mile pool referred to as the "six mile pool". The river flows from Kankakee to Wilmington where an 11 foot dam creates a 2 mile pool. The Kankakee merges with the DesPlaines River near Channahon to form the Illinois River. The Kankakee River's two principle tributaries are the Yellow River and Iroquois River (Bhowmik and Bonini, 1981; Ivens et al., 1981).

Prior to channelization, the river arrived at the state line after traveling 250 miles via 2,000 bends and meanders with a gradient of about 5 inches to the mile. Today, the channel has been deepened and the distance between the two points is 82 miles (Bhowmik and Bonini, 1981; Ivens et al., 1981). Historically, the winding water flowed over sand and gravel until it reached Momence where the substrate changed to limestone bedrock. In 1878, when the U.S. Army Corps of Engineers conducted the first of five studies on the Kankakee River, Major Jared A. Smith referred to this area as the "rock ledge" at Momence. Since that time the term "rock ledge" has lead to a serious misconception that has driven much of the debate over drainage of the "Grand Kankakee Swamp". Many have the impression that the "ledge" is a single obstruction like a dam. It is actually a 4 mile reach of river where the water is flowing over bedrock (see appendix IV for a Chronology of Important Events on the Kankakee River).

The principal causes for the creation of the Grand Kankakee Marsh were continental glaciation and the Kankakee Torrent. These factors account for why most of the Grand Marsh formed in Indiana, the large expanse of sand dune and swale topography, and why the river past Momence develops a higher energy and much steeper descent: 25 feet over 14 miles from Momence to the confluence of the Iroquois, and then 103 feet over 33.5 miles to its mouth at the Illinois River (Bhowmik and Bonini, 1981; Ivens et al., 1981).



View of the Kankakee River looking east from near the Indiana/Illinois state line.



View of the Kankakee River looking west from near the Illinois/Indiana state line

## 2. Climate

The climate of the Kankakee Basin is temperate continental, marked by cold winters, warm and humid summers, and the lack of a pronounced dry season. The climate of the northern half of the Basin is influenced by its proximity to Lake Michigan. Lake-effect climatic conditions include warmer autumns, cooler springs, higher humidity, increased winter cloudiness, and greater amounts of snow than areas of comparable latitude (Beatty, 1990). In general, the lake produces a marine effect moderating the continental climate of northern Indiana and Illinois.

Total annual precipitation in the Indiana portion of the basin averages approximately 38 inches/year (Beatty 1990), with nearly 22 inches of this falling between mid-April and mid-October. Of particular note, lake-effect snows that affect the northeast part of the Basin can produce twice the annual snowfall of the southern and western areas of the Basin (Beatty 1990). In a year of average precipitation, it is estimated that 30 inches is lost to evaporation, yielding a water surplus in a normal year (Beatty 1990). This has importance for the availability of water and associated stream flow and recharge of wetlands within the Basin.

The average annual temperature within the Indiana portion of the Basin averages 50° F. The main valley of the Kankakee River has the shortest growing season in Indiana (150 days) primarily because of the low-lying terrain and sandy soils covered by organic material. These soils, because they gain and lose heat rapidly, are particularly susceptible to frost (Beatty 1990). Conversely, the northern portion of the Basin has a comparatively long growing season (170 days) because of its proximity to Lake Michigan.

### 3. Geology

The Kankakee River Basin consists of glacial deposits over paleozoic bedrock (Gross and Berg 1981). The landscape is attributable to events that took place during the latter part of the Wisconsin glaciation from about 24,000 - 10,000 years ago. Most relevant to current fish and wildlife resources are the occurrence of a glacial lake encompassing what is now the Kankakee River floodplain, and windblown sands that formed dunes along the southern margin of the existing Basin. About 14,000 years ago, drainage from the Lake Michigan, Saginaw, and Erie lobes discharged meltwater into the Kankakee Basin. This lake produced a broad flat flood-basin that is approximately 2 miles wide near the city of South Bend, Indiana and spreads to about 8 miles wide at the Indiana-Illinois State line (Beatty 1990). As the glacial lake receded, sand deposited in a belt that ranges from about 20 miles wide in Iroquois County, Illinois, to 30 miles wide in Starke County, Indiana, was exposed to primarily western winds that formed an extensive area of dunes. These lie mostly south of the present day Kankakee River in Newton, Jasper, Starke, and Marshall Counties in Indiana and Kankakee and Iroquois Counties in Illinois (Gross and Berg 1981). These dunes stand from 15 to 50 feet above the surrounding floodplain and are oriented north-south reflecting predominately westerly winds (Beatty 1990).

### 4. Soils

Soil is formed through the interaction of climate, living organisms, and landscape position with the glacial and bedrock parent material over time (Broderson 1991). Principal soils of interest for the proposed Refuge include: the Maumee-Gilford-Sebewa association on the lacustrine and outwash plains of the main Kankakee River valley that are nearly level, very-poorly drained soils formed under native grasses and mixed water-tolerant hardwoods; Genesee-Eel-Shoals, Tracy-Door-Ly dick, and Oshtemo-Fox and Fox-Ockley-Westland associations located on alluvial and outwash deposits, and formed under mixed hardwood trees except on Door (prairie grasses) and Ly dick (prairie grasses and trees); the Plainfield-Maumee-Oshtemo association located on *eolian* sands and formed under prairie grasses and black oak (*Quercus velutina*); and, Brookston-Odell-Corwin and Parr-Brookston associations which formed in thin loess over glacial till and Markham-Elliott-Pewamo which formed in clayey glacial till, all of which formed under prairie grasses (Beatty 1990).

Under current land use, soils in the Basin support predominately agricultural ecosystems. At least 3 elements, however, lower the suitability of large areas of soils within the Basin for agriculture. They are erosion, drought, and poor drainage. The most extensive of these is that many soils in the Basin have poor natural drainage and even in artificially-drained areas, wetness, ponding, and flooding can pose moderate-to-severe limitations (Beatty 1990). The continuing difficulties with large-scale agricultural production on one of the world's largest historic wetlands was the driving force behind the establishment of the Kankakee River Basin Commission and the study by SEG Engineers.



## 5. Water

Groundwater in the Kankakee basin is used primarily for domestic water supply with surface water used for agriculture and recreation. Groundwater in the Basin originates in 3 aquifers: the Valparaiso Outwash Aquifer, the Kankakee Aquifer, and the St. Joseph Aquifer. Surface water in the Basin originates in irrigation ditches near South Bend, Indiana which become the Kankakee River approximately 8 miles southwest.

Water has played the key role in the physical, biological, and socio-economic environments of the Basin. When the Wisconsin glaciation ended approximately 10,000 years ago, meltwater covered the Basin with large lakes and the erosive forces of the Kankakee Torrent contributed to the surficial geology of the Basin. Water continued to be the dominant factor driving the ecosystem until European settlement in the mid-19th century.

The Grand Marsh posed a formidable challenge to the settlement of the Indiana part of the Basin. As early as 1849, the Indiana General Assembly authorized projects to begin draining the area. By the early part of the 20th century, a system of ditches and levees supported a predominately agricultural landscape. Since that time, it has become essential to many Indiana farmers that the Kankakee River function as an agricultural drainage ditch. In Illinois, where the Kankakee River has not been channelized, the Kankakee exists in a near natural condition especially between the Indiana state line and Momence, Illinois, where the river meanders through natural winding channels, high-quality shrub swamps, and mature floodplain forests. Although the landscape is predominately agricultural, Illinois farmers are not nearly as dependent on the Kankakee River as their principal conduit for agricultural drainage as are many of their Indiana counterparts.

In Illinois, the Kankakee River, based on biological parameters, has among the best water quality of any river in the state. The water in the Kankakee has been variously classified as "excellent among Illinois streams", and a "Class B Stream (Highly Valued Aquatic Resource)", and included on a list of outstanding Illinois aquatic ecosystems (Kwak 1993). In Indiana, based on the Index of Biotic Integrity (IBI), 76% of stream miles surveyed fully or partially support aquatic life use, while 24% are not supportive. Low IBI values were primarily attributable to lack of habitat, and to a limited extent, low dissolved oxygen (IDEM, 1995).

## 6. Sedimentation

The deposition of sediment in the Kankakee River has long been an issue with its users. Concern exists that materials carried downstream from the channelized portions of the river settle out when they reach the natural river in Illinois, causing flooding and limiting the overall recreational and ecological value of the river. Recent studies on sedimentation by the U.S. Geological Survey on the meandering portions between the state line and the Momence Wetlands and Six-Mile pool above the Kankakee dam found substantial amounts had accumulated in recent years. From 1980 to 1994, 133,600 cubic yards of sediment had accumulated along the Momence Wetlands. Between 1978 to 1980, 115,700 cubic yards had accumulated in Six-Mile pool and from 1980 to 1994, sediment in the pool grew by another 182,900 cubic yards.

## 7. Flooding

Currently the Kankakee River overflows its banks an average of every two years. These flooding events combine large volumes of water with unusually low peaks and extremely long durations. This is principally due to the large expanse of flat land that holds the water for extended periods of time. Data beginning in 1926 show that annual flood peaks are increasing due to intensified agricultural practices, diking and pumping, and urban growth (Kankakee River Basin Commission, 1989).

The frequent flooding in the Basin is the result of several factors, including 1) the loss of river capacity due to channelization, 2) increased runoff to the river and its major tributaries due to agricultural drainage and urban/rural development, 3) loss of wetlands to retain and slowly release flood waters, 4) erosion of topsoil due to inadequate land treatment practices, and 5) bank erosion along the river and its tributaries as a result of increased peak flows. Not only does the Kankakee River and its tributaries receive increasing amounts of runoff, increased deposition and build-up of sediments within the river and its tributaries are reducing the capacity to retain these waters within the river banks. Further, due to the flatness of the Basin, floodwaters have the potential to affect large acreages.



Modern-day flooding and sedimentation not only cause monetary damages to local property, they also destroy natural resources and degrade and/or restrict many recreational uses of the river.

