U.S. Fish and Wildlife Service

Hackmatack
National Wildlife Refuge

Environmental Assessment, Land Protection Plan, and Conceptual Management Plan

U.S. Department of the Interior
U.S. Fish and Wildlife Service
Region 3; Bloomington, MN

Selection of Alternative
And
Finding of No Significant Impact

Proposed Hackmatack National Wildlife Refuge
McHenry County, Illinois and Walworth County, Wisconsin

An Environmental Assessment (EA) has been prepared to identify and publicly disclose the possible environmental consequences that establishment of the Hackmatack National Wildlife Refuge (NWR, Refuge) and implementation of the Conceptual Management Plan could have on the quality of the physical, biological, and human environment as required by the National Environmental Policy Act of 1969 (NEPA). The EA evaluated three action alternatives for restoration and protection of a significant tallgrass prairie and wetland ecosystem in Northeastern Illinois and Southeastern Wisconsin. The EA also evaluated the consequences of no action by the U.S. Fish and Wildlife Service (FWS, Service).

Alternative Selection: Alternative C, which includes core Refuge units (11,200 acres) and connecting natural corridors, is selected for implementation.

Justification: Several grassland bird species are declining throughout their range. The Service is the primary federal agency responsible for conserving these species. Recent research has shown that large blocks of grasslands such as those proposed in this Refuge project may be key to reversing the downward trend. The proposed Refuge could eventually restore and connect a landscape that includes large blocks of grasslands, wet prairies, and natural stream watercourses.

The Service seeks to provide Refuge visitors with an understanding and appreciation of fish and wildlife resources through environmental education and interpretation and through wildlife-oriented recreational experiences to the extent these activities are compatible with the purposes for which a Refuge is established. The official Service land acquisition policy for urban Refuges is to acquire lands and waters in or adjacent to metropolitan statistical areas to protect fish and wildlife resources and habitats that will provide the public wildlife-oriented recreation, education, and interpretation opportunities. The primary purpose for establishment of new urban Refuges will be to foster environmental awareness and outreach programs, and to develop an informed and involved citizenry that will support fish and wildlife conservation.

The proposed Refuge would contribute to a long-standing vision held by conservation organizations across the Greater Chicago metropolitan area. These partners have worked to identify key lands for conservation, open space, and greenways aimed at providing a way to connect urban and suburban residents with nature. The establishment of a refuge would provide an anchor for this broad-based conservation and environmental education initiative. In addition:

- Acquisition of lands would be from willing sellers only.
- Habitat restoration programs and efforts contributed by partner agencies and organizations are a vital part of the proposed Refuge.
- The Refuge will contribute toward the Service's Urban Refuge Policy.
- Net impacts to the regional economy will be positive.
- Cultural resources will be protected on acquired lands.
- This action will not have an adverse impact on threatened or endangered species.

Finding: Based on an evaluation of the information contained in the Environmental Assessment and supporting documents, the establishment of the Hackmatack National Wildlife Refuge under Alternative C is not a major federal action that 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.

Supporting Documents:

Environmental Assessment
Conceptual Management Plan
Land Protection Plan

Thomas O. Melius
Regional Director

5/16/12
Date

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Chapter 1: Purpose and Need for Action

In this chapter

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1.1 Purpose

The U.S Fish and Wildlife Service (FWS, Service) is proposing the establishment of a national wildlife refuge (NWR, refuge) in McHenry County, Illinois and Walworth County, Wisconsin. This Environmental Assessment (EA) provides the public and agency decision makers with an analysis of the range of options to restore, enhance, and protect wetlands and upland habitats within a new refuge in McHenry County, Illinois and Walworth County, Wisconsin (Figure 1). The EA also publicly discloses the direct, indirect, and cumulative effects of each strategy on the quality of the human environment, as required by the National Environmental Policy Act (NEPA) of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, 83 Stat. 852 as amended by P.L. 94-52, July 3, 1975, 89 Stat. 258, and P.L. 94-83, August 9, 1975, 89 Stat. 424). The Conceptual Management Plan found in the appendix presents a blueprint for management practices and public recreational opportunities on the proposed Hackmatack NWR.

The purpose of the Refuge is to contribute to the mission and goals of the National Wildlife Refuge System (NWRS, Refuge System) by:

1. Protecting and enhancing habitats for federal trust species and species of management concern, with special emphasis on migratory birds and species listed under the federal Endangered Species Act of 1973.
2. Creating opportunities for hunting, fishing, wildlife observation and photography, and environmental education and interpretation, while promoting activities that complement the purposes of the Refuge and other protected lands in the region.
3. Promoting science, education, and research through partnerships to inform land management decisions and encourage continued responsible stewardship of the natural resources of the region.

Alternative C, Cores and Corridors, is the Service’s preferred action alternative. After reviewing the analysis in this document, including the attached appendices and any public comments, the Regional Director will determine whether to formally recommend to the Director of the Service that a refuge be established. At that time, the document, including any revisions, will be submitted to Service's Director for final review and approvals.

1.2 Need for Action

Several grassland bird species are declining throughout their range. The Service is the primary federal agency responsible for conserving these species. Recent research has shown that large blocks of grasslands such as those proposed in this Refuge project may be key to reversing the downward trend. The proposed Refuge could eventually restore and connect a landscape that includes large blocks of grasslands, wet prairies, and natural stream watercourses.

The Service seeks to provide Refuge visitors with an understanding and appreciation of fish and wildlife resources through environmental education and interpretation and through wildlife-oriented recreational experiences to the extent these activities are compatible with the purposes for which a Refuge is established. The official Service land acquisition policy for urban Refuges is to acquire lands and waters in or adjacent to metropolitan statistical areas to protect fish and wildlife resources and habitats that will provide the public wildlife-oriented recreation, education, and interpretation opportunities. The primary purpose for establishment of new urban Refuges will be to foster environmental awareness and outreach programs, and to develop an informed and involved citizenry that will support fish and wildlife conservation.

In addition, the proposed Refuge would contribute to a long-standing vision held by conservation organizations across the Greater Chicago metropolitan area. These partners have worked to identify key lands for conservation, open space, and greenways aimed at providing a way to connect urban and suburban residents with nature. The establishment of a refuge would provide an anchor for this broad-based conservation and environmental education initiative.

1.3 Conserving Wildlife and Serving People: The U.S. Fish and Wildlife Service

Refuges are administered by the Service. The Service is the primary federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife populations and their habitats. It oversees the enforcement of federal wildlife laws, management and protection of migratory bird populations, restoration of nationally significant fisheries, administration of the Endangered Species Act, and the restoration of wildlife habitat. The Service also manages the NWRS.

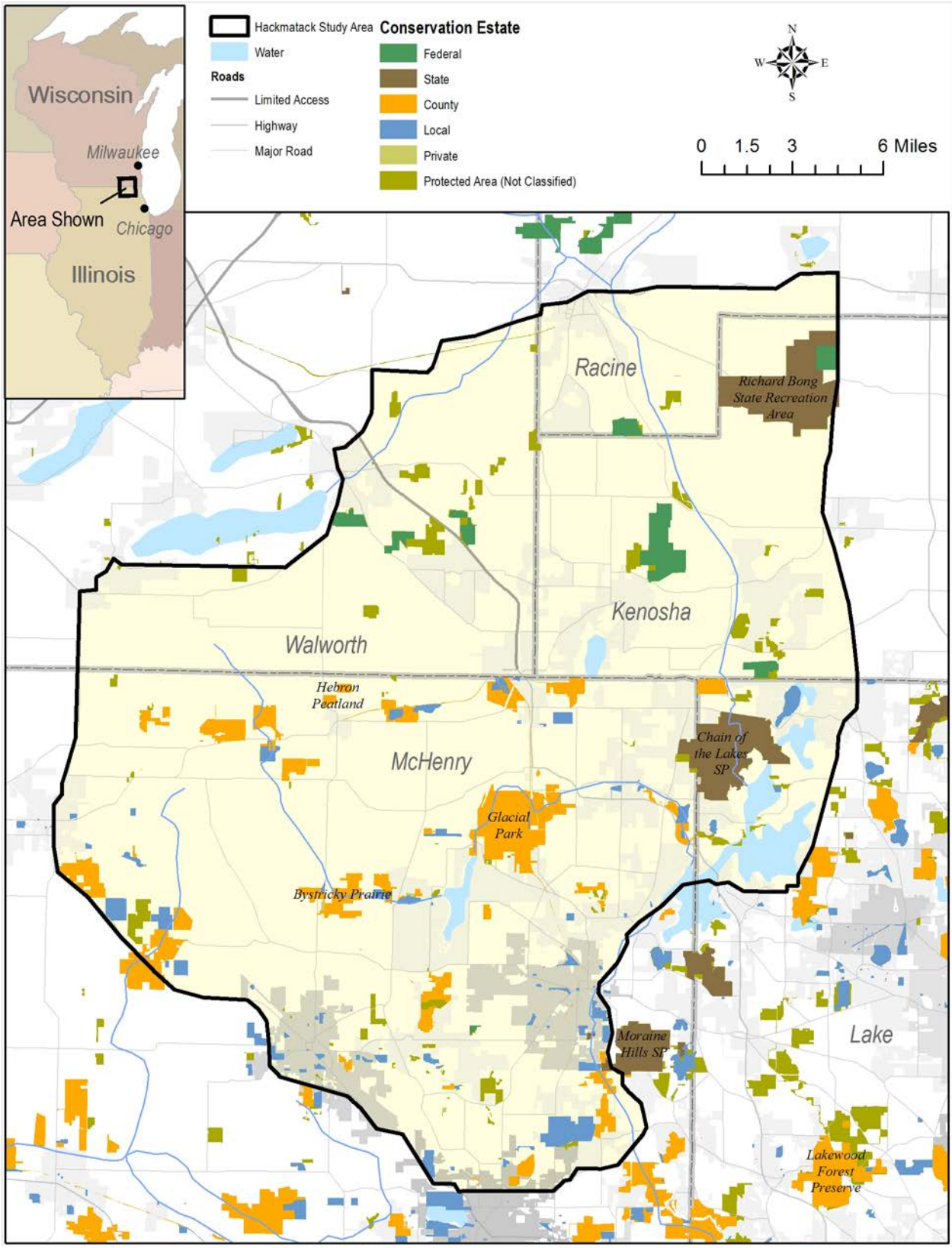
1.3.1 The National Wildlife Refuge System

Refuge lands are part of the National Wildlife Refuge System (NWRS, Refuge System), which was founded in 1903 when President Theodore Roosevelt designated Pelican Island in Florida as a sanctuary for Brown Pelicans. Today, the system is a network of 555 refuges and wetland management districts covering over 150 million acres of public lands and waters. Over half of these lands and waters (51 percent) are in Alaska, with approximately 16 million acres located in the lower 48 states and several island territories, and the balance in submerged areas of the Pacific Ocean.