Flooding along the Kankakee's main channel in Indiana impacts 106,150 acres, of which 86,060 are cropland. A 1976 study placed the extent of annual damage at \$1,420,000, which in 1997 dollars is \$4,250,000. With respect to tributaries, that same study found that flooded land amounted to 91,000 acres and produced damages estimated at \$1,234,700, or \$3,690,000 in 1997 dollars. Another study in Illinois found that flooding along the Illinois portion of the river produced similar damages. It was estimated that over 10 percent of the land within the Basin floods and annual damages along the Kankakee, Iroquois, and Sugar Creek could be as high as \$1,240,000 (1997 dollars). Recent estimates of flood damages within the Basin indicate annual damages in excess of \$14 million.

## 8. Archeological Resources

Numerous archeological sites are known to exist in the Kankakee River Basin. The following data indicate the known archeological sites within each of the counties that comprise most of the Basin: Iroquois - 204 sites, Kankakee - 486 sites, Will - 1,682 sites, Porter - 515 sites, St. Joseph - 342 sites, Lake - 443 sites, LaPorte - 247 sites, Starke - 113 sites, Newton - 180 sites, Jasper - 66 sites, and Marshal - 363 sites. The river and its tributaries offered native peoples excellent transportation and sites rich in essential resources.

## II. THE BIOLOGICAL ENVIRONMENT

The Keystone Center, 1991, defines biological diversity as the variety of life and its processes including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. Biological diversity can be considered at a minimum of 4 levels: *genetic level, species level, ecosystem level, and landscape level*. In order to manage the biological resources of the Basin, it is necessary to work at the species, ecosystem, and landscape levels.

Because the Basin exists at the edge of the prairie biome, numerous species occur at the edge of their ranges there. The area remains important for those organisms inhabiting prairie-wetland and the transition zone between prairie and oak-hickory forest. Considerations of genetic diversity may be particularly important for these species, but for practical reasons, planning to actively conserve genetic diversity will constitute a minor component of Refuge development.

To limit the complexity of the discussion, we consider the various levels of biological diversity independently here. However, the levels of biological diversity are inextricably interrelated on the ground. Species are how we typically measure biological diversity and they historically represent the principal focus of wildlife managers.

### 1. Species Level Biological Diversity

#### A. Plant Species

The protection of plants by means of the proposed Refuge will focus on three categories of plants: 1) Federally listed (endangered, threatened, and candidate) plants or plants necessary to the viability of populations of Federally listed species; 2) those that biologists within the Indiana DNR Division of Nature Preserves (DNP) and Illinois DNR consider particularly vulnerable; and, 3) plants that would best be protected by the proposed Refuge's landscape approach.

#### B. Threatened and Endangered Species

Restoration of the wetland-prairie/oak savanna landscape would also benefit other historically important and ecologically significant species. Federally endangered, threatened, and candidate species within focus areas in the Basin include Mitchell's satyr butterfly and Indiana bat. The entire Basin holds more than 200 state-listed species including the western sand darter (*Etheostoma clarum*), northern leopard frog (*Rana pipiens*), eastern massasauga (*Sistrurus catenatus catenatus*), Franklin's ground squirrel (*Spermophilus franklinii*), and Kankakee mallow (*Iliamnaa remota*). One important outcome of the proposed Refuge would be to avert possible Federal listing of some of the numerous Illinois and Indiana state-listed species occurring in the Basin. While not a primary goal of the Refuge, the recent successful reintroduction of the northern river otter (*Lutra canadensis*) by the Indiana DNR in a neighboring watershed suggests opportunities for the reintroduction of other extirpated species into a landscape of protected areas. Examples could include prairie chicken and bison (*Bison bison*). The latter would reintroduce a large herbivore and an important component of the prairie/savanna ecosystem.

### C. Invertebrate Species

The Kankakee River in Illinois supports a diverse mussel fauna (20 species) including 10 species that are listed under the Illinois, Indiana, or Federal Endangered Species Acts. The Federally endangered Higgin's eye (*Lampsilis higginsii*) and the state endangered rainbow (*Villosa iris*), snuffbox (*Epioblasma triquetra*), and spectaclecase (*Cumberlandia monodonta*) do not have recent live records and may be extirpated from the drainage (Kwak 1993).

State-listed species extant in the "Kankakee River Resource Rich Area" in Illinois, which corresponds closely with Refuge focus areas include: slippershell (*Alasmidonta viridis*) (state threatened (ST)), spike (*Elliptio dilatata*) (ST), sheepnose (*Plethobasiscus cyphus*) (state endangered (SE)), purple wartyback (*Cyclonaias tuberculata*) (ST), black sandshell (*Ligumia recta*) (ST), salamander mussel (*Simpsonaias ambigua*) (SE), and ellipse (*Venustaconcha ellipsiformis*) (Special Concern) (Francis Harty, Illinois Dept. of Natural Resources, 9 March 1997, facsimile communication; Illinois Natural History Survey Mollusk Collection Database 1999).

The Federally endangered Hine's emerald dragonfly does not likely occur in the Basin, but the area has not yet been adequately surveyed and suitable habitat for this species may exist (Tim Cashatt, Illinois State Museum, 29 July 1997, telephone conversation).

### D. Fish Species

Fishing on the Kankakee River is a major recreational activity in northwestern Indiana and northeastern Illinois. The Kankakee River in Illinois is a premiere smallmouth bass stream and holds past state records for several recreational species. Ninety-nine species of fish in 19 families have been collected in the Kankakee River (Kwak 1993). In addition, the Illinois DNR lists 6 species in the Kankakee River Resource Rich Area as either state endangered or state threatened. They are: western sand darter, northern brook lamprey (*Ichthyomyzon fossor*), river redhorse (*Moxostoma carinatum*), pallid shiner (*Notropis amnis*, *Hybopsis amnis*), ironcolor shiner (*Notropis chalybaeus*), and weed shiner (*Notropis texanus*). The varied fish fauna of the Kankakee River has long been valued as a food and recreational resource by the people of the Basin.

### E. Amphibians and Reptile Species

Herpetofauna are increasingly the concern of conservation biologists (Blaustein, Wake, and Sousa 1994). Nearly 15 years ago, Minton 1982, perceived declines of some species in Indiana including the cricket frog (*Acris crepitans*), the northern leopard frog, and the striped chorus frog (*Pseudacris triseriata triseriata*). Although we do not completely understand the apparent decline of certain amphibian populations, habitat loss and fragmentation may play an important role. Wetland protection and linking isolated wetlands into a landscape complex in the Basin could be important for the long-term survival of some amphibian species.

### F. Bird Species

The restoration of wetland complexes containing large, interconnected habitat patches would provide habitat for a variety of area-sensitive (birds that have minimum area requirements) wetland-dependent

birds including the least bittern, American bittern, black tern, sedge wren, and prothonotary warbler which currently breed in the Basin. Numerous other wetland or successional habitat-dependent species including several on the list of Migratory Non-game Birds of Management Concern in the United States (1995 List) occur in the Basin (Office of Migratory Bird Mgt. 1995).

The 1995 List contains 122 species and documents habitat loss as the primary threat to 80% of those species (Office of Migratory Bird Mgt. 1995). Grassland species of management concern on the 1995 List that would benefit from prairie/savanna restoration and protection in the Kankakee Basin include: grasshopper sparrow, bobolink, Henslow's sparrow, field sparrow, eastern meadowlark, dickcissel, and upland sandpiper. The proposed Refuge's contribution to large scale prairie restoration in the Basin will provide necessary habitat particularly for area-sensitive non-game grassland birds. Herkert 1994 identified the following grassland species breeding in northeastern and east-central Illinois as area sensitive: grasshopper sparrow, Henslow's sparrow, bobolink, savannah sparrow, and eastern meadowlark.

The wetlands of the Kankakee remain a significant breeding area for waterfowl despite habitat loss and fragmentation. Dubowy and Hartman, 1995 studied waterfowl nesting in the Basin and found mallards, blue-winged teal, and wood ducks exhibited a nesting density of 0.8 pairs/wetland acre in natural and restored wetlands within the Basin. In addition, tens of thousands of migratory waterfowl depend on the wetlands of the Kankakee River Basin. Waterfowl hunting remains an important recreational activity in the area with a tradition going back to the days of the Grand Marsh.

The Basin currently supports up to 100% of the eastern population of greater sandhill cranes (*Grus canadensis tabida*) during migration. Sandhill cranes now use primarily 1 site, the Jasper-Pulaski Fish and Wildlife Area, to stage during migration. The realization of the proposed Refuge would provide additional protected habitat for this species. One objective of the Refuge is to spread out the population of birds to avoid potential loss to disease, catastrophic weather, or other stochastic events.

## G. Mammal Species

The mammals of principal concern within the Basin are those historically associated with grassland ecosystems and, therefore, several occur at the edge of their ranges. Illinois has no mammals on the state list. The Federally endangered Indiana bat (*Myotis sodalis*), and the following Indiana-listed species occur within the Basin: American badger (*Taxidea taxus*), bobcat (*Lynx rufus*), Franklin's ground squirrel (*Spermophilus franklinii*), northern river otter (*Lutra canadensis*), plains pocket gopher (*Geomys bursarius*), and western harvest mouse (*Reithrodontomys megalotis*).

## 2. Ecosystem Level Biological Diversity

Ecosystems are defined as the interacting parts of the physical and biological worlds (Ricklefs 1990). There are three ecosystems of primary importance with respect to the Kankakee River Basin: wetlands, savannas, and prairies. Historically, ecosystem level protection has occurred through regulatory programs such as Section 404 of the Clean Water Act, and by protecting habitat for refuges, state-protected areas, and preserves.

In the Kankakee River Basin, several examples of each ecosystem are protected in existing managed areas. Wetlands are an important component of most of the managed areas in the Basin. More than 1,000 acres of wet prairie and sedge meadows are protected at the Iroquois County State Conservation Area and the Beaver Lake State Nature Preserve and over 2,000 acres of high-to-fair quality oak savanna are protected among several state-owned areas in Indiana and Illinois. In addition, TNC's Fair Oaks Farm restoration project could result in restoration of approximately 7,200 acres of grasslands (TNC 1997). While state agencies and private organizations have made significant strides in ecosystem protection, for the most part, protected areas remain isolated, and ecosystems are unrelated to one another in the landscape.

#### **A. Wetland Ecosystems**

Wetlands have declined at an alarming rate. The State of Illinois has lost more than 85% of its pre-settlement wetlands and the State of Indiana has lost about 87% (Dahl 1990). Of the approximately 5.6 million acres of pre-settlement wetlands in Indiana, approximately 15% were found in the Grand Kankakee Marsh. Abundant, diverse, and functioning wetlands provide a broad range of benefits to society. The value of wetlands have been accepted by multi-disciplinary forums (National Wetlands Policy Forum 1988). Wetland ecologists classify these values into 3 categories: population, ecosystem, and global values. Population values consist of habitat for a wide variety of species and related recreation values. For example, about 35% of all endangered animal species require wetlands during their life cycles (National Wetlands Policy Forum 1988). Ecosystem values include: flood water storage, water quality, and sediment control. Global values may include maintenance of the biogeochemical cycles of nitrogen, carbon, and methane (which may be important in preservation of the ozone layer).

Wetlands are among the most productive areas on earth. These diverse systems provide the biological interface between the aquatic and terrestrial communities, which multiply their function and contribute to their dynamics. Within wetlands, invertebrates, insects, gastropods, and other organisms living among the vegetation provide an important food source for fish and mammals. Waterbirds and other wildlife rely on wetlands for subsistence, nest sites, and cover, while others utilize fish and invertebrates which inhabit the vegetation. Where natural processes are still occurring, zonation and succession in response to environmental conditions are among the important community processes. Water level fluctuations and the resultant plant and animal response is often the most significant driving force in most wetland communities.

Another ecologically important aquatic habitat found along the Kankakee River are side channels, which are defined as all departures from the main channel in which there is current during normal river stage. These areas are characterized by low current, soft bottom, and reduced turbidity, and provide important food sources of zooplankton, phytoplankton, and benthic organisms for fish, waterfowl, and migratory birds. Side channels often have a greater production and diversity of benthic organisms, phytoplankton, and aquatic macrophytes than the main channel due to their structural diversity that ranges from fast flowing chutes with high banks, to sluggish streams moving through marshy areas.

Water quality, quantity, velocity, timing, frequency, and duration are the primary determinants of a river's floodplain structure and function. When a river floods under natural conditions, it alters its shape by scouring new channels and inundating riverside lands, depositing sediments, and building new banks and beaches. These functions, called reset mechanisms, are as important to a healthy river system as a fire is to a prairie.

During the annual spring flood, fish and other aquatic life are transported to inundated floodplain nursery and spawning habitats. As the water naturally recedes, it forces the spring's production into the web of larger fish, fish-eating birds, and alike. It also allows the transfer and incorporation of organic materials, such as leaves and decaying branches found in the floodplain, into the river's base food webs.

The summer's dry cycle seasonally exposes mudflats where sediments dry and compact, organic material breaks down, and moist soil vegetation (annuals) begin to grow. The annual fall flood makes the summer's bounty available to migrant and resident wildlife and fish. It also provides fish and other aquatic life access to wintering areas that have adequate food supplies and relatively slow currents.

The construction of levees and channels has altered the natural structure and function of the river-floodplain relationship. The seasonal hydrologic pulsing that normally provides the vehicle for transfer between the floodplain and the river has been modified. Vast floodplain areas have been virtually excluded from the river system through levee and channel construction.

Historically important, the Kankakee River Basin remains significant in terms of existing wetland resources. Areas of protected wetlands in Illinois and Indiana include: the Momence Wetlands Nature Preserve and the Momence Wetlands Land and Water Reserve, Kankakee River State Park, and the Des Plaines Wildlife Conservation Area in Illinois; and, LaSalle, Kankakee, and Kingsbury, Jasper-Pulaski, and Willow Slough Fish and Wildlife Areas, and Potato Creek State Park in Indiana. The 500,000 to 1,000,000 acre wetland area that once existed in the Basin obviously affords the opportunity for landscape scale wetland restoration. The IDNR has funded a remote sensing study of the wetland restoration potential in the Basin similar to that conducted for the Indiana Gap Analysis project in the Eel River watershed (Yang et al. 1996). Wetland restoration efforts are currently underway in the Basin, most notably the Indiana Partners for Wildlife Habitat Restoration Project and the Indiana Grand Kankakee Marsh Restoration Project of the North American Waterfowl Management Plan.

## **B. Savanna Ecosystems**

Savanna is defined as a variety of related plant communities found around the world consisting of open-grown trees, found scattered or in small groves, with a primarily grassy understory. Botanists typically use tree density to distinguish between prairie, oak savanna, and forest. In Indiana and Illinois, tree canopy cover from 10% to 80% can define oak savanna ecosystems. Natural processes important in the formation of Midwest oak savanna include: fire, climate, topography, soil, and large herbivores (Nuzzo 1986). In addition, savanna is typically a transitional community between forest and grassland where it occurs in the United States.

Midwest oak savannas are among the world's most threatened communities (Anderson, et al. 1993). Although what remains in the Kankakee Basin is among the most concentrated occurrence of northern black oak savanna in the nation, loss to development continues to be a serious threat. In addition to loss,

many remaining savannas are severely degraded primarily because of the absence of fire critical to the maintenance of this system. Prompt management and protection efforts are required to conserve what remains.

The southeastern Kankakee County/northeastern Iroquois County area in Illinois has the potential for large-scale management for oak savanna. Recent work by Banks et al. preliminarily confirms the existence of significant remnant savanna in the Indiana portion of the Basin. Landscape level management of sand savannas in this region is a priority for the Indiana DNR and the Indiana Field Office of TNC. The Midwest Oak Ecosystem Recovery Plan (Leach and Ross 1995) lists as goal 2: "establish a networked system of reserves that captures the full array of oak ecosystem species, communities, and processes, and that conserves viable populations of all plants and animals known to inhabit them." Other listed goals include the establishment of buffer areas and the development of stewardship and education networks.

### **C. Prairie Ecosystems**

Prairie is a general term for several types of grass-dominated ecosystems. In Indiana, tall-grass prairie historically covered approximately 13% of the state and yet in the late 1960's, Lindsey found only 1 remnant large enough to allow him to consider prairie a landscape type (Lindsey, Schmesz and Nichols 1969). In 1978, the Illinois Natural Areas Inventory identified only 2,352 acres of high quality prairie scattered over 253 areas, with a full 73% occurring along railroads and in cemeteries (White 1981). Many small remnants exist in the study area, but will require intensive management to preserve their diversity. Even under careful stewardship, small, isolated "islands" exhibit the twin problems of the loss of some conservative species and the domination of opportunistic species (Noss and Harris 1986).

Betz, 1978, divides the prairies of Indiana into 3 major types: sand prairies and black oak savannas; black silt-loam prairies; and, dry gravel-hill prairies. Approximately 50% of the Indiana prairies were sand prairies and black oak savanna. White and Madany, 1981, classified prairie communities of Illinois into 6 subclasses: Prairie subclass, Sand Prairie subclass, Gravel Prairie subclass, Dolomite Prairie subclass, Hill Prairie subclass, and the Shrub Prairie subclass. The railroad prairie remnants identified by Bacone and Harty in the Kankakee Sand Area (contained mostly in Kankakee and Iroquois counties) consisted of predominately sand prairie and 1 gravel prairie site (Bacone and Harty 1981). Because particularly the black silt-loam prairie soils are agriculturally valuable, little of the eastern tall grass prairie remains anywhere.

Until 1997, when TNC completed the purchase of approximately 7,200 acres of the 19,760 acre Prudential farm, little opportunity existed to restore a large, functional prairie ecosystem. Prairie restoration and management has typically been conducted on a much smaller scale. TNC's property, along with Indiana DNR and Illinois DNR properties, provide the core around which additional prairie restoration and complementary management of other ecosystems can occur. These core areas provide the possibility for the restoration and management of prairie as part of a biologically diverse landscape.



### 3. Landscape Level Biological Diversity

Landscape is defined as a number of interacting stands or ecosystems repeated in similar form over a kilometer wide area (Forman and Godron 1986). For convenience, we can think of it as a regional view of biological diversity. Until recently, there has been very little work, particularly in the Midwest, to protect biological diversity at the landscape scale. In order for the proposed Refuge to exist as part of a functioning landscape, the Service will have to: 1) protect and restore ecosystems historically occurring in the landscape across a significant portion of the Basin, 2) arrange protected areas so that the arrangement of ecosystems mimics the natural organization, e.g., between the Kankakee River and riparian forest adjacent to wet prairie surrounding oak savanna, 3) work cooperatively with a broad array of partners to manage public and privately owned land in order to mimic natural processes, e.g., fire, flooding, succession, and providing connectivity to the matrix in which the refuge would occur.



Management at the landscape level goes well beyond the scope or authority of any one agency. To be successful, it will take a true partnership among government, conservation organizations, and the citizens of the Basin. A partnership to manage a landscape represents decades of cooperative effort, but may be the only way to both protect biodiversity and sustain economic development in the region.

## III. THE SOCIOECONOMIC ENVIRONMENT

The socioeconomic environment of the Kankakee River Basin is discussed in detail in the appended *Economic Impact Assessment Of The Proposed Grand Kankakee Marsh National Wildlife Refuge* prepared by the Department Of Agricultural Economics At Purdue University.

## **CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES**

This chapter evaluates the potential environmental consequences or impacts of the No Action alternative and the four Action alternatives with regard to the opportunities and issues raised during the scoping process and as a result of the DEA review (see Chapter 1 "scoping and public involvement"). The No Action alternative, which assumes a status quo condition, is used as a yardstick by which to measure the impacts of the Action alternatives.

In evaluating the potential environmental consequences for the five alternatives, it must be noted that because of the willing seller only acquisition policy of Alternatives 2-5, there is no reliable way to predict when or where particular land parcels might be acquired. Based on this uncertainty, it is problematical at best to identify specific time schedules with locations for implementation of Refuge management programs and land use changes. In order to facilitate meaningful analysis, project acquisition and development was projected to take 30 years. In reality, it may take much longer. In the meantime, acquired areas would be developed and management programs would proceed according to the size and location of lands purchased.