The Refuge System is the world's largest collection of lands specifically managed for fish and wildlife. Overall, it provides habitat for more than 5,000 species of birds, mammals, fish, amphibians, reptiles, and insects. As a result of international treaties for migratory bird conservation and other legislation, such as the Migratory Bird Conservation Act of 1929, many refuges have been established to protect migratory waterfowl and their migratory flyways.

Refuges also play a crucial role in preserving endangered and threatened species. Among the most notable is Aransas NWR in Texas, which provides winter habitat for the highly endangered Whooping Crane. Likewise, the Florida Panther Refuge protects one of the nation's most endangered predators. Refuges also provide unique recreational and educational opportunities for people. When human activities are compatible with wildlife and habitat conservation, they are places where people can enjoy wildlife-dependent recreation such as hunting, fishing, wildlife observation, photography, environmental education, and environmental interpretation. Many refuges have visitor centers, wildlife trails, automobile tours, and environmental education programs. Nationwide, approximately 30 million people visited national wildlife refuges in 2004.

Figure 1: Location of Study Area



The National Wildlife Refuge System Improvement Act of 1997 established several important mandates aimed at making the management of refuges more cohesive. The preparation of Comprehensive Conservation Plans (CCPs) is one of those mandates. The legislation directs the Secretary of the Interior to ensure that the mission of the Refuge System and purposes of the individual refuges are carried out. It also requires the Secretary to maintain the biological integrity, diversity, and environmental health of the Refuge System.

The goals of the Refuge System are to:

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that are strategically distributed and carefully managed to meet important life history needs of these species across their ranges.
- Conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts.
- Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (e.g., hunting, fishing, wildlife observation and photography, and environmental education and interpretation).
- Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

1.4 Public Involvement

Involvement by local government officials, organizations, landowners and other interested citizens is integral to planning for any new refuge. Proposals that involve land acquisition by a government agency can be controversial. Open communication with all parties is essential throughout the planning process. Starting in September 2010, the Service had provided and sought information through news releases, media interviews, open house events, a project website, letters to specific organizations and one-on-one discussions. A website (http://www.fws.gov/midwest/planning/Hackmatack/index.html) has been developed to share information with the public in a timely manner.

1.4.1 Background

A Preliminary Project Proposal for a refuge within the Study Area was developed by Service biologists in January 2010. The purpose of this report was to brief the Director of the Service about the resource conservation opportunities of the area and to obtain permission to conduct a study of the merits of the proposal. The proposal was approved by the Director on April 5, 2010.

An interagency Planning Coordination Team was formed in May 2010 that includes representatives from state, local, and regional governments, as well as the Service.

Beginning with a public announcement in September 2010 and extending through August 2011, the Refuge project planning staff have held four public open house events, placed or received hundreds of e-mail messages and phone calls, and have given several radio and newspaper interviews concerning the

Refuge proposal. Several non-profit conservation groups and individuals have also given presentations on the Refuge concept before and after this planning period.

Two open houses were held in Illinois. The first was on Tuesday, Oct. 12, 2010 at the McHenry County Government Center Administration Building, which is located at 667 Ware Road in Woodstock, IL. The second open house in Illinois was on Wednesday, Oct. 13 at the Lost Valley Visitor Center in Glacial Park, Route 31 and Harts Road, Ringwood, IL.

Two open houses were also held in Wisconsin. The first was on Wednesday, Oct. 20, 2010 at the Bristol Municipal Building, which is located at 19801 83rd Street in Bristol, WI. The second open house in Wisconsin was held on Thursday October 21, at the City of Lake Geneva City Hall, at 626 Geneva Street in Lake Geneva, WI.

All open houses were held from 4-8 p.m. and interested citizens were encouraged to stop by any time and stay as long as they wished to speak with Service staff or submit comments. Comment forms were available so that written comments could be submitted onsite or mailed in later.

These events drew more than 530 people who provided their reaction to the idea of a refuge and identified issues and opportunities that they felt needed to be addressed during the planning process.

The Environmental Assessment was released for public review March 21, 2012; the comment period lasted 37 days and ended April 27, 2012. During the comment period the Refuge hosted two open house events to obtain comments. The first open house was held on Tuesday, April 3, 2012, from 5:00 p.m. to 8:00 p.m. at the Lost Valley Visitor Center in Glacial Park, Route 31 and Harts Road, Ringwood, Illinois. The second open house was held Wednesday, April 4, 2012 from 5 p.m. to 8 p.m. in Genoa City, Wisconsin at the Brookwood Middle School, 1020 Hunter's Ridge Drive. Over 400 people attended one or both of these events.

By the conclusion of the comment period the planning team received over three thousand written responses by organizations and individuals. Approximately, 2500 of these responses were from an internet write-in campaign by a non-governmental organization. In response to all comments we made a number of minor edits to the final document. A response to comments section has been added to this EA chapter.

1.4.2 Issues, Opportunities and Concerns

The Service received about 360 letters, comment forms, postcards and e-mail messages from people during the initial scoping process in 2010. Comments were received primarily from local residents, non-profit organizations, and governmental offices.

Issues and concerns identified during scoping helped the Service identify and evaluate strategies for the proposed action (Table 1). Individual comments expressed during the open houses or received in writing have included the following themes:

Table 1: Summary of Public Scoping Comments

Category	Topic	Percent of Comments
Habitat/Species		**80%**
	General Concern for the Environment	
	Wetland Preservation/Restoration is Needed	
	Grassland Preservation/Restoration is Needed	
	Habitat Fragmentation Exists/Linkages are Needed	
	Conservation of Biodiversity is Desirable	
	Endangered Species Would Benefit	
Recreation/Education		**12%**
	Increased Recreational Opportunities are Desirable	
	Snowmobile Support	
	Horseback Riding Support	
	Hunting Support	
	Hunting Opposition	
	Environmental Education Support	
Societal Issues		**8%**
	General Opposition to Government	
	Fear of Increased Government Control	
	Avoid Sand/Gravel Deposits & Consider Restoration	
	Economic/Tourism Boost will Benefit Area	

These issues will be discussed as an integral part of the Alternatives and Environmental Consequences chapter in this EA. In addition, we have included a list of frequently asked questions in the Appendix.

1.4.3 Summary and Response to Comments on the EA

The EA was released for public review March 21, 2012; the comment period lasted 37 days and ended April 27, 2012. During the comment period the Refuge hosted two open house events to obtain comments. By the conclusion of the comment period we received over three thousand written responses by organizations and individuals. Approximately, 2500 of these responses were from an internet write-in campaign by a non-governmental organization. In response to all comments we made a number of minor edits to the final document.

Nearly all respondents endorsed the selection of Alternative C.

The following is a summary of the comments received on the EA and how the issues are addressed.

Comments Received	How Issues are Addressed
Several thousand individuals and dozens of organizations endorsed the EA as written and recommended establishment of a refuge.	Comments acknowledged. The Service appreciates this endorsement of its proposed plan.
Approximately 30 individuals wrote to express concern that a refuge would result in the closure of existing snowmobile trails.	The issue of snowmobile trails was discussed in the EA and in an e-mail message or letter sent to 60 snowmobile clubs. Motorized vehicles on national wildlife refuges are

	generally permitted only on designated roads during specified times of the year. Off-road vehicle use, including ATVs and snowmobiles, is generally not permitted due to impacts on vegetation, disturbance to wildlife and other Refuge users, and safety and liability issues. However, the Service's objective is not to eliminate or interrupt existing snowmobile trails. It is possible that at some time in the future a landowner would offer land for sale to the Refuge that contains a portion of an existing snowmobile trail. We do not expect this situation to occur very often. The Service would work with the landowner and snowmobile clubs to either reroute the trail or encourage a third party to obtain a permanent trail easement prior to the federal purchase. McHenry County has expressed an interest in working with landowners and the Service to secure trail easements if the situation arises. The Department of Natural Resources in Illinois and Wisconsin, the respective county governments, and local snowmobile clubs may also choose to be involved to secure an existing trail. Please see the EA for a map of known snowmobile trails and more information on this subject.
Several organizations and dozens of individuals asked the Service to consider expanding the Refuge boundaries. Ideas for expansion included connecting corridors to specific conservation lands in Kenosha County, Wisconsin and into Lake County in Illinois. However, the most repeated request was taken from the following letter excerpt: "We recommend the following additions to Concept C: Expand the westernmost core area to include all of the Nippersink Headwaters subwatershed, an area where many conservation-minded private landowners have already banded together to protect the beauty and integrity of the highest glacial landscape in McHenry County. Add the land north of Peterkin Pond which is shown as part of the refuge in Concept B to the preferred option (Concept C) boundaries. This will capture the West Branch of Nippersink Creek in Walworth County. Make use of Nippersink Creek corridors to extend the refuge to build another core area in Wisconsin around the existing Four Seasons Preserve (owned by city of Lake Geneva), Bloomfield Wildlife Refuge and Big Foot Beach State Park (owned by the WI DNR)."	The boundaries of the Core Units and potential connecting corridors in Alternative C were drawn based on soil types, historic natural vegetation, and existing wildlife habitats. The planning team tried to include large blocks of historic prairie soil types in order to enhance the prairie and oak savanna restoration potential. The presence of residential and commercial developments and existing roads also were important in drawing a manageable refuge boundary. The High Point area west of the Preferred Alternative C northwest corner is an area that historically was primarily forest with some smaller areas of mixed forest/prairie and prairie. The area is higher in elevation that the majority of Alternative C areas and is generally well drained to moderately well drained. This reduces the potential areas of wetland or wet prairie found there. Since much of our interest in the Hackmatack area is focused upon grassland birds and wetland associated birds, from a biological standpoint the High Point area does not rank high as judged against our selection criteria. That is not to say that it is not of high biological value. However, with the high level of citizen conservation interest in the area and the presence of McHenry County Conservation District lands, we believe that there is already a good formula in place for conservation gains in that area. It would certainly compliment the Service's Hackmatack conservation proposal if the High Point area were connected to the proposed Refuge area. However, we feel that it is more consistent with our priorities to not include that area in the preferred alternative and instead support private and county conservation efforts there as opportunities arise.