### **I. POTENTIAL IMPACTS TO THE PHYSICAL ENVIRONMENT**

#### **Alternative 1 - No Action**

##### **Water Quality in the Kankakee River**

Waters of the Kankakee and its tributaries would likely remain about the same with the No Action alternative, or could gradually improve as the technology, techniques and regulations evolve to address the problems associated with sedimentation, chemical runoff, and the discharge of urban and industrial waste. Sediment loads would remain fairly high as long as the river's bare, unprotected river banks continue to erode and farming continues on the valley's slopes. USDA soil conservation requirements currently minimize soil erosion on participating farms with highly erodible soil, but large amounts of sediment and farm chemicals continue to enter area waterways. Annual flooding would continue to cause erosion on affected bottomland farm ground. Additional clearing of bottomland forests unprotected by existing regulations would exacerbate this problem by reducing sites for floodwater retention and ground water recharge, and increasing the likelihood of stream bank erosion. In addition, population growth and the expansion of urban areas in the Basin, will subject increasing areas of soil to disturbance and development.

Compared to other "Major Land Resource Areas" of Indiana, the Kankakee Basin has a lower than average overall rate of erosion. Nationally, soil erosion has declined by about 42 percent between 1982 and 1997 (USDA.) . However, Indiana still loses between 50-100 million tons of soil per year and Illinois loses more soil by water erosion than any other state in the Nation, with the exception of Iowa (Natural Resource Conservation Service, 1995).

Under the No Action alternative, U.S. Department of Agriculture (USDA) programs, like the Conservation Reserve Program (CRP), designed to conserve soil resources, would continue. Other government programs such as "Rule 5" (327 IAC 15-5), administered by the Indiana Department of Environmental Management (IDEM) would have some positive impact on soil erosion caused by

development. Neither program would likely have a significant effect on erosion or the conversion of productive soils resulting from low density housing and other developments less than 5 acres.

IDEM selected the upper Basin for a study of ground water quality because of its high susceptibility to ground water contamination and because the Basin is characterized by intensive farming. The ground water in the study area contains elevated levels of nitrates and low level detections of pesticides, although contamination by nitrates was confined to only 11 of 27 sample sites and only 2 of the 11 exceeded 10 mg/l (IDEM 1993). Under the No Action alternative, we would expect the current trend of limited groundwater contamination to continue. Increased development in the Basin, however, may elevate the risk for ground water contamination since underground storage tank leaks, hazardous materials spills, and waste disposal activities are leading causes for ground water contamination in Indiana (IDEM 1993).

IDEM, 1995, characterizes the surface water quality in the Kankakee River as "generally good throughout". Metals and sewage-related problems accounted for most of the impairment identified in the 1,638 stream miles assessed in the Indiana portion of the basin. Kwak, 1993, reviewed several studies of water quality in the Illinois portion of the Kankakee and concluded the quality of the water and sediments in the River relatively unpolluted. The No Action alternative would likely result in some degradation of surface waters with increased development.

An emerging problem tied to the Kankakee watershed is hypoxia or reduced oxygen in the Gulf of Mexico. Studies over the last several years have identified 42 sub-basins of the Mississippi River that contribute nutrients, primarily nitrogen, to the Gulf via the Mississippi River. Data beginning in the 1900's indicate that nitrate concentrations in the Mississippi have increased by a factor of from 2 to 5. These increased levels of nutrients are believed to be a partial cause of the extensive area (5,500 sq.mi.) of low dissolved oxygen in the Gulf. The interagency working group studying the problem has identified the Illinois River Watershed in Indiana and Illinois (primarily the Kankakee drainage) as among the highest source areas for nitrogen in the Mississippi basin (Goolsby, et al. 1999). Although point sources are a significant factor within the Illinois River watershed, fertilizer applied to agricultural land and particularly nitrates entering rivers via tile-drained agricultural land appears to be an important source of contamination to the Gulf. Under the No Action alternative one would expect increased efforts to tile drain and farm the extensive areas of historic wetland within the basin to aggravate this national problem.

Beatty, 1990, reports that agricultural irrigation in Indiana is most extensive in northwest Indiana including the Kankakee River basin which in 1987 accounted for 33% of the state's irrigated land and 43% of the registered withdrawals for irrigation. The No Action alternative would result in continued withdrawal for irrigation. Moreover, the increasing population in a significant part of the Basin will demand more water over the coming decades. Continued degradation of the Kankakee River's water quality from sedimentation, chemical run-off, and miscellaneous dumping could jeopardize populations of several species of state-listed fresh water mussels.

### **Agricultural Land**

In general, we would expect the No Action alternative to result in a decrease in farmland over time in the Basin primarily from increased human development, and secondarily as a result of landowners

withdrawing flood-prone, prior-converted and farmed wetlands from production. For example, in Kankakee and Iroquois Counties in Illinois, farmland dropped from 389,185 acres to 358,920 acres and 685,137 acres to 662,629 acres, respectively, between 1987 and 1992 (Bureau of Census 1992).

In the Indiana portion of the Kankakee Basin, every county except Pulaski (+ 0.85%) exhibited a decline in farmland in the 10 year period from 1982 to 1992. The declines ranged from a high of 11.64% in Porter County to 0.31% in Jasper County (Indiana Farm Bureau 1996). The average percent decline in farmland in 9 Indiana counties in the Basin during the period was 3.9%. Some percentage of farmland in both states would also likely be lost to land acquisition by conservation agencies, flood control efforts by various Federal, state, and local agencies, and other organizations working in the Basin. A more ominous threat to farmland is rapid and widespread urbanization of rural areas. According to a recent study just released by the Chicago-based Openlands Project, the Chicago metropolitan region is predicted to double in size over the next 30 years. It is estimated that the population will grow by 48% during the next 30 years, but that land development will increase by a whopping 165%. Moreover, the authors of the report contend that without concerted efforts to contain growth, urban sprawl threatens to reach north to Milwaukee, west to Dekalb, south to Kankakee, and east to South Bend, Indiana.

### **Drainage and Flood Control**

Under the No Action alternative flooding frequency and duration would be expected to increase. Erosion from upland farmland and sediment deposition during bottomland flooding would necessitate maintenance of existing legal ditches on an as-needed basis by local Drainage Boards. Uncontrolled beaver populations and typical high sediment loads would continue to restrict the drainage capacity of bottomland ditches and streams, increasing wetness in some low-lying farm fields and reducing yields or forcing abandonment.

Population growth, sedimentation, runoff, and urban development are all expected to increase significantly in the Kankakee Basin. In Will county alone, the population is expected to more than double from 1990 to 2020. If a new regional airport is constructed near Peotone, urban development and commercial growth in this region is expected to increase even more, placing more demands on the Basin and its resources. Over time, these processes will increase flood peaks and subject more property to damage at higher monetary costs.

### **Alternatives 2-5**

#### **Water Quality in the Kankakee River**

With these alternatives, we would expect water quality in the Kankakee River to improve, primarily because of the removal of approximately 10-15,000 acres of marginal farmland from agricultural production. Although this would occur over a relatively long time (at least 30 years), the ultimate result would be a substantial reduction in sediments and farm chemicals entering area waterways. Restoring and developing moist-soil and forested wetlands as well as certain uplands would increase the water filtration and ground water recharge capabilities within the River ecosystem. Stabilizing riverbanks would decrease the serious erosion problem occurring in the upper end of the project area.

Under these alternatives the Service would cooperate with appropriate agencies and individuals to identify off-site sources of contamination and formulate effective measures to reduce or eliminate many threats to the water quality of the Kankakee River and its tributaries. This could involve annual water quality monitoring by the Service to identify specific pollutants and their sources, or by facilitating the formation of a community-based "River Watch" or "Watershed Association" composed of students, community leaders, farmers, conservation groups and others to work together in addressing water quality issues and developing a comprehensive plan for restoring the natural health and beauty of the river.

Concerning the biotic integrity of the surface water, of the 45% of IDEM's stations in the Kankakee Basin that did not attain their biological uses, low scores were primarily attributable to poor habitat (IDEM 1995). The proposed Refuge would significantly improve riparian habitat along the Kankakee mainstem and on portions of various tributaries. In addition, wetland restoration would greatly improve the function of thousands of acres of wetland for wildlife.

### **Agricultural Land**

The potential impacts to agriculture from the Action alternatives are discussed in detail in the appended Economic Assessment prepared by Purdue University.

Most of the farmland that the Service would likely be involved with would include those lands that are expensive to drain, too dry to farm profitably, highly erodible or otherwise not ideally suited for agriculture. These lands are those often targeted by USDA programs such as the Conservation Reserve and Wetland Reserve Programs and state and Federal private lands programs. Many of these programs offer landowners short-term contracts while keeping the land in private ownership. Any conversion of agricultural land to other uses by the Service would occur gradually as acquisition and habitat restoration dollars become available over time and as landowners emerge as willing participants and/or sellers.

Alternatives 2-5 would likely result in reduced acreage of agricultural land when existing cropland is converted to wetland or permanent upland cover. We estimate that approximately fifteen thousand (15,000) acres of rowcrop land could be acquired by the Service and restored over the next 30 years. Additional acres of hay and pasture land could also be acquired. In the long term, this restored land would serve to protect and rebuild soil under the native vegetation restored on it. Moreover, restoration would not be irreversible if it is determined that it is in the best public interest, at some future date, to again cycle these lands back to agricultural use. Commercial or residential development, however, represents destruction of the topsoil and a much longer term impact on the agricultural land base.

Landowners in some areas of the Basin have expressed sincere concern for the impact that the restoration of wetlands would have on neighboring farms. The Service is committed to limiting the impact of its restoration activities to Service owned or managed lands. Regional studies may provide some guidance, but it is likely that site-specific hydrological evaluations will be necessary prior to acquisition for many properties. We will also draw from our own experience and the experience of other organizations and individuals conducting wetland restoration in the Basin.

The Service is also aware of the concern expressed by some landowners and business people that the proposed Refuge could reduce the amount of farmland in a county below some sustainable threshold. As the focus areas indicate, the 30,000 acres of the proposed Refuge will stretch over parts of 8 counties.

In addition, since acquisition will occur over 30 or more years, communities will have a reasonable time period to adapt to the proposed land use changes. As previously stated, current development in the Basin is increasing, and its impact on farmland will likely be much greater than that of the proposed Refuge in the coming decades.

The Service shares the concern of the agricultural community about the loss of prime farmland soils. It is important to note that the definition of prime farmland is a soil-based definition. Therefore, land defined as prime farmland can have many different land uses, e.g., forest, wetland, pasture, or row crop. We feel the proposed refuge would contribute to the maintenance of prime farmland soils because, as stated previously, refuge land would protect, preserve, and build soil. According to USDA statistics, prime farmland used as crop land increased in the Illinois portion of the basin between 1982 and 1992 (USDA see web <http://cgi-bin/kmusser/>). The most serious and irreversible threat to prime farmland soils is development and urban sprawl. According to a recent study just released by the Chicago-based Openlands Project, the Chicago metropolitan region is predicted to double in size over the next 30 years. It is estimated that the population will grow by 48% during the next 30 years, but that land development will increase by a whopping 165%. Moreover, the authors of the report contend that without concerted efforts to contain growth, urban sprawl threatens to reach north to Milwaukee, west to Dekalb, south to Kankakee, and east to South Bend, Indiana. The Service feels the proposed refuge would contribute to the maintenance of prime farmland soils because as stated previously, refuge lands would protect, preserve, and re-build soils.

### **Drainage and Flood Control**

Development of a National Wildlife Refuge (alternatives 2-5) would have little or no impact on existing drainage systems as they affect private land. Protection, restoration, and management activities associated with any of the action alternatives could not legally contribute to flooding on private property, or impede drainage so as to adversely impact private property. The Service would not cause any artificial increase of the natural level, width, or flow of waters without ensuring that the impact would be limited to lands in which it has acquired an appropriate interest from a willing seller.

In April 1999 the Service and the Corps of Engineers signed an agreement (appendix III) to work cooperatively on their respective initiatives in the Basin. Development of a new national wildlife refuge in the Basin would not impact flood control efforts of the Corps of Engineers. The potential for Service wetland restoration projects to affect neighboring landowners would be minimized by completing hydrologic studies for each unit to determine optimum siting and design. The Service would comply with all Federal and state regulations (e.g., Indiana's 1945 Flood Control Act) to assure its actions do not adversely impact others. Likewise, the Service cannot legally alter established drainage patterns if that action adversely impacts other property owners. If Service activities create a water problem for any private landowner, the problem must be corrected at Service expense.

Prior to any wetland development involving dikes or levees in the floodplain, a hydrologic study would be completed. The analysis would identify potential impacts related to the degree of or duration of flooding based on the addition of structures such as a dike in the floodplain. The hydrologic study would provide the information necessary to apply to the Indiana Department of Natural Resources, Division of Water, for a permit to construct in the floodplain. This permit application procedure is required according to the 1945 Flood Control Act of the State of Indiana.

## **II. POTENTIAL IMPACTS TO THE BIOLOGICAL ENVIRONMENT**

### **Alternative 1 - No Action**

#### **Biological Diversity and Abundance**

Under this alternative we anticipate that biological diversity as well as the quantity and quality of wetlands, bottomland forests, and oak savanna would continue to decline in the project area. The Basin has immense existing and converted wetland resources dispersed over more than 3 million acres. Under alternative 1, some wetland restoration and preservation could continue by other Federal programs such as the Wetland Reserve Program and by state and local efforts. However, wetland restoration and preservation would not likely be coordinated across state lines, nor would it have a focus on Service trust resources that the Action alternatives provide. The result would be less effective and possibly less efficient protection of Service trust resources in the Basin.

Areas of bottomland forest not considered wetlands under the Swampbuster provisions of the Food Security Act could eventually be cleared and put into agricultural production. The many water quality and wildlife habitat benefits associated with these areas would be lost. Timber harvest decisions on unmanaged woodlands would likely be based primarily on maximizing short-term income. Continued high-grading would further reduce tree species diversity, and the heavy mast component (oaks) of the forest community would remain low. Few areas of mature bottomland forest would exist. Emergent, scrub-shrub and open water wetlands would continue to receive limited protection afforded by present regulatory processes. The latest report from the Service indicates that while wetland loss has slowed considerably since the Swampbuster provisions of the 1985 Farm Bill, we continue to lose approximately 117,000 acres of wetland per year. The report estimates that 79 percent of that loss in the lower 48 states is caused by agriculture (USFWS 1995)

Alternative 1 would result in no direct change in migratory bird production or use since there would not be an appreciable increase in nesting, resting, or feeding habitats in the proposed project area, nor would the quality of existing habitats improve appreciably. Recent efforts by TNC will undoubtedly have a positive impact as will continued efforts by both the Illinois and Indiana DNR's. In the long-term, local wetland and grassland-dependent migratory bird populations will likely decline as existing habitats degrade and predation, artificially heightened by fragmented landscapes, continues to take its toll on nesting females and their young.

With less coordination among the conservation organizations, the No Action alternative would probably result in less efficient conservation of biological diversity. In the meantime, opportunities to work at the landscape scale in the Basin would rapidly disappear. Most of the threats to the Basin have been realized over the past 150 years. However, a substantial amount of oak savanna was lost in the last 20 years when several thousand acres in the Indiana portion of the Basin were cleared for a now defunct ranching operation. The southeastern Kankakee County/northeastern Iroquois County area in Illinois is similarly vulnerable. As urban sprawl continues unchecked in the Basin, opportunities are dwindling to increase the effective size of existing natural areas, to provide connectivity, and to restore degraded ecosystems.

Restoration and preservation of Federally and state-listed species would continue under existing laws and regulations in alternative 1. This alternative might not, however, focus Service restoration and habitat management activities to benefit both Federally and state-listed species.

## **Alternatives 2-5**

### **Biological Diversity and Abundance**

Implementation of alternatives 2-5 would result in the restoration and preservation of biological diversity in the Basin, although each in varying degrees.

Alternative 2 primarily focuses on the protection of wetlands along the Kankakee River mainstem, the Yellow River, and in the cluster of existing and potentially restorable wetlands in Marshall County around the Menominee Wetlands Management Area. The biological impact of this alternative, if implemented, would be to reconstruct a wetland corridor from the Momence Wetlands in Illinois to the Menominee wetlands in Indiana along the Kankakee and Yellow Rivers. If implemented, this alternative could preserve high quality existing wetlands and restore many historic riparian and non-riparian wetlands that provide important habitat for fish, amphibians, wetland dependent reptiles, and some wetland dependent mammals. Wetlands that fall within the focus areas identified for this alternative would primarily be riparian wetlands and include palustrine forested wetlands, palustrine emergent wetlands, palustrine scrub-shrub wetlands, and possibly riverine wetlands, if restoration of historic river meanders is feasible without impacting others in the Basin. Alternative 2 would lead to increased wetland-dependent migratory bird production and use in the Basin by increasing the quantity and quality of nesting, resting, and feeding habitats. Alternative 2 would be of particular importance to area-sensitive wetland birds such as the American bittern, which require large blocks of habitat.

Alternative 3 would focus on restoration and protection of grasslands and remnant oak savannas in the Basin. These efforts would occur, for the most part, south of the Kankakee River and toward the western end of the Basin. This alternative would have the most impact on those species dependent on large grassland ecosystems and on oak savanna, namely grassland-dependent migratory birds. Alternative 3 could involve comparatively large increases in native grassland habitat in the Kankakee River Basin. Although some preservation of existing habitat would occur, particularly existing oak savanna, this alternative would also involve substantial restoration of native grasslands. Careful reconstruction of the native prairie would help perpetuate the existence and diversity of rare native grassland ecosystems. Re-establishing large blocks of grassland habitat should benefit numerous grassland-dependent migratory birds, some grassland-adapted mammals, invertebrates, and some reptile and amphibian species.

Alternative 4 would primarily focus on protecting and restoring habitat for the two Federally endangered species within the Basin, as well as for a suite of state endangered species. Since both Federally endangered species, the Indiana bat and the Mitchell's satyr butterfly are wetland-dependent species, this alternative shares many of the same areas and goals as alternative 2. Alternative 4, however, focuses more on the riparian corridor for the Indiana bat and on specific areas and management prescriptions for the Mitchell's satyr. It lacks emphasis on the very large habitat blocks found in Alternative 2. Although this alternative would likely produce many of the same positive impacts to the environment as alternative 2, it would be most beneficial to those organisms sharing habitat requirements with the two Federally endangered species. Some existing wetland would be modified to more closely meet the needs



of the Federally endangered or other species selected for more intensive management. We feel that habitat restoration from marginal farmland or partially functioning wetlands would far outweigh modifications to existing functional habitat.

Implementation of Alternative 5 would contribute to the preservation of the aquatic environment by restoring and preserving additional wetland, grassland, and savanna habitats in the Basin. Riparian protection and wetland restoration coupled with Best Management Practices (BMP) in the Basin could help limit sedimentation and its negative impacts to aquatic organisms. In addition, since many fish depend on the floodplain for foraging and spawning, the restoration and preservation of riparian wetlands and the natural processes that sustain them could be important for the long-term viability of fish populations in the Kankakee.

Amphibians and wetland-dependent reptile species would possibly benefit more from the wetland alternative that emphasizes larger wetland blocks. Nevertheless, some state-listed species that would likely benefit from Alternative 5 include: the blue spotted salamander (*Ambystoma laterale*) (Special Concern (SSC) - IN), northern leopard frog (SSC - IN), eastern massasauga (SE - IL, SE - IN), Blanding's turtle (*Emydoidea blandingii*) (SE - IN, ST - IL), ornate box turtle (*Terrapene ornata*) (SE - IN), and Kirtland's snake (*Clonophis kirtlandii*) (SE - IN, ST - IL)."