	There are several reasons the area north of Peterkin Pond is not included in the proposed Refuge boundaries. The corridor along County H from Genoa City to Lake Geneva is projected to see substantial residential housing development by 2030 in comparison to the majority of the areas identified under Alternative C. This could potentially bisect corridors connecting Big Foot Beach State Park with Four Seasons Preserve or Bloomfield Wildlife Refuge and the main body of the Refuge identified near Peterkin Pond. Extending the authorize boundaries north would also potentially impact a segment of snowmobile trail crossing east-west through Peterkin Pond and adjoining lands. While much of the area falls within historic prairie, other areas within Alternative C already ensure good representation of this habitat within the proposed Refuge. The area north of Peterkin pond has much less wet soils compared to other areas of the proposed Refuge, which means less opportunity to restore wet prairie or wetlands, habitats of interest for the project. The Service does not feel the area in question is necessary to achieve the proposed Refuge objectives. However, acknowledging the value of the area and in particular the preservation and enhancement of water quality in the West Branch of the Nippersink Creek that flows through the area, the Service does encourage private, local, and state conservation activity there and may be able to assist in restoration efforts through the Service's Partners for Fish and Wildlife Program. The Service and most of our non-governmental organization partners recognize that Refuge land acquisition will not be the sole tool to achieve conservation success for the Hackmatack project. Everyone concerned with habitat conservation in the area will need to contribute to the goal. Government budget constraints, the presence of willing landowners, and the potential speed of commercial development are all factors in this project. The Service and the proposed Refuge will do its part to aid wildlife, habitat and people in this region.
The Wisconsin Department of Natural Resources requested that we include trapping of furbearing animals as an allowable use on a new refuge.	In general, trapping may be conducted as a wildlife management tool on many national wildlife refuges for furbearers, like muskrat and beavers, which damage infrastructure, and mammalian predators that may negatively impact nesting waterfowl. Trapping is usually conducted by permittees on a sustainable, relatively small scale. Trapping data must indicate that there is no adverse direct effect on the long-term populations of target species or indirect effect on related prey species. As with hunting, trapping is suspended when the populations of target species appear to be low. We will add a paragraph on trapping to the Conceptual Management Plan.
One national organization and several individuals asked us to consider the impact of light pollution on the future Refuge environment.	Comments acknowledged. This will be mentioned in the Conceptual Management Plan and will serve to remind future Refuge managers to consider light pollution and starlight preservation in future Refuge developments and programs.

Several regional organizations endorsed the plan based on the increase in recreational opportunities for local tourism and businesses.	Comments acknowledged. However, it may take many years to build a sufficient land base for some wildlife-dependent recreational activities. Refuge land acquisition will be conducted on a willing seller and available funding basis.
The Forest County Potawatomi Community (FCPC) submitted a letter with substantial information about the ongoing Potawatomi connection to land in the proposed refuge. We identified three major topics in their comments: The desire to "supplement the Draft EA's 'Archeological and Cultural Resources' section…." The intent to "demonstrate the continuing significance of the lands within the Proposed Refuge to FCPC…." And A "request that FWS consult with FCPC to ensure (1) that future actions related to the Proposed Refuge do not adversely impact culturally sensitive areas or items and (2) that the environmental education and interpretation activity explain the historic Native American stewardship and interdependence on the natural habitat and species within the Proposed Refuge."	We have made edits to the Archeological and Cultural Resources section in the EA to reflect these comments and wrote a response letter to the Potawatomi Community.

1.4.4 Conservation Plans and Initiatives Guiding Planning

The conservation goals and objectives of existing ecosystem plans for the landscapes in which refuges are located are important. They help to determine the manner in which a refuge can best contribute to overall conservation efforts and to the functioning of the ecosystems in that area. The Service must coordinate refuge planning with other units of government, other government agencies and nongovernmental organizations and to the extent practical to make refuge plans consistent with the fish and wildlife conservation plans of the state. The Service also endeavors to make refuge planning consistent with the conservation programs of the tribal, public and private partners within the ecosystem. The following plans were considered during the development of this document.

Upper Mississippi River and Great Lakes Region Joint Venture (2007). A primary goal of the Joint Venture is to integrate continental migratory bird priorities into conservation actions at regional and state levels. Bird Conservation Regions 22 and 23 are both within the Hackmatack Study Area. The Joint Venture Plan integrates conservation visions from the North American Waterfowl Management Plan, North American Landbird Conservation Plan, United States Shorebird Conservation Plan, and the North American Waterbird Conservation Plan. The goal of the Joint Venture Plan is deliver the full spectrum of bird conservation through regionally-based, biologically-driven, landscape-oriented partnerships. It utilizes 70 "focal" or priority bird species from which habitat conservation recommendations are based. Over half (36 of 70) of the focal or priority species identified on Joint Venture Implementation Plan breed within the boundary of proposed Refuge.

USFWS Climate Change Strategic Plan - Five Year Action Plan (2010). The USFWS Five Year Action Plan, designed to implement the Climate Change Strategic Plan, includes the promotion of habitat connectivity and integrity. The Hackmatack Study Area, with its rich conservation estate of protected but disconnected lands, offers an opportunity to implement habitat connectivity at a significant scale, specifically the north-south landscape linkage between the Kettle Moraine State Forest complex in Wisconsin and the Fox River watershed in Illinois.

State of Wisconsin Wildlife Action Plan (2005). The Wisconsin Wildlife Action Plan identified a number of general management recommendations for the Southeast Glacial Plains Landscape. These include increasing publically-owned lands to accommodate recreational needs; protect, link, and restore oak forests; restore and manage wetlands that provide important ecological functions, and protect and restore rivers and riparian zones.

State of Illinois Wildlife Action Plan (2005). The Illinois Wildlife Action Plan places special importance on assembling and protecting large blocks of habitat (grasslands, forests, and wetlands) that support a number of wildlife species in greatest need of conservation. The Illinois Department of Natural Resources (DNR) has identified the Lake McHenry Wetlands Complex Conservation Opportunity Area (COA) within the proposed Refuge Study Area. COA's are locations with significant existing wildlife and habitat resources, where partners plan for and implement conservation plans, where financial and human resources are available, and where conservation is motivated by an agreed-upon conservation purpose.

Chicago Wilderness Biodiversity Recovery Plan (1999). This plan identifies the actions necessary to preserve the region's biodiversity including the vision of a network of protected lands and waters that will preserve habitat for a complete spectrum of the region's natural communities. It calls upon federal, state and local units of government to work cooperatively with private landowners to restore and manage the region's rich natural heritage of land, water and wildlife. The plan identifies conservation targets for both terrestrial and aquatic communities, provides recovery goals with action plans and a role for key players, identifies threats to communities, charts adaptive management strategies that include research and monitoring, and acknowledges the value of education and communication with the public. Many of the species and communities within the Hackmatack Study Area are important components of this plan.

Chicago Wilderness Green Infrastructure Plan (2004). Chicago Wilderness (CW) is a consortium of over 250 conservation organizations, museums, businesses, public agencies and nongovernmental organizations focused on regional approaches to conservation in the tri-state region of Illinois, Indiana and Wisconsin. The CW Green Infrastructure Plan was developed to provide "a visionary, regional-scale map of the Chicago Wilderness region that reflects both existing green infrastructure – forest preserve holdings, natural area sites, streams, wetlands, prairies, and woodlands – as well as opportunities for expansion, restoration, and connection." The overall goal of this plan is to develop a sustainable system of conservation lands, both public and private that can support the rich biodiversity of plants and wildlife native to the region.

McHenry County Green Infrastructure Plan (2011). This plan, currently under development by McHenry County, brings together stakeholders from various groups to identify important landscape features and natural resources, including the Hackmatack Study Area, that are of paramount importance in future planning related to growth. The plan identifies important elements of "green infrastructure" that include present and future open space, private conservation initiatives, ecosystem restoration opportunities, and where elements of conservation design should be incorporated into future development.

McHenry County Conservation District Natural Areas Protection Plan (2006). The Natural Areas Protection Plan calls for the protection and management of significant natural resources of the county; including natural areas, wildlife, geologic features of significance, endangered and threatened species, and high quality aquatic systems including Nippersink Creek and its tributaries.

McHenry County Conservation District Oak Ecosystem Inventory (2005). The Oak Ecosystem Inventory documents the loss of oak-dominated ecosystems from 1837 through 2005 across the entire county. With loss of these ecosystems at nearly 90 percent and fragmentation of the remaining blocks into small units generally less than 25 acres in size, the plan's recommendations for future conservation are

comprehensive. They include protection of remaining savanna and woodland blocks through acquisition and private easements, management of existing oak stands and replanting of oak dominated ecosystems.

U.S. Fish and Wildlife Service Lespedeza Leptostachya Recovery Plan. U.S. Fish and Wildlife Service, Twin Cities, Minnesota (1988). This plan was developed by the Service to guide recovery efforts for prairie bush clover, a midwestern endemic grassland species, whose original midwestern range includes both northern Illinois and southeastern Wisconsin. Protection and management of known lespedeza populations is a recommendation of the recovery plan. Populations of this species are known to occur in both Wisconsin and Illinois, within or in close proximity to the Study Area. Suitable habitat is present within the Study Area for the species.

U.S. Fish and Wildlife Service. Eastern Prairie Fringed Orchid Recovery Plan. Fort Snelling, Minnesota. (1999). This plan was developed by the Service to guide recovery efforts for the eastern prairie white fringed orchid, a midwestern grassland species, whose original midwestern range includes both northern Illinois and southeastern Wisconsin. Protection and management of known orchid populations is a recommendation of the recovery plan. Several populations of this species occur in the Hackmatack Study Area. Suitable habitat is present that may support additional populations that have yet to be discovered.

Natural Areas Plan for Southeastern Wisconsin (Southeastern Wisconsin Regional Planning Commission [SEWRPC], 1997). This plan identifies actions to protect and manage critical habitats for plants and animals and improve ecosystems. The plan maps important environmental corridors, critical habitats, and natural areas of statewide significance and calls for the protection of these areas as future development occurs within the southeastern Wisconsin region.

America's Great Outdoors Initiative. This national initiative seeks to increase American's access to outdoor recreation and identifies projects in all fifty states with the potential to do so. In Illinois, the proposed Hackmatack NWR was identified as one of those projects. The Refuge would also provide outdoor education opportunities to the estimated 3.5 million people that live within 60 miles of the project area.

1.4.5 Partners for Fish and Wildlife Program

The Service established the Partners for Fish and Wildlife Program in 1987 to work beyond the boundaries of refuges with landowners and other partners to improve habitat on private lands for fish and wildlife. The program is voluntary, relies heavily on a partnership approach, and leverages both ideas and funding from a variety of sources. Cost sharing agreements and technical assistance are important components.