Wetland-associated migratory bird species expected to benefit from the alternative 5 include the: sandhill crane (SE - IN, ST - IL), American bittern (SE - IL, SE - IN), red-shouldered hawk (*Buteo lineatus*) (ST - IL, SSC - IN), golden-winged warbler (*Vermivora chrysoptera*) (SE - IN), least bittern (SE - IN, ST - IL), black tern (SE - IN, IL), marsh wren (*Cistothorus palustris*) (SE - IN), king rail (*Rallus elegans*) (SE - IN, IL), black-crowned night heron (*Nycticorax nycticorax*) (SE - IN, IL), yellow-headed blackbird (*Xanthocephalus xanthocephalus*) (SE - IN, IL), Virginia rail (*Rallus limicola*) (SE - IN), sedge wren (SE - IN), yellow-billed cuckoo (*Coccyzus americanus*), great-crested flycatcher (*Myiarchus crinitus*), Acadian flycatcher (*Empidonax virescens*), prothonotary warbler, yellow-throated warbler (*Dendroica dominica*), mallard (*Anas platyrhynchos*), and wood duck (*Aix sponsa*).

Alternative 5 also targets the protection and management of several grassland species of concern. These include species from the Service's Fish and Wildlife Resource Conservation Priorities document, the Service's 1995 Species of Management Concern List, and those identified through the Ohio River Valley Ecosystem Team, Partner's in Flight Working Group, and the Illinois and Indiana Departments of Natural Resources. They include Henslow's sparrow (SE - IN, IL), upland sandpiper (SE - IN, IL), short-eared owl (*Asio flammeus*) (SE - IL, SE - IN), northern harrier (*Circus cyaneus*) (SE - IL, SE - IN), western meadowlark (*Sturnella neglecta*) (SSC - IN), field sparrow, dickcissel, orchard oriole (*Icterus spurius*), bobolink, and grasshopper sparrow. Herkert et al. (1993) identified additional species of management concern using Breeding Bird Survey data from 1966 to 1991 to estimate population trends for some Illinois grassland birds including bobolinks (-92.6%), western meadowlark (-86.1%), grasshopper sparrow (-85.4%), savannah sparrow (-63.0%), eastern meadowlark (-61.0%), field sparrow (-57.9%), and northern bobwhite (-56.8%)."

Of these declining and management-concern species, northern harrier, upland sandpiper, bobolink, savannah sparrow, and Henslow's sparrow are classified as having high sensitivity to habitat fragmentation (highly area sensitive) and eastern meadowlark, western meadowlark, and grasshopper sparrow are classified as having moderate sensitivity to habitat fragmentation (Herkert, et al. 1993). Alternative 5 includes focus areas where the restoration of large, native grassland blocks (250 acres and

larger), and the management of the surrounding landscape (pasture and other non-forested habitat) will establish a favorable landscape for the management of area-sensitive grassland birds. Those components of Alternative 5 that will protect and restore habitat for grassland nesting migratory birds will likely also provide suitable habitat for grassland mammals, reptiles and amphibians whose distribution coincides with the Grand Prairie natural region. Moreover, Alternative 5 would attempt to restore the links between the historic wetland, prairie, and oak savanna ecosystems.

The Service would also identify and target oak savanna within the Basin for restoration and preservation. This effort will involve protection of the unique vegetation structure and floristic assemblages of oak savannas, as well as their habitat value for migratory birds. Anderson, et al., 1993, provide an extensive list of birds believed to have occurred in Illinois savannas. The list of migratory birds for which savanna appears important habitat includes Baltimore oriole, summer tanager, eastern wood peewee, great-crested flycatcher, American robin, and whip-poor-will, with red-headed woodpecker possibly a savanna-dependent species in Illinois (Jeff Brawn, Illinois Natural History Survey, facsimile communication 29 July 1997).

Alternative 5 will target protection of the two Federally endangered species within the Basin, the Indiana bat and the Mitchell's satyr butterfly, while also "sweeping" certain state-listed species. The Service evaluated the focus areas under the endangered species alternative (which is encompassed by Alternative 5) to see how well these sites "sweep" state listed species occurring in the study area. In our analysis, sweep is defined as the occurrence of at least one location from the Heritage Database for a state-listed species inside the focus area boundary. We assume that if land containing a state-listed species were protected under the proposed Refuge, then that state-listed species would receive a measure of protection. The following are state-listed species swept by the proposed refuge focus areas:

Great Blue Heron (*Ardea herodias*), Slim-Spike Three Awn Grass (*Aristida intermedia*), Rushlike Aster (*Aster junciformis*), Western Silvery Aster (*Aster sericeus*), Marsh Wren, Sweet Fern (*Comptonia peregrina*), Hemlock Parsley (*Conioselinum chinense*), Small White Lady's-Slipper (*Cypripedium candidum*), Tufted Hairgrass (*Deschampsia cespitosa*), Clinton Woodfern (*Dryopteris clintoniana*), Baltimore oriole (*Euphrydrias phaeton*), Plains Pocket Gopher, Great St. John's-Wort (*Hypericum pyramidatum*), Northern Brook Lamprey, Ground Juniper (*Juniperus communis*), Deep-Rooted Clubmoss (*Lycopodium tristachyum/Lymnaea stagnalis*), Bobcat (*Lynx rufus*), Climbing Hempweed (*Mikania scandens*), Tall Millet-Grass (*Milium effusum*), Cutleaf Water-Milfoil (*Myriophyllum pinnatum*), Ironcolor Shiner, Weed Shiner, Yellow-Fringed Orchid (*Plantanthera ciliaris*), Prairie White-Fringed Orchid (*Plantanthera leucophaea*), Small Purple-Fringed Orchid (*Plantanthera psycodes*), Virginia Rail, Northern Leopard Frog (*Sabatia campanulata*), Hall's Bullrush (*Scirpus hallii*), Weak Bullrush (*Scirpus purshianus*), Eastern Massasauga Rattlesnake, American snowbell (*Styrax americana*), Prairie Fame-Flower (*Talinum rugospermum*), American Badger (*Taxidea taxus*), Ornate Box Turtle, Forked Bulecurl (*Trichostema dichotomum*), Marsh Arrow-Grass (*Triglochin palustre*), Hairy Valerian (*Valeriana edulis*), Primrose-Leaf Violet (*Viola primulifolia*), and White Camas (*Zigadenus elegans var. glaucus*).

### III. POTENTIAL IMPACTS TO THE SOCIO-ECONOMIC ENVIRONMENT

The potential socio-economic impacts of both the No Action alternative and the four Action Alternatives are discussed in the appended *Economic Impact Assessment of the Proposed Grand Kankakee Marsh National Wildlife Refuge* prepared for the Service by the Department of Agricultural Economics at Purdue University.. Following is a brief summary of their findings.

The report focuses on direct, indirect and induced economic impacts arising from changes in land use that would accompany the proposed Refuge. The report considers only changes in expenditures and economic activities in the economic study area associated with Refuge development. Reallocation of existing expenditures is not considered. For purposes of comparing "with Refuge" and "without Refuge" scenarios, the analysis assumes that in the absence of the proposed Refuge, the characteristics of the economic study region would be unchanged and that the level of economic activity in the study region would remain constant. The analysis also assumes that development of the Refuge would have three broad stages of impacts over the 30-year period. The initial stage (years 1-5) would involve facility construction and modest land acquisition and restoration. In the second stage of the project (years 6-15) the cumulative amount of land acquired by the Service for the Refuge would increase, as would employment by the Service . However, during this second stage the local economic impacts derived from recreational activities taking place in the Refuge are expected to be modest. During the third stage of the project (years 16-30) economic impacts from recreational activities are projected to increase as the Refuge becomes fully established and the economic study area develops economic infrastructure to capture expenditures in the study area.

Analysis is conducted for a Baseline Scenario and two alternative scenarios that differ with respect to assumptions regarding visitation rates, the value of agricultural land, and the share of recreational expenditures captured in the local economy. Results from the Baseline Scenario indicate that Refuge development would result in increased personal incomes and employment over 30 years. Economic output would increase under alternatives 3 and 5, but would decline under alternatives 2 and 4.

Refuge impacts on economic output is projected to increase initially due to expenditures by the Service. Subsequent impacts reflect reductions in agricultural output - as land is taken out of production - and increases in recreational activities. Based on a real discount rate of 3.6%, the projected aggregate impacts of the proposed Refuge can be summarized as follows:

- ◆ Over the 30-year time horizon considered in this study, the proposed Refuge would result in changes in economic output ranging from a loss of \$1.23 million (alternative 4) to a gain of \$6.60 million (alternative 5).
- ◆ The proposed Refuge is estimated to increase personal income in the study area under all management alternatives. The estimated changes in personal income range from \$8.58 million (alternative 4) to \$10.44 million (alternative 5).
- ◆ The proposed Refuge is projected to result in an increase in employment in the study area. The estimated change in average annual employment ranges from 17.0 jobs (alternative 4) to 27.9 jobs (alternative 2).

- ◆ Differences in outcomes for the four management alternatives examined in this report reflect differences in the amount of agricultural land projected to be acquired and differences in the types and amounts of recreational activity supported by the management alternatives. Overall, alternative 5 would result in relatively less agricultural land being acquired. Alternative 5 would also allow more recreational activity than other alternatives considered.

## IV. GENERAL IMPACT ANALYSIS

### A. Unavoidable Adverse Impacts

Under Alternatives 2-5, the potential development of access roads, dikes, control structures, visitor parking areas, and reclamation of former building sites could lead to local and short-term negative impacts to plants, soil, and some wildlife species. Some loss of cultural resources could occur by restoring former wetlands. Greater public use may result in increased littering, noise, and vehicle traffic.

### B. Short-Term Use Versus Long-Term Productivity

The local, short-term uses of the environment under alternatives 2-5 include habitat restoration and enhancement. Alternatives 2-5 could also include development of public use facilities. The resulting long-term affect of these alternatives include increased protection of threatened and endangered species, increased waterfowl and songbird production, and long-term recovery of a myriad of species dependent on quality wetland and grassland habitats. In addition, the local public will gain long-term opportunities for wildlife-dependent recreation and education.

### C. Irreversible and Irretrievable Commitments of Resources

Funding and personnel commitments by the Service or other organizations under Alternatives 2-5 would be unavailable for other programs. Fee-title acquisition of lands by the Service would make them "public lands" and preclude other use of these lands in accordance with individual desires. Traditional land uses may change since uses on Service lands must be shown to be compatible with the purposes for which the land is acquired. Any lands purchased will lose their potential for future development by the private sector as long as they remain in public ownership. Structural improvements that are purchased with any land may be declared surplus to government needs and sold or demolished on site.