The overall goal of Partners Program projects is to return a site to the ecological condition that likely existed prior to loss or degradation. Priority ranking is given to proposed projects that meet these conditions:

- Improve habitat for migratory birds, threatened and endangered species, interjurisdictional fish, marine mammals, and other declining species.
- Complement activities on Refuge System lands, or contribute to the resolution of problems on refuges that are caused by off-refuge practices.
- Address species and habitat priorities that have been identified through Service planning teams (with our partners), or in collaboration with state fish and wildlife agencies.

- Reduce habitat fragmentation or serve as buffers for federal or state conservation lands.
- Result in self-sustaining systems that are not dependent on artificial structures.

Service biologists work one-on-one with landowners to plan, implement, and monitor their projects. This level of personal attention and follow-through is a significant strength of the Program.

1.5 Decisions

This EA is an important step in the Service's formal decision-making process. In compliance with the National Environmental Policy Act, the Regional Director, Midwest Region, will consider the information presented in this document to select one of the alternatives.

The Regional Director will determine whether the preferred alternative will or will not have a significant impact on the quality of the human environment and issue a Finding of No Significant Impact (FONSI) or a Decision of Significant Impact. A FONSI means that the preferred alternative is accepted and can be implemented in accordance with other laws and regulations. A Decision of Significant Impact would indicate the need to complete an Environmental Impact Statement (EIS) or a rejection of the project proposal.

1.6 Legal Compliance

The Service planning process, land acquisition, and management are done in accordance with authority delegated by Congress and as interpreted by Department of the Interior and agency regulations and guidelines. Land acquisition authority includes the Migratory Bird Conservation Act of 1929, Endangered Species Act, Emergency Wetlands Resources Act of 1986, and the Fish and Wildlife Act of 1956. Land management authority, including comprehensive conservation planning, is directed primarily by the National Wildlife Refuge System Improvement Act of 1997. Other relevant Acts and Executive Orders are listed in the Appendices.

This EA was prepared by the Service and represents compliance with applicable federal statutes, regulations, Executive Orders, and other compliance documents, including the following:

- Administrative Procedures Act (5 U.S.C. 551-559, 701-706, and 801-808) as amended
- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996)
- Antiquities Act of 1906 (16 U.S.C. 431-433)
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d) as amended
- Clean Air Act of 1972 (42 U.S.C. 7401 et seq.) as amended
- Clean Water Act of 1972 (33 U.S.C. 1251 et seq.) as amended
- Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) as amended
- Executive Order 11593: Protection and Enhancement of the Cultural Environment (issued in May 1971)
- Executive Order 11988: Floodplain Management (issued in May 1977)
- Executive Order 11990: Protection of Wetlands (issued in May 1977)

- Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations (issued in February 1994)
- Executive Order 13112: Invasive Species (issued in February 1999)
- Fish and Wildlife Act of 1956 (16 U.S.C. 742a et seq.)
- Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661 et seq.) as amended
- Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421)
- Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712) as amended
- National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) as amended
- National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.) as amended
- National Pollutant Discharge Elimination System (33 U.S.C. 1251 et seq.) as amended
- National Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 et seq.)
- Partners for Fish and Wildlife Act of 2006 (16 U.S.C. 3771)
- Purpose, Policy, and Mandate for Implementing the Procedural Provisions of NEPA (40 CFR 1500 et seq.)
- Soil and Water Resources Conservation Act of 1977 (16 U.S.C. 2001-2009) as amended

Further, this EA reflects compliance with applicable State of Illinois, State of Wisconsin and local regulations; statutes, policies, and standards for conserving the environment and environmental resources such as water and air quality.

1.7 Establishing Authority

Lands acquired by the Service for the proposed Hackmatack NWR would be purchased under the authority of the Migratory Bird Conservation Act of 1929, the Refuge Recreation Act of 1962, the Fish and Wildlife Act of 1956, and the Emergency Wetland Resources Act of 1986.

1.8 Goals of the Proposed Hackmatack NWR

The following goals for the proposed Hackmatack NWR were developed within the framework of the Refuge System's mission statement, the National Wildlife Refuge System Improvement Act of 1997, the Refuge's primary purposes, and other Service policy and directives. The goals are intentionally broad statements that describe desired future conditions and would guide the management of the Refuge in the interim period and the development of management objectives and strategies for the CCP.

- Protect and enhance habitats for federal trust species and species of management concern, with special emphasis on grassland-dependent migratory birds and protection of wetlands and grasslands.

- Create opportunities for hunting, fishing, wildlife observation and photography, and environmental education and interpretation, while promoting activities that complement the purposes of the Refuge and other protected lands in the region.
- Promote science, education, and research through partnerships to inform land management decisions and encourage continued responsible stewardship of the natural resources of the Hackmatack NWR.

Chapter 2: Description of Alternatives

In this chapter

2.1 Formulation of Alternatives
2.2 Explanation of Alternatives

2.1 Formulation of Alternatives

Each of the following four alternatives was designed to benefit specific wildlife and plant habitats within the Study Area. The boundaries were formulated based on the watersheds, existing conservation areas, habitat requirements of desired wildlife species, public roads, and comments received from the public. The recommended protection levels (e.g., acquisition, conservation easements, private landowner initiatives, etc.) were based on the Service's policy to acquire the least interest in land necessary to meet Refuge goals.

2.2 Explanation of Alternatives

Alternative A: Current Direction (No Action)

The National Environmental Policy Act of 1969 requires all federal agencies consider a "No Action" alternative. In this case "No Action" means that a refuge would not be established in the Study Area. However, Service involvement in conservation work would continue under existing programs and, in some cases, may increase in future years. The Service would continue to emphasize habitat conservation on private lands through the Partners for Fish and Wildlife Program, Joint Venture projects under the North American Waterfowl Management Plan, the Endangered Species Program, and other federal or partner agency initiatives.

Alternative B: Refuge and Landscape Conservation Area

The Refuge and Landscape Conservation Area alternative would create a large contiguous block of habitat (28,127 acres). The proposed Refuge boundary would seek to connect a series of existing county and state conservation lands to increase block size and promote travel corridors for wildlife (Figures 2 & 3). The larger block sizes would provide sufficient habitat for nesting grassland birds and waterfowl that are sensitive to fragmented habitat and edges. Land acquisition or conservation easements from willing sellers would be the preferred method of conservation.

Figure 2: Alternative B – Refuge and Landscape Conservation Area (Source: USFWS, Midwest Region

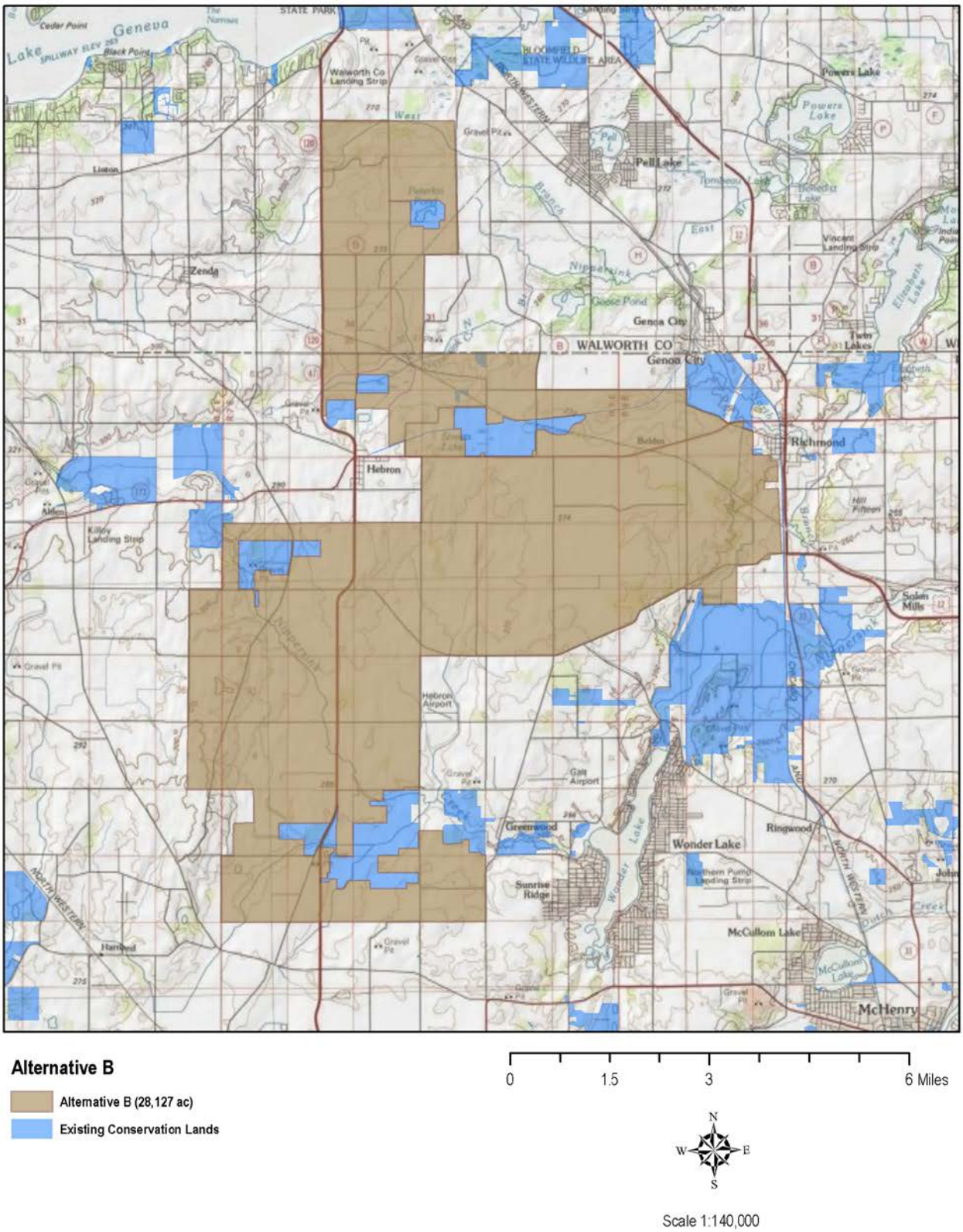
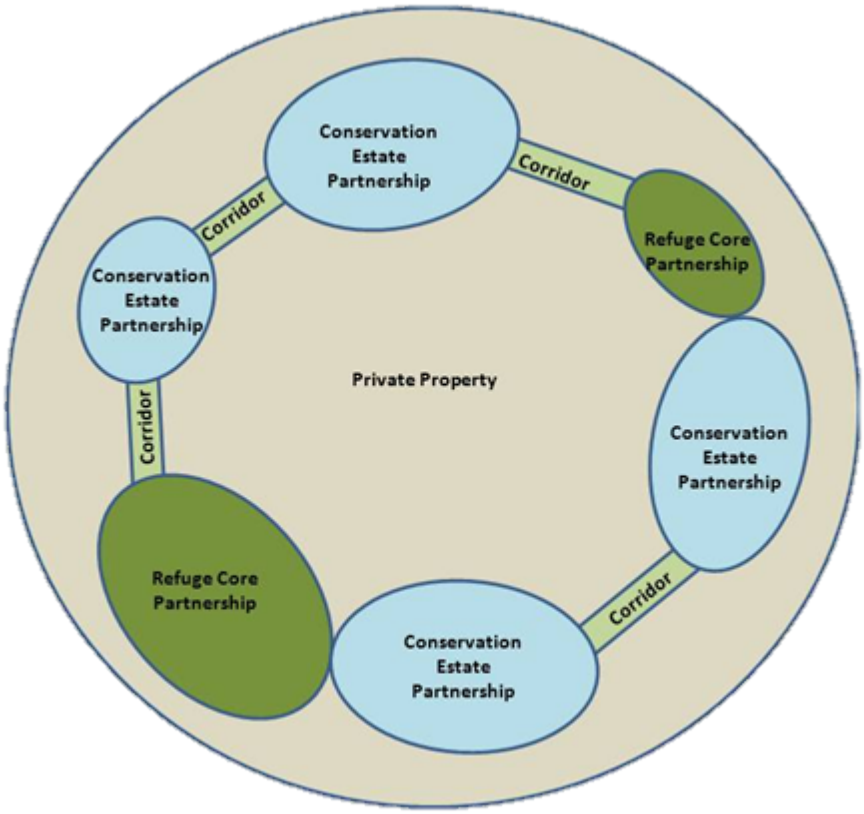


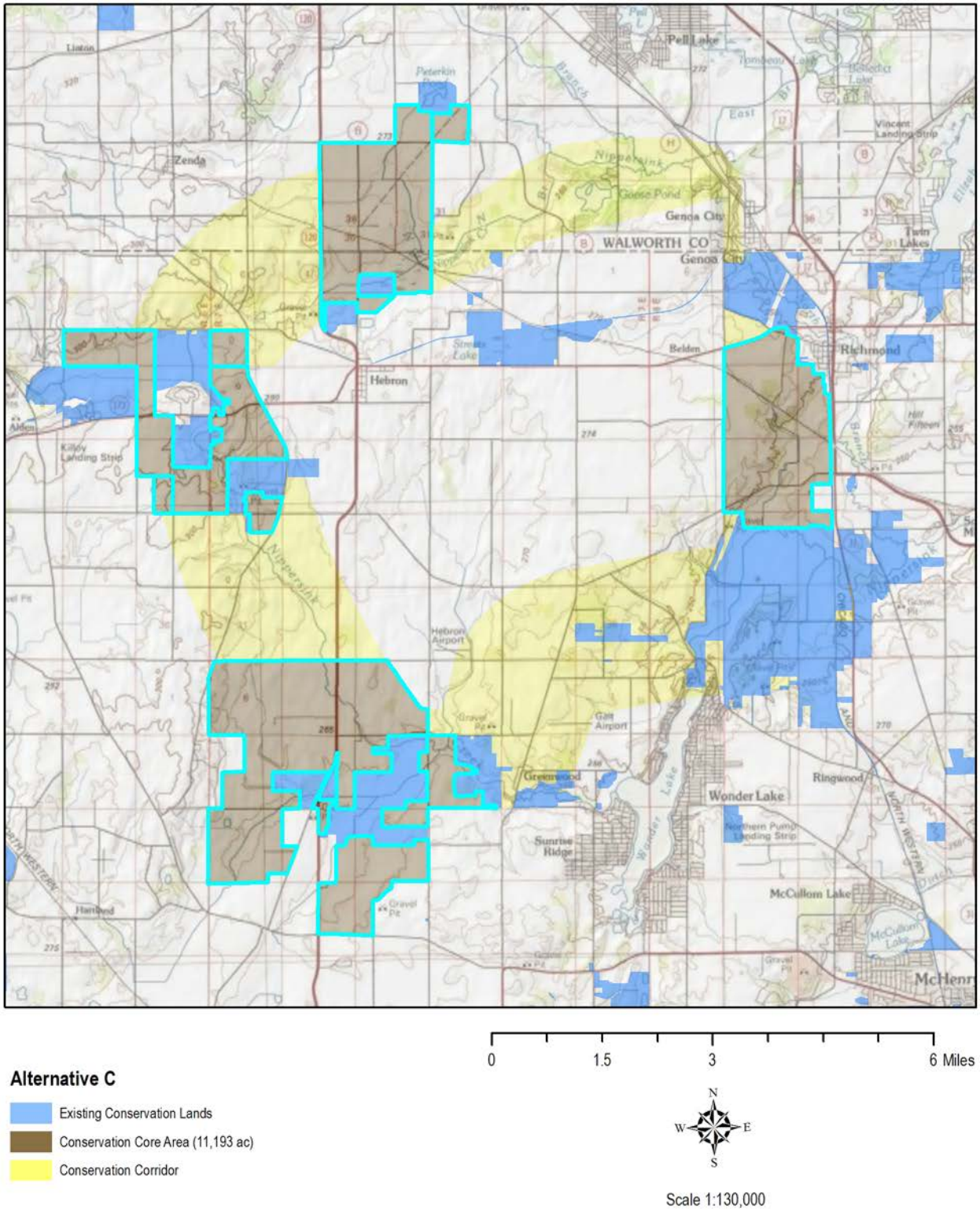
Figure 3: Conceptual Configuration for Alternatives C



Alternative C: Cores and Corridors (Preferred Alternative)

Alternative C would link and expand upon existing conservation areas to benefit migratory birds and endangered species. Similar to Alternative B, the larger block sizes associated with the cores would provide sufficient habitat for nesting grassland birds and waterfowl that are sensitive to fragmented habitat and edges. The corridors would assist terrestrial migration of small mammals, herptiles, and plants that may be impacted by a changing climate (Figure 4).

Figure 4: Alternative C – Cores and Corridors (Source: USFWS, Midwest Region)



Land protection methods for the conservation core areas (11,193 acres) would include land acquisition conservation easements, and Non-Governmental Organizations (NGOs)/private opportunities aimed at creating contiguous natural habitat (Table 2). The conservation corridors would connect the cores primarily through use of partnership efforts and to a lesser degree with land acquisition. Specific, narrow corridors can't be identified at this time as detailed land status and partnerships would determine the ultimate siting. However, a continuous corridor of a minimum of 600 feet wide would be considered complete.

Table 2: Summary of Potential Conservation Tool Configurations

Area	Primary Conservation Tool	Secondary Conservation Tool
Conservation Core	Acquisition, easement, agreements	Same as primary tools
Conservation Corridors	Easement, agreement, Partners for Fish and Wildlife	Acquisition, private landowner initiatives led by others (NGOs, County)
Private Property (Agricultural areas adjacent to core and corridor areas)	Partners and NRCS programs, easements, agreements, private landowner initiatives	Same as primary tools

Cores: These areas serve to round out existing conservation lands to create contiguous natural habitat in 3,000-5,000 acre blocks. Land protection methods would include both land acquisition and easements to conserve and restore lands. Federal programs such as the Service's Partners for Fish and Wildlife Program and the Natural Resource Conservation Service (NRCS) Wetland Reserve Program would be encouraged to increase efforts is these areas.

Corridors: Conservation corridors used to connect to primary areas. The Service's Partners for Fish and Wildlife Program would be actively engaged to work with landowners to conserve and restore natural habitat. Private landowners, NGOs, local governments, and other partners would provide the leadership for establishing connecting corridors.

Corridor Selection Criteria and Desirable Features

The following selection criteria will be used to develop the best possible routes for future connecting habitat corridors.

- No development.
- Native habitats.
- Wide enough for wildlife corridor as well as room for a multi-use trail; minimum 600 feet wide; assume average of 660 feet (1/8 mile; 80 acres/mile).
- Shortest possible route between core areas when the property can meet other criteria.
- Willing participant landowners only.
- Use existing corridors when possible.
- Avoid roads when possible.
- The corridors have permanent protection.

- Avoid high economic value land when possible.
- Corridors contain areas of woody vegetation as well as grassland to facilitate movement of animals and plants dependent upon both habitat types.
- Trails are located on corridor edges, not through the center, to avoid habitat fragmentation.

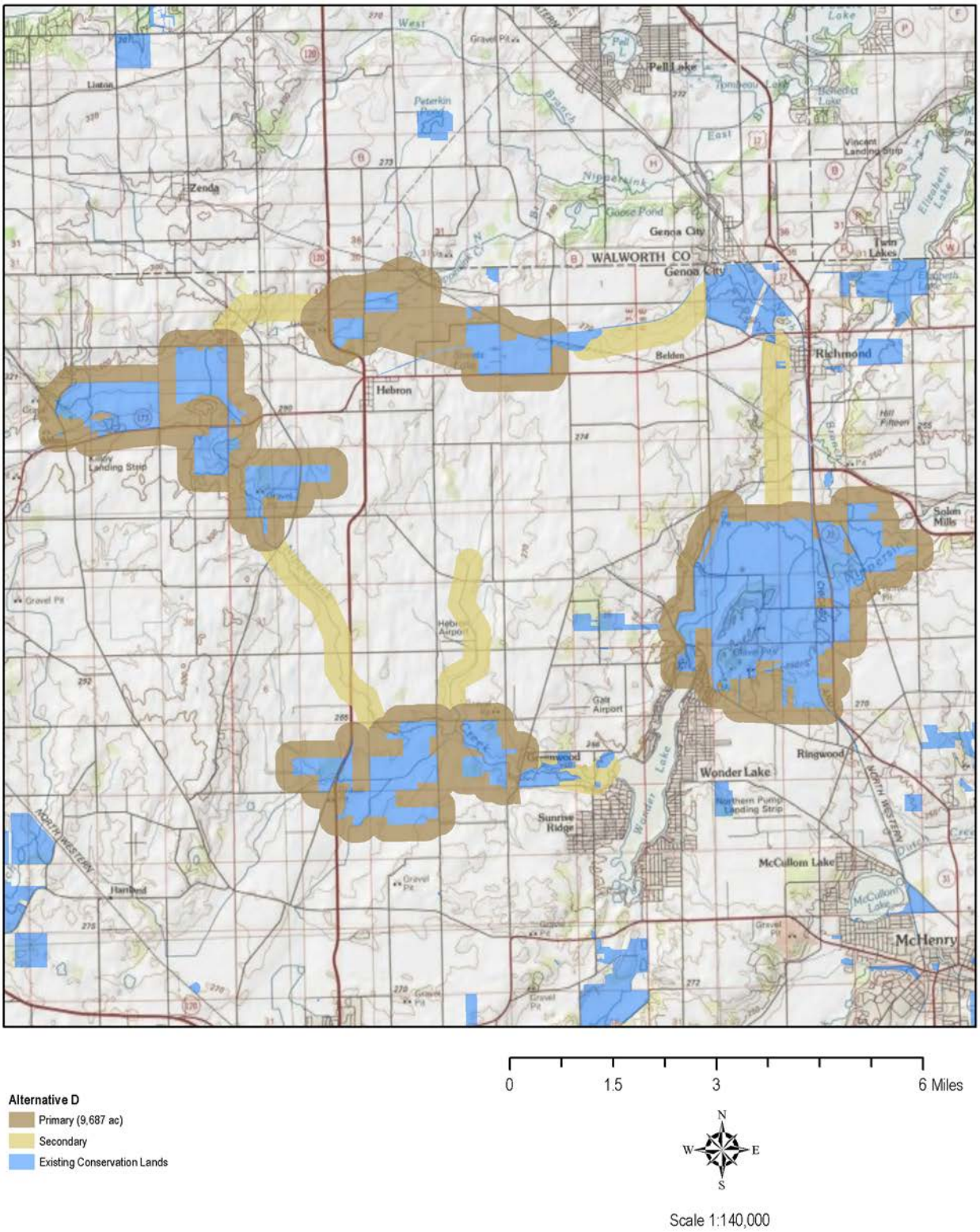
Possible means to create the corridors:

- Partners take the lead in developing the corridors.
- If Service is involved in acquiring the corridors.
    - Partner acquires rights to any areas to be used by snowmobiles prior to Service acquisition of any rights; Service works with partners to minimize any potential negative impacts of the trail's location.
    - Easements are first priority; include rights to establish a multi-use trail.
    - Voluntary partnerships with landowners are possible but may not result in areas that allow trail development.
    - Use willing-seller acquisition as the last resort.
- Service or partners obtain rights to restore habitats in the corridor or at least maintain existing habitats where they are compatible with Service interests.

Alternative D: Partnership Initiative

This alternative would seek to increase the amount of conservation land in the area similar to Alternative C but with a reduced acreage footprint (Figure 5). Core areas would encompass 9,687 acres, while the corridors would be similar to those in Alternative C with a minimum width of 600 feet. The emphasis of the Refuge would be to buffer and connect existing conservation lands. The Service would purchase lands if a landowner preferred that option. However, the Service would primarily work with established partners and private landowners on less-than-full acquisition options.

Figure 5: Alternative D – Partnership Initiative (Source: USFWS, Midwest Region)



Chapter 3: Affected Environment

In this chapter

3.1 Introduction
3.2 Physical Environment
3.3 Biological Environment
3.4 Land Use and Management Status
3.5 Socioeconomic Environment
3.6 Conclusion

3.1 Introduction

This chapter describes the proposed Hackmatack NWR Study Area in southeast Wisconsin and northeast Illinois and its local and regional setting. The Study Area's physical environment, habitats, species, and human environment are all described. This description provides a thorough overview of the Study Area's current features so the effects of the proposal (establishing a new refuge) can be weighed within the larger context of its surroundings (The Greater Milwaukee and Chicago metropolitan areas).

3.2 Physical Environment

The Hackmatack Study Area is located in portions of Walworth, Racine, and Kenosha Counties in Wisconsin and McHenry and Lake Counties in Illinois encompassing 350,000 acres (54 square miles). Its approximate boundary is defined by a 30-mile radius from the village of Richmond, Illinois on the state border. The Study Area lies approximately 50 miles from downtown Milwaukee and Chicago. Located 20 miles west of Lake Michigan, the Study Area's varied landscape of lakes, streams, ridges, and valleys is intersected on the east by the Fox River.

3.2.1 Topography, Geology, and Soils

The Study Area falls within the physiographic morainal section. The topography and soils are a result of glaciers advancing and retreating from 13,000 to 26,000 years ago. These glaciers formed the many "moraines" or ridges in the area, left behind "glacial meltwater" or lakes and marshes, created rivers that scoured out valleys, and changed lake levels and shorelines. The "glacial drift" or raw soil materials left behind by the glaciers has been naturally weathered and sorted to create "outwash" in the lowlands and "till" in the uplands. More recently, this drift has been covered over by "loess" or wind -blown dust in some areas, and peat has built up in undrained basins. Over time, all of these processes have shaped the land within and around the Study Area (Sullivan, 1997).

The elevation ranges from 650 to 950 feet above mean sea level. A few pockets of the land on the western side of the Study Area range from 950 to 1150 feet above mean sea level.

The bedrock foundation is very old sedimentary rock, a magnesium-rich limestone known as dolomite, or more specifically Niagara dolomite (Sullivan, 1997). This dolomite has commercial value where it is close to the surface, both as dimensional building stone and, when crushed, as an aggregate for construction or as an agricultural soil conditioner. Even though the deposit is in fact dolomite, it is often referred to as Lannon stone or limestone, primarily calcium carbonate. Gravel and sand deposits are scattered within the Study Area. They are important sources of concrete aggregate, gravel for road

subgrade and surfacing, sand for mortar, and molding sand. The largest concentration lies to the north of the Study Area in Waukesha County (SEWRPC, 1997).

The soils are those typical of much of the Midwest. They include alfisols, which naturally form under hardwood forest cover and have a clay-enriched subsoil with high native fertility making them prime farmland; mollisols, which naturally form under grassland cover, have deep, high organic matter, and are also prime for farmland (especially if drained); and to a much lesser extent histosols, which consists mostly of organic materials, include mucks and peats, and due to their poor drainage and acidity are not prime for agricultural soils.

3.2.2 Climate

The climate of the Study Area ranges from continental to humid continental with wide variations closer to Lake Michigan. The winters are cold and snowy while the summers are warm and wet to hot and humid. About two-thirds of the annual precipitation falls during the growing season (freeze-free period). The average annual temperature is about 50ºF, with an average temperature of 30ºF in the winter and 70ºF in the summer (Climatography of the United States, 2011).

The pronounced moderating effect of Lake Michigan is well illustrated by the fact that the growing season of 140 to 150 days along the east-central coastal area is of the same duration as in the southwestern Wisconsin valleys. The average date of last spring freeze is typically early May, while the first autumn freezes occur in mid-October (Climatography of the United States, 2011).

The long-term mean annual precipitation is between 30 and 35 inches over most of the area. Thunderstorms average about 45 per year and occur mostly in the summer. Occasional hail, wind, and lightning damage are also reported. The mean dates of first snowfall of consequence, an inch or more, is usually in early December with an average annual duration of snow cover of 85 days. Normal annual snowfall exceeds 38 inches (970 mm) in Chicago and is closer to 52 inches near Milwaukee (Climatography of the United States, 2011; and Climate of Milwaukee, 2011).

3.2.3 Hydrology and Water Quality

Water Resources

Since the landscape of the Study Area is considered “young” geologically and has just emerged from underneath the glaciers, much of the land is poorly drained. An elaborate network of branching streams and rivers has not yet formed, and some of the land does not drain at all. The water in the many depressions that dot the landscape is either evaporated or absorbed into the ground (Sullivan, 1997).

A continental divide runs just to the east of the Study Area, splitting the drainage of rivers and streams between Lake Michigan to the east and the Mississippi River to the west. The Fox River, Nippersink Creek, and various other rivers, streams, and creeks within the Study Area generally flow to the Illinois River and then on to the Mississippi River. The rest of the landscape contains numerous lakes, wetlands, bogs, and seeps of various sizes that play a part in the hydrology of the area. Most of the Study Area lies within the Upper Fox River Watershed with a small portion on the western edge in the Kishwaukee Watershed.

Water Quality

The existing rural areas within the Study Area allow most of the rain that falls to recharge groundwater or reenter the atmosphere. However, in the highly developed urban and intensive row crop agricultural locations in and near the Study Area, much of the rain that falls becomes surface run-off. This water mixes with chemicals applied to or contained in the surface and degrades the water's quality. While the Study Area has several groundwater aquifers from which local residents obtain drinking water, increased surface run-off has increased the potential for groundwater contamination by harmful pollutants. This is especially true in areas with highly permeable soils and subsurface materials such as sand and gravel.

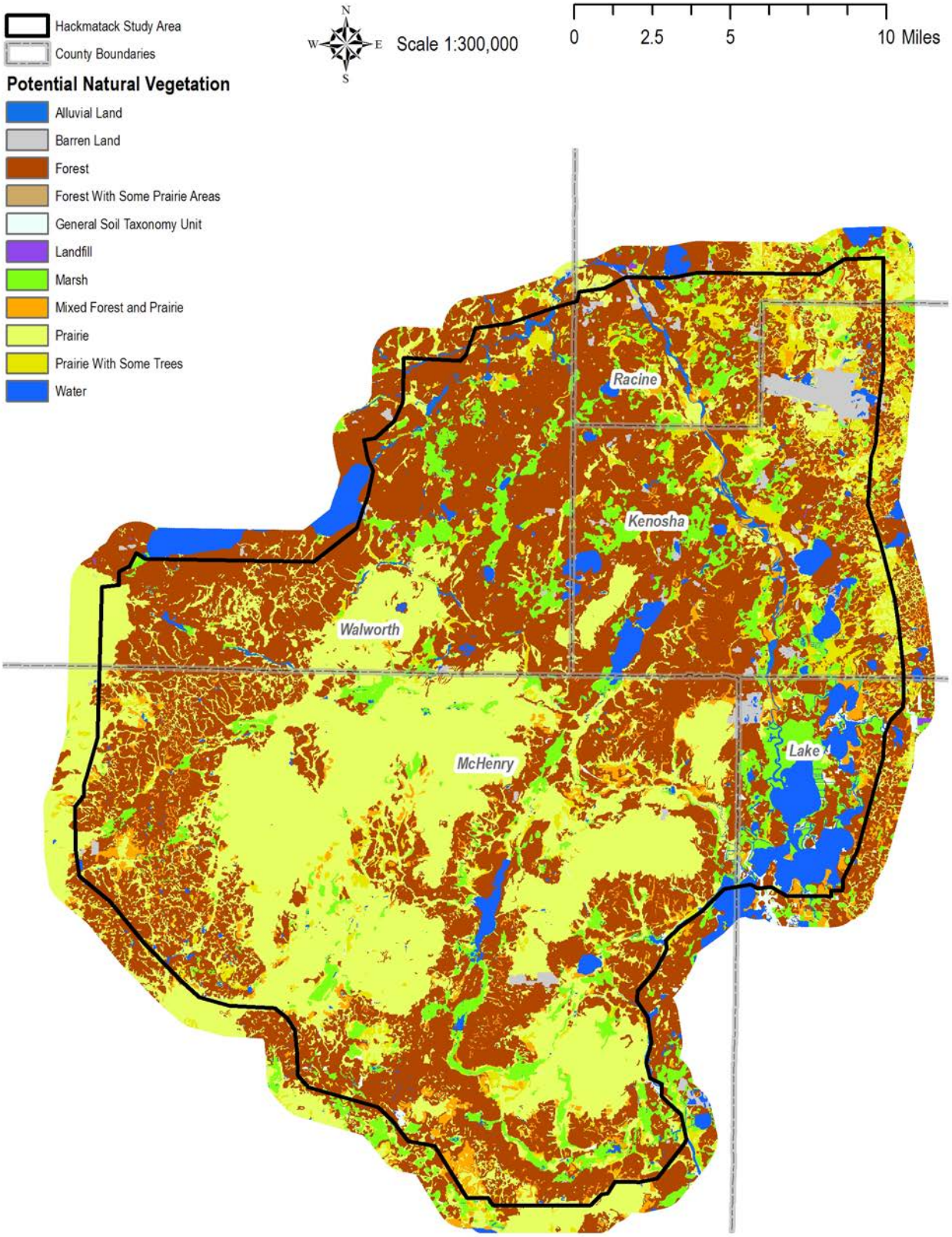
Five Class III Special Resource Groundwater Protection Areas have been established in McHenry County within or adjacent to nature preserves containing unique wetland natural communities that depend on a constant flow of clean, cool groundwater from shallow aquifers. McHenry County's rivers and streams represent some of the highest quality stream resources in northeastern Illinois. According to the Illinois Environmental Protection Agency and the Illinois DNR, most of these freshwater sources maintain healthy aquatic systems with biological integrity ratings of Class A or B (on a scale of A to E). The Kishwaukee River, Nippersink Creek, and Boone Creek are examples of these high-quality streams.