### D. Service Land Acquisition and Funding

Under all Action alternatives, the Service would use a combination of voluntary agreements, easements, and land acquisition to achieve its habitat restoration and preservation objectives for this Refuge. All land acquisition by the Service would be on a willing buyer/willing seller basis only.

Land acquisition by the Service could involve approximately 30,000 acres over the next 30 years. These acquisitions could involve conservation easements, cooperative agreements, fee-title purchases, leases, or a combination of all methods, depending on the site and circumstances. All lands acquired by the Service would be administered and managed by the National Wildlife Refuge System, Grand Kankakee Marsh National Wildlife Refuge. Tracts in which less than fee-title agreements are negotiated would remain in private ownership. All restoration and preservation would be carried out on a tract-by-tract

basis as participants and fiscal resources become available over a 30 year time period (willing buyer/willing seller basis).

Funding for land acquisition would be from the Migratory Bird Conservation Fund and the Land and Water Conservation Fund. It must be noted that it is Service policy to acquire the minimum interest necessary to reach project goals and objectives. Full consideration would be given to extended use reservations, exchanges, or other alternatives that would lessen the impact on the landowners and the community. Acquisition of lands would be from willing sellers only and only lands in which a realty interest is acquired would become part of the proposed Refuge. If the acquisition of only a portion of a property would leave the landowner with an uneconomic remnant, the Service would offer to acquire the uneconomic remnant along with the portion of the property needed for the project. Written offers to willing sellers will be based on a professional appraisal of the property using recent sales of comparable properties in the area. Landowners will have the final decision on whether to accept or reject a Service offer.

Acquisition procedures of other agencies and private conservation organizations often follow the aforementioned procedures, although their standards may differ from the Service's. Some groups may have more latitude as to the price offered for a particular tract of land. The Service, by law, must pay market value for lands it purchases. Since acquisition under Alternatives 2-5 would be from willing sellers who would be paid market value, acquisition procedures would have little or no impact on landowners within the project area that choose not to sell.

The following table discusses some of the types of acquisition the Service can use. A more detailed description of each mechanism follows.

|                           |  |
|---------------------------|--|
| Fee Title -               | the acquisition of all land ownership rights   |
| Conservation Easements -  | the acquisition of part of the surface land ownership rights. Such easements are usually perpetual.                |
| Jurisdictional Transfer - | the transfer of surface management from one Federal agency to another.   |
| Cooperative Agreement -   | short term agreements with landowners to accomplish specific management objectives.                                |
| Lease -                   | short term or long term "rental" of land for management. This usually includes periodic payments to the landowner. |
| Donation -                | gift of land or interest in land without monetary reimbursement.   |

## Service Acquisition Mechanisms

*Conservation Easements* - involve the acquisition of certain rights that can be of value for the purpose of achieving fish and wildlife habitat objectives (usually prohibiting or encouraging certain practices, e.g., the right to drain a wetland or delay haying or harvest). Easements become part of the title to the property and are usually permanent. If a landowner sells his or her property, the easement continues as part of the title.

*Lease Agreements* - are short-term agreements for full or specified use of the land in return for an annual rental payment which generally includes occupancy rights. For example, the Service could lease 40 acres of grassland habitat to provide safe nesting for ground nesting birds. The landowner would not be able to hay or otherwise disturb the ground during the lease period.

*Cooperative Agreements* - are negotiated between the Service and other government agencies, conservation groups, or individuals. An agreement usually specifies a particular management action or activity the landowner will do, or not do, on his or her property. For example, a simple agreement would be for the landowner to agree to delay hayland mowing until after a certain date to allow ground nesting birds to hatch their young. More comprehensive agreements are possible for such things as wetland or upland restoration, or public access. Agreements are strictly voluntary on the part of the landowner and are not legally binding. As long as a landowner abides by the terms of the agreement, this protection can be effective in meeting certain refuge objectives. Because these agreements are voluntary and can be modified by either party, there is no complete assurance the terms of the agreement will always be met.

*Fee-simple acquisition* - involves acquisition of most or all of the rights to a persons land. There is a total transfer of property with the formal conveyance of a title to the Federal government. While fee acquisition involves most of the rights to a property, certain rights may be withheld or not purchased (water rights, mineral rights, use reservations).

### E. Property Taxes and Refuge Revenue Sharing Payments and Apportionment

Under all Action alternatives, the Service would make refuge revenue sharing payments to the counties where the fee-title acquisition occurred.

The Refuge Revenue Sharing Act of June 15, 1935, as amended, provides for annual payments to counties or the lowest unit of government that collects and distributes taxes based on acreage and value of National Wildlife Refuge lands located within the county. The monies for these payments come from two sources: (1) net receipts from the sale of products from National Wildlife Refuge System lands (oil and gas leases, timber sales, grazing fees, etc.) and (2) annual Congressional appropriations. Annual Congressional appropriations, as authorized by a 1978 amendment, were intended to make up the difference between the net receipts from the Refuge Revenue Sharing Fund and the total amount due to local units of government.

Payments to the counties are calculated based on which of the following formulas, as set out in the Act, provides the largest return: (1) \$.75 per acre; (2) 25 percent of the net receipts collected from refuge lands in the county; or (3) 3/4 of 1 percent of the appraised value. In both Illinois and Indiana, 3/4 of 1 percent of the appraised value always brings the greatest return to the taxing bodies. Using this method, lands are re-appraised every five years to reflect current market values.

In November and December of 1994, the Service canvassed all 141 counties in the 8 state area of Region 3 where refuge revenue sharing payments are made on National Wildlife Refuge System lands. The counties were asked to estimate the real estate taxes on these lands had they remained in private ownership. In Indiana, 2 of the 3 counties that receive refuge revenue sharing payments from the Service responded to the survey. In Illinois, 8 of the 18 counties surveyed responded. Based on their estimates, the refuge revenue sharing payment at full entitlement for these 2 states is 164 percent (Indiana) and 99 percent (Illinois) of what taxes would be if the lands had remained in private ownership.

According to the Refuge Revenue Sharing Act which authorizes the Service to make these payments, "Each county which receives payments....shall distribute, under guidelines established by the Secretary, such payments on a proportional basis to those units of local government (including, but not limited to, school districts and the county itself in appropriate cases) which have incurred the loss or reduction in real property tax revenues by reason of existence of such area." In essence, the Act directs the counties or lowest unit of government that collects and distribute taxes to distribute refuge revenue sharing payments in the same proportion as it would for tax monies received.

#### **F. Uneconomic Remnants**

No instances of uneconomic remnants would occur as a result of the Service's land acquisition program under any of the Action alternatives. 49 CFR Part 24.102 (k) prohibits the Federal Government from creating uneconomic remnants. If such a remnant were to occur, the Service would offer to purchase the remnant at market value, along with the portion of the property needed for the Project. The Service would pay for necessary title evidence, mortgage prepayment penalties, mortgage releases, boundary surveys, recording fees, and similar expenses incidental to the transfer of title. It would not pay for fees charged by an attorney who was hired by the landowner.

#### **G. Relocation Benefits**

The uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act) provides for certain relocation benefits to home owners, businesses, and farm operators who choose to sell and relocate as a result of Federal acquisition. The law provides for benefits to eligible owners and tenants in the following areas:

- Reimbursement of reasonable moving and related expenses;
- Replacement housing payments under certain conditions;
- Relocation assistance services to help locate replacement housing, farm, or business properties;
- Reimbursement of certain necessary and reasonable expenses incurred in selling real property to the government.

#### **H. Private Property Rights adjacent to Refuge Lands**

Service or other agency control of access, land use practices, water management practices, hunting, fishing, and general use next to any tracts acquired under Alternatives 2-5 is limited only to those lands in which the Service has acquired that ownership interest. Any landowners adjacent to lands acquired by the Service retain all the rights, privileges, and responsibilities of private land ownership, including the right of access, hunting, vehicle use, control of trespass, right to sell to any party, and to pay taxes.

## **I. Cultural Resources**

Refuge development and land acquisition alone would have no effect on archeological resources, but could have an adverse effect on standing structures. The Service seldom acquires structures with the intent to maintain and preserve them, and neglect as well as demolition is an adverse effect. Archeological resources receive increased protection from unconsidered destruction because of the several Federal laws that apply to property owned and administered by the Federal Government. The Service could, however, affect some archeological resources when it develops Refuge lands for wildlife habitat, administrative facilities, public use areas, and when it cleans up old farmsteads.

Alternative 1 would likely have long-term, negative effects on cultural resources of the area as development of sites continues. Alternatives 2-5 would have a generally positive impact on the preservation of cultural resources since the Service recognizes the need to protect these sites whenever possible, and is governed by national legislation. However, some loss of sites could still occur on lands acquired by the Service depending on location and extent of future development. Any development (dikes, roads, buildings, etc.) would only be carried out after a thorough review or survey of possible cultural resources likely to be disturbed, and plans for avoidance or minimizing impacts are in place. The Service will inform state Historic Preservation Officers of any acquisition of lands and structures. Structures considered to meet the criteria for the National Register will be maintained until the Service's Regional Historic Preservation Officer can complete an evaluation and appropriate mitigation is accomplished. In the case of significant structures, the Service will consider how the historic property can be retained and used for Refuge purposes.

A description of undertakings for all Refuge lands would be provided by the future Refuge Manager to the Regional Historic Preservation Officer who will analyze the undertaking for potential effects on historic properties. The Regional Historic Preservation Officer will enter into consultation with state Historic Preservation Officers and other parties as appropriate. No undertakings will proceed until the Section 106 process is complete. Also, the Refuge Manager will, with the assistance of the Service's Regional Historic Preservation Officer, develop a program for conducting Section 110 inventory surveys, and will attempt to obtain funding for those surveys. The Refuge Manager will similarly involve the Service's Regional Historic Preservation Officer in other historic preservation and cultural resource issues on the Refuge, in accordance with applicable laws, regulations, and Service policy.