3.3 Biological Environment

3.3.1 Habitats

The varied landscape that was left behind after the glaciers finally retreated supported a wide variety of habitats that in turn support a wide variety of species. The Wisconsin portion of the Hackmatack Study Area lies in the Southeast Glacial Plains Ecological Landscape. Historically, this landscape supported a mosaic of prairie, oak forests, oak savanna, maple-basswood forests, marshes, and fens (Figure 6). The Illinois portion of the Study Area lies within the Northeastern Morainal Natural Division (NMND). This landscape historically consisted of wetlands, oak savanna, woodlands and prairie. Today, with the exception of lands in the existing conservation estate, only small, often isolated pockets of these habitats exist in the Study Area along with sculpted remnants of moraines, kames, kettle marshes, and bogs from its glacial past.

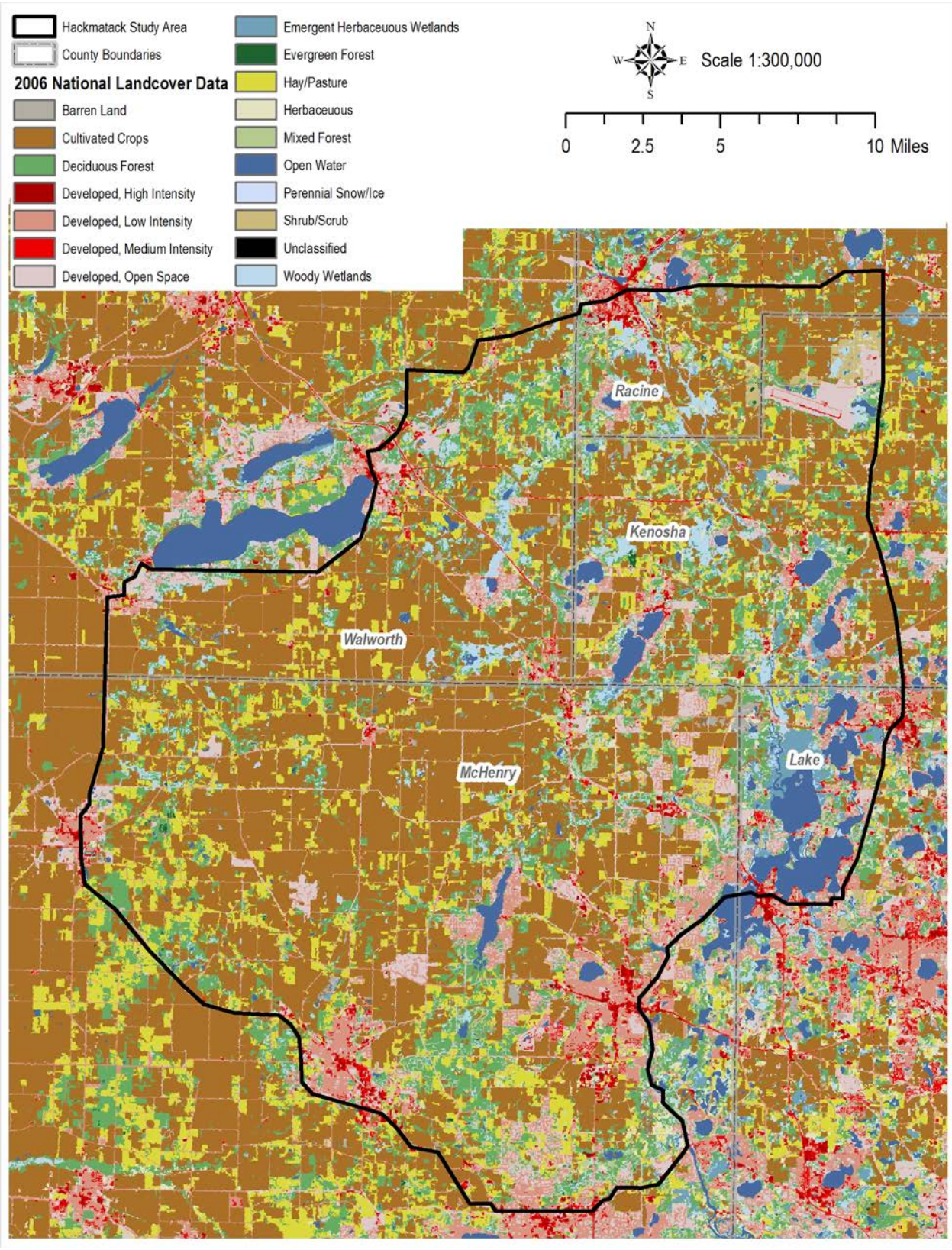
Figure 6: Potential Natural Vegetation of the Study Area



Agricultural and urban land use practices have drastically changed the land cover of the Study Area since Euro-American settlement. The current vegetation is primarily agricultural cropland (over 50 percent). Remaining forests occupy only about 10 percent of the land and consist of oak, maple-basswood and lowland hardwoods (Figure 7).

Two habitat types account for most of the sensitive species in the Study Area: wetlands and grasslands. Historically, as much as 22 percent of the Study Area may have been wetland while 21 percent may have been grassland; an additional five percent may have been savanna. The remainder of the landscape was most likely forest and mixed forest/prairie. The glacial history of the Study Area produced a rich variety of wetlands and water bodies including fens, bogs, marshes, swamps, ponds, lakes, and streams that attract abundant and diverse wildlife. While prairie was a dominate vegetation community on the landscape historically, only a patchwork of these grasslands too rugged or wet for agriculture still exist today.

Figure 7: Current Land Cover of the Study Area (Source: USFWS, Midwest Region)



Wetlands

Inventory information shows that about half of the original wetland area of Wisconsin has been lost to land use changes, primarily agricultural drainage and road, urban, and industrial development. Many of the remaining wetlands are in an altered or disturbed condition due to partial drainage, vegetation clearing, grazing, periodic plowing, and other agricultural uses. Some of these remaining wetlands (less than 25 percent of the original amount) are interspersed among the former prairie and oak savanna areas of southern and east-central Wisconsin within and near the Study Area. For Wisconsin, 32 percent of the state's threatened and endangered plants and animals are wetland dependent (Wisconsin Ecological Landscapes Handbook, 2001).

The remaining natural wetlands (excluding floodplain forest) occupy about one percent of Illinois, and only 6,800 acres are considered high quality. Marsh-type wetlands are scarce, highly degraded, and critical for the Species in Greatest Need of Conservation (i.e., species meeting one or more of eight criteria used when developing wildlife conservation strategies). Remaining wetlands are in poor condition due to fragmentation, siltation, altered hydrological conditions, and invasive species. Invasive plant species such as reed canary grass, common reed, Eurasian milfoil, and purple loosestrife can dominate disturbed wetlands and exclude native plant species, resulting in a loss of biodiversity. Wetland bird and insect communities are especially sensitive to changes in hydrology, plant species composition, and habitat loss (Illinois DNR, 2005).

The Illinois DNR has identified the Lake-McHenry County Wetland Complex, located within the Refuge Study Area, as a Conservation Opportunity Area in the Illinois Wildlife Action Plan. This area includes priority resources to conserve including "several rare wetland types including fens and bogs, rare wetland and grassland species-some not found elsewhere in Illinois," (Illinois DNR, 2005).

Grasslands (and Oak Savanna)

The prairie grasslands in Wisconsin are comprised of the tallgrass prairie that was intermixed with oak savanna. Tallgrass prairies, along with oak savanna, are among the most decimated and threatened natural communities in the Midwest and the world. Less than one percent of Wisconsin's original prairie still exists today even though soils and topography in Wisconsin have been preserved more than in other states. Most native prairies found today are small remnants, less than 10 acres in size with very few exceeding 50 acres, and are too small to support the full species diversity of the past. Mesic (moderately moist) prairie, which was the most common type in pre-settlement days, is almost gone now, with only about 100 acres known to exist today (Wisconsin Ecological Landscapes Handbook, 2001). Similarly, the oak savanna that once covered 5.5 million acres in Wisconsin, now covers fewer than 500 acres with a similar species diversity to that of the past (Wisconsin Natural Heritage Inventory, 2011).

Before settlement, prairie grasslands covered an estimated 21 million acres of Illinois. Now less than 2,600 acres of native prairie dot the state's landscape. Even though much of Illinois' native prairie has been destroyed, nearly one-fifth of the state is categorized as "grassland" habitat due to temporary agricultural programs. Most of the historic grasslands have been plowed, heavily grazed, or frequently mowed; and few are large or connected enough to support area-sensitive species. Often dominated by introduced grasses, especially fescue, these grasslands do not resemble native prairies as most are planted to monocultures or are otherwise highly manicured. The relatively high prices received for corn and soybeans in recent years have led to an accelerated conversion of these grasslands to row crop agriculture. Only a small portion of the state's land categorized as "grassland" habitat is actually functioning as a natural grassland ecosystem (Illinois DNR, 2005).

3.3.2 Ecological Systems

Prairie-Forest Border

The Study Area occurs within the Prairie-Forest Border Ecoregion as described by The Nature Conservancy (TNC), modified from Bailey (U.S. Forest Service) in 1994. This ecoregion is a transition zone between tallgrass prairie and northern forest. Much of the region was covered by glaciers in the last Ice Age, resulting in a varied landscape of rolling hills and extensive flatlands formed by moraines, drumlin fields, pitted outwash, and glacial lakes. Fire occurred regularly acting in concert with climate to create a shifting mosaic of oak savanna, forest, and prairie based on fire intervals, topography, and weather patterns.

Many different plant communities occur within the ecoregion, including globally significant oak savannas and a variety of prairies. Sixty-three plant and animal species occur within the ecoregion that are globally rare or federally listed. Thirteen plant communities, ten animal, and six plant species are endemic to the ecoregion, found only in this part of the world.

The Southwestern Great Lakes Morainal Section of the Prairie-Forest Border ecoregion encompasses the Hackmatack Study Area. This landform is characterized by ground and end moraines vegetated by oak savanna. Extensive wetlands and oak barrens occur in glacial lake plains; and sugar maple-basswood forests occur locally where there are natural fire breaks created by rivers or rugged, kettle-moraine topography. Extensive prairies occur in flat outwash plains, now mostly agricultural fields; lakes and wetlands are common, particularly in the pitted outwash region. This section has a long growing season, fertile soils, and relatively flat topography, well suited for both agriculture and development.

As mentioned previously, the Wisconsin portion of the Hackmatack Study Area lies in the Southeast Glacial Plains Ecological Landscape while the Illinois portion of the Study Area lies within the Northeastern Morainal Natural Division (NMND).

Southeast Glacial Plains Ecological Landscape

This ecological landscape makes up the bulk of the noncoastal land area in southeast Wisconsin. It is primarily composed of glacial till plains and moraines. Soils are lime-rich tills overlain in most areas by a silt-loam loess cap. Agricultural and residential interests throughout the landscape have significantly altered the historical vegetation. Most of the rare natural communities that remain are associated with large moraines or in areas where the Niagara Escarpment occurs close to the surface. Historically, vegetation in the Southeast Glacial Plains consisted of a mix of prairie, oak forests, savanna, and maple-basswood forests. Wet-mesic prairies, southern sedge meadows, emergent marshes, and calcareous fens were found in lower portions of the landscape. End moraines and drumlins supported savannas and forests. Fire suppression has allowed many existing forest patches that were formerly savannas to succeed to hardwood forest (Wisconsin Department of Natural Resources [DNR], 2005).

The Southeast Glacial Plains Ecological Landscape has the highest aquatic productivity for plants, insects, invertebrates, and fish of any Ecological Landscape in Wisconsin. Most riparian zones have been degraded through forest clearing, urban development, and intensive agricultural practices. Kettle lakes are common on end moraines and in outwash channels. In addition to Horicon Marsh, this Ecological Landscape contains important fens, tamarack swamps, wet prairies, and wet-mesic prairies that contain rare plants and animals. However, most wetlands have experienced widespread ditching, grazing, and infestation by invasive plants. Watershed pollution in the Ecological Landscape is about average

according to rankings by Wisconsin DNR, but groundwater pollution is worse than average compared to the rest of the state (Wisconsin DNR, 2005).

Northeastern Morainal Natural Division

This natural division is the most recently glaciated in Illinois. Drainage is poorly developed, thus abundant marshes, natural lakes, and bogs are distinctive features. With diverse wetland, prairie, forest, savanna, and lake communities, this northeastern section of Illinois hosts the greatest biodiversity in the state and the largest human population. As is true statewide, natural land cover has been extensively altered, though urbanization is considerably more extensive than elsewhere (Illinois DNR, 2005).

3.3.3 Plants and Animals

The Wisconsin Wildlife Action Plan contains a list of Species of Greatest Conservation Need (SGCN) for the Southeast Glacial Plains Ecological Landscape. All vertebrate, native wildlife species in Wisconsin were evaluated for their level of risk using the following seven criteria: global relative abundance, global distribution, global threats, global population trend, state rarity, state threats, and state population trend. Within each of the **vertebrate** major taxonomic groups (i.e., birds, fish, herptiles, and mammals), each species was ranked based on scientific literature and the best professional judgment of a team of experts and then selected as SGCN. **Invertebrates** were assessed using a modified process that incorporated information on the status of knowledge for different invertebrate taxa groups. Although a considerable amount of information has been gathered over the last decade, data on invertebrate species distribution, occurrence, population trend, and life history are insufficient to conduct the type of detailed evaluation that was carried out for vertebrates.

The Illinois Wildlife Action Plan contains a list of critical species for the Northeastern Morainal Natural Division. These SGCN should be managed within a natural division if they are to be effectively conserved in Illinois. The following criteria were used to select the SGCN:

- Threatened or endangered in Illinois or federally and within the state, global conservation rank indicator of G1, G2, or G3
- Rare, significantly declining in abundance or distribution from historical levels, dependent upon a rare or vulnerable habitat for one or more life history needs
- Endemic to Illinois or disjunct from the rest of its range

The Illinois portion of the population represents a significant proportion of its global population, representative of a broad array of other species found in a particular habitat. Status is poorly known, but available evidence suggests conservation concern. The following species descriptions were taken from these two state plans and their respective landscape or division groupings mentioned above unless otherwise noted.

Plants

The plant species within the Study Area are too numerous to list and have not all been documented. However, within and near the Study Area, the Nippersink Creek Watershed contains 790 native plant species while Glacial Park contains 416 species. Many of the plants in both of these conservation areas are state-threatened or endangered. One of those species of particular note is the eastern prairie fringed orchid (wet prairie, sedge meadow, marsh habitat), which is federally-threatened. Also within the Study Area and McHenry County, the Alden Sedge Meadow contains 362 native plant species and Lake

Elizabeth contains 217 species, again with several that are state-threatened or endangered. Two other conservation areas within McHenry County, North Branch (217 species) and Winding Creek (197 species), both have a good diversity of native plant species with several that are state-endangered.

Hackmatack – Tamarack

The American tamarack tree has been known by different names to different people over the centuries including eastern larch, American larch, red larch, black larch, takmahak, and hackmatack. It is from this tree that the Study Area gets its name, Hackmatack, a Native American word for the tamarack. While tamarack trees are more common in northern Wisconsin, Minnesota, and Michigan; they reach as far south as the Study Area, in southeast Wisconsin and northeast Illinois. The Study Area contains a few remaining stands of tamarack representing relics of a time in the geologic past, thousands of years ago, when northeastern Illinois and southeastern Wisconsin lay in the grip of a massive continental glacier. It is but one of dozens of rare species and globally significant natural communities that can be found in this area.

Mammals

Mammals are generally abundant within and near the Study Area. Some of the common mammals include Virginia opossum, coyote, common raccoon, striped skunk, northern flying squirrel, American beaver, white-tailed deer, and eastern cottontail rabbit (Macdonald, 1984). However, the Wisconsin Wildlife Action Plan lists the following SGCN: Franklin's ground squirrel; eastern red, hoary, northern long-eared and silver-haired bats; prairie and woodland voles; and water shrew. The Illinois Wildlife Action Plan lists only the Franklin's ground squirrel as a critical species. The Franklin's ground squirrel is most often found in dense grassland vegetation, while the water shrew prefers cold-water streams, bogs, and swamps.

Birds

The Study Area is also home to many common species of breeding and migratory birds. The diverse array of habitat, especially wetlands and grasslands, supports a diverse group of bird species. Therefore, the Wisconsin Wildlife Action Plan lists the following as SGCN:

- Forest, woodland, savanna: Acadian, Least and Willow Flycatchers, Yellow-billed Cuckoo, **Black-billed Cuckoo**, Blue-winged Warbler, Black-throated Blue Warbler, Canada Warbler, Yellow-throated Warbler, Kentucky Warbler, Golden-winged Warbler, Prothonotary Warbler, Hooded Warbler, Cerulean Warbler, Brown Thrasher, Louisiana Waterthrush, **Red-headed Woodpecker**, Wood Thrush, Bell's Vireo, **Loggerhead Shrike**, Veery, Whip-poor-will, Red Crossbill, Red-Shouldered Hawk, and Bald Eagle
- Wetland or waterfowl: **American Bittern**, American Golden Plover, American Woodcock, **Common Tern**, **Forster's Tern**, **Black Tern**, Blue-winged Teal, Canvasback, Dunlin, Hudsonian Godwit, Marbled Godwit, King Rail, Lesser Scaup, Redhead Grebe, Red-necked Grebe, and Horned Grebe, Rusty Blackbird, Short-billed Dowitcher, Whooping Crane, Solitary Sandpiper, Buff-breasted Sandpiper, **Upland Sandpipers**, Snowy Egret, Whimbrel, Yellow-crowned Night-heron, American Black Duck, Osprey, Trumpeter Swan, and **Wilson's Phalarope**
- Grassland: **Bobolink**, Dickcissel, Eastern and Western Meadowlark, Grasshopper, Field, Vesper, Lark, **Henslow's Sparrows**, Northern Bobwhite Quail, **Northern Harrier**, Barn Owl, and Short-eared Owl

Similarly, the Illinois Wildlife Action Plan lists species bolded above plus the following as critical species:

- Woodland: Northern Flicker
- Wetland or waterfowl: Least Bittern, Black-crowned Night-heron, Piping Plover, Yellow and Black Rail, Common Moorhen, Sandhill Crane, Greater Yellowlegs, and Yellow-headed Blackbird
- Grassland: Swainson's Hawk

Of particular note is the federally-endangered Whooping Crane, which has been seen in the Hackmatack Study Area. As the eastern migratory population of whooping cranes expands, the marshes and bogs of this region may become increasingly important to this critically imperiled species. Also, many of the bird species that rely on prairie grasslands, including Henslow's Sparrow, Short-eared Owl, Bobolink, and Dickcissel are threatened, endangered, or in steep population decline across their range. The Hackmatack Study Area presently contains a patchwork of wetlands and grasslands, which, if connected, could greatly enhance habitat for these species of conservation concern. Throughout the Study Area both public and private lands are home to significant species such as Cooper's Hawks (dense deciduous forest habitat) and nesting pairs of Sandhill Cranes (open, fresh water wetland habitat). Migrating Ospreys and Bald Eagles use the Fox River and nearby Chain 'O' Lakes area during spring and fall.

Fish and Mussels

Fish and mussel populations are specific to individual streams