## **J. Maintenance of Roads and Existing Right-Of-Ways**

State, county, and townships retain maintenance obligations for roads and their rights-of-way under their jurisdiction within refuge boundaries. Some township roads may be suited for abandonment (but not necessarily closure) and their maintenance assumed by the Service. Any such abandonments would only be with the consent of the appropriate governing body. Existing rights-of-ways and terms of other easements will continue to be honored. New rights-of-ways and easements will be considered in relation to Refuge System regulations and likely impacts of the rights-of-way or easement to Refuge resources.

The Refuge would cooperate with state, county and township officials in the maintenance of roads that cross the Refuge. Roadside mowing would be completed in accordance with State and local laws.



## **K. Environmental Justice**

Environmental justice refers to the principle that all citizens and communities are entitled to: (a) equal protection from environmental and occupational health or safety hazards, (b) equal access to natural resources, and (c) equal participation in the environmental and natural resource policy formulation process.

On February 11, 1994, President Clinton issued Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations." The purpose of this Order was to focus the attention of federal agencies on human environmental health and to address inequities that may occur in the distribution of costs/benefits, land use patterns, hazardous material transport or facility siting, allocation and consumption of resources, access to information, planning, and decision making, etc.

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. The developing environmental justice strategy of the Service extends this mission by seeking to ensure that all segments of the human population have equal access to America's fish and wildlife resources, as well as equal access to information which will enable them to participate meaningfully in activities and policy shaping.

Conservation of fish and wildlife and their habitats also provides opportunities for Americans to encounter their natural national heritage. The role of the national wildlife refuge system has evolved beyond protecting waterfowl to providing recreational and educational experiences as well. National wildlife refuges enrich people in a great variety of ways and these benefits should be equitably distributed among all segments of society.

Although many social or experiential benefits of refuges are not easily quantified, it can be demonstrated that recreational visits to national wildlife refuges generate substantial economic activity. In 1997, the Service initiated a multi-phase study to determine the impact of national wildlife refuges on their surrounding local economies. Eco-tourism refers to the relatively recent phenomenon where approximately 30,000,000 people visit refuges annually. Eco-tourism is one way to derive economic benefits from the conservation of fish and wildlife habitat. Non-resident refuge visitors pay for food, lodging, fuel, and other purchases from local businesses to pursue their recreational experience, thereby generating substantial local economic activity.

## **L. Other Planning Efforts**

Many people expressed concern that the Service needs to work with the Army Corps of Engineers as they proceed with their flood control feasibility study. On April 16, 1999, the Service and U.S. Army Corps of Engineers signed an interagency partnership agreement to work together on refuge planning and flood control through ecosystem restoration activities within the Basin. The agreement will help the agencies consolidate resources focused on finding ways to reduce flood damage to property and natural resources, preserve ecosystem structure and function, and the protect prime farmland soils in the Basin. The Corps and the Service agree that sharing staff and information will better serve the needs of local communities and agricultural interests. Besides being fiscally smart, the combined resources of both agencies will help eliminate the duplication of effort in each agencies respective planning processes.

The upcoming Refuge Comprehensive Conservation Plan and the Corps Feasibility Study will proceed on a parallel track to help identify appropriate management strategies for each respective effort.

## M. Mosquitos

Some people have expressed concern that development of a Refuge will increase the incidence of disease transmitted by mosquitoes. Commonly referred to as the "swamp syndrome", this concern is based on assumptions that since mosquitoes are common in swamps, more swamps (wetlands) means more mosquitoes and more mosquitoes means more disease. It is not a simple issue to understand since there is much misinformation upon which assumptions are based which leads to faulty conclusions. It is also an emotional issue involving legitimate concern for personal health and safety. To analyze the stated concern that the proposed project will increase the risk of disease due to an increase in mosquitoes due to an increase in wetland habitat, requires a basic understanding of the mechanism of disease transmission by mosquitoes.

For mosquitoes to offer a disease threat to humans certain prerequisites are necessary:

1. The disease causing organism (pathogen) must be present in the area.
2. There must be a host animal that carries the pathogen.
3. The specific species of mosquito capable of transmitting the pathogen must be present.
4. Habitat conditions that support reproduction of the problem species of mosquito must be present.

Many of the diseases spread by mosquitoes have been eliminated in Indiana. Malaria is a good example. In the 1920's and 1930's the Wabash River Valley was a notorious area for malaria. However, the last serious outbreak of malaria occurred near Terre Haute in the 1950's. A combination of factors led to control and near elimination of this disease. The species of mosquito most responsible for spreading malaria was *Anopheles quadrimaculatus*. As swamps were drained and waters became more polluted with organic wastes, the offending mosquito decreased because it was very intolerant of pollution which was concentrated from drainage. The use of screening in homes and spraying DDT also became very widespread after World War II.

The *Anopheles quadrimaculatus* mosquito population decreased, access to people decreased, fewer and fewer people became carriers and eventually the malaria pathogen disappeared or reached such low levels that it was rarely present in other host animals. Even though the problem mosquito is still present under suitable habitat conditions, it no longer provides a serious threat because host animals rarely carry the pathogen in their blood. Today, when occasional cases of malaria are reported, it can almost always be traced back to the presence of returning war veterans, foreign travelers or illegal aliens residing temporarily in local communities.

Mosquitoes have always been present in the Basin and will continue to be there. The larvae are an important part of the food chain for many species of fish and wildlife. The adults also serve as important pollinators of plants. Under all Action alternatives, Service biologists would work cooperatively with the State Department of Health and County Health Departments to assist in administering a mosquito monitoring program where Service lands may be involved. The monitoring program will maintain an awareness of potential problems which will lead to actions that control the problem.

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## **GLOSSARY OF TERMS**

***Biological Diversity -***

The variety of life forms and processes, including the complete natural complex of species, communities, genes, and ecological functions.

***Biomass -***

The weight of all life in a specified unit of environment or an expression of the total mass or weight of a given population, both plant and animal.

***Bloom -***

A readily visible concentrated growth or aggregation of plankton (plant and animal).

***Comprehensive Conservation Plan (CCP) -***

The purpose of a CCP is to provide long-range guidance and management direction for a Refuge to accomplish its purpose, contribute to the mission of the National Wildlife Refuge System, and to meet other relevant mandates. It provides Refuge employees and managers with clear goals and strategies to help meet the Service's mission and fulfill commitments made to the American people.

***Cumulative Effects -***

Those effects on the environment that result from the incremental effect of the action when added to the past, present, and reasonable foreseeable future actions regardless of what agency (Federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

***Dissolved Oxygen -***

Amount of oxygen dissolved in water.

***Drainage Basin -***

An area mostly bound by ridges or other similar topographic features, encompassing part, most, or all of a watershed.

***Ecology -***

The study of the relations between organisms and the totality of the biological and physical factors affecting them or influenced by them.

***Ecosystem Approach -***

A strategy or plan to manage ecosystems to provide for all associated organisms, as opposed to a strategy or plan for managing individual or clusters of species.

***Ecosystem -***

An ecological system; the interaction of living organisms and the nonliving environment producing an exchange of materials between the living and nonliving.

|                                   |  |
|-----------------------------------|--|
| <i>Ecosystem Management -</i>     | Management of an ecosystem that includes all ecological, social, and economic components which make up the whole of the system.  |
| <i>Effects -</i>                  | Effects, impacts, and consequences, as used in the environmental assessment, are synonymous. Effects may be direct, indirect, or cumulative.   |
| <i>Endangered Species -</i>       | Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register.  |
| <i>Environmental Analysis -</i>   | An analysis of alternative actions and their predictable short-term and long-term environmental effects, incorporating physical, biological, economic, and social considerations.  |
| <i>Environmental Assessment -</i> | A systematic analysis of site-specific or programmatic activities used to determine whether such activities have a significant effect on the quality of the physical, biological, and human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary. |
| <i>Eutrophication -</i>           | The intentional or unintentional enrichment of water.  |
| <i>Food Chain -</i>               | The dependence of organisms upon others in a series of food. The chain begins with plants or scavenging organisms and ends with the largest carnivores.  |
| <i>Goals -</i>                    | Broad statements of direction; end results or positions to be achieved.  |
| <i>Interdisciplinary Team -</i>   | A group of individuals with varying areas of expertise assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately analyze the problem and propose action.   |
| <i>Monitoring -</i>               | A process of collecting information to evaluate if an objective and/or anticipated or assumed results of a management plan are being realized (effectiveness monitoring) or if implementation is proceeding as planned (implementation monitoring).  |

***National Environmental Policy Act -***

An act passed in 1969 to declare a National policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, and establishes a Council on Environmental Quality.

***Objectives -***

Intermediate-term targets necessary for the satisfaction of Refuge goals; quantifiable measures that serve as indicators against which attainment, or progress toward attainment, of goals can be measured.

***Riparian Area -***

A geographic area containing an aquatic ecosystem and the adjacent upland areas that directly affects it. This includes floodplain, and associated woodland, rangeland, or other related upland areas. Pertaining to the banks of streams, lakes, wetlands, or tidewater.

***Riparian Zones -***

Terrestrial areas where the vegetation complex and micro-climate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables, and soils that exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.

***Sedimentation -***

The settling-out or deposition of suspended materials.

***Succession -***

A gradual change from one community to another and characterized by a progressive change in species structure, an increase in biomass and organic matter accumulation, and a gradual balance between community production and community respiration.

***Sensitive Species -***

Those plant or animal species for which population viability is a concern as evidence by a significant current or potential downward trend in population numbers, distribution, density, or habitat capability.

***Strategies -***

Step-down approaches that could be used to meet Refuge goals and objectives; provide direction for defining and coordinating operational tasks to effectively perform the Refuge's purpose.

***Threatened Species -***

Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register.

***Viable Population -***

A viable population is one which has such numbers and distribution of reproductive individuals as to provide a high likelihood that a species will continue to exist and be well-distributed throughout its range.

***Watershed -***

The drainage basin contributing water, organic matter, dissolved nutrients, and sediments to a water body.

***Watershed Analysis -***

A systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis is a stratum of ecosystem management planning applied to watersheds.

***Watershed Restoration -***

Actions taken to improve the current conditions of a watershed to restore degraded habitat, and to provide long-term protection to natural resources, including riparian, terrestrial, and aquatic resources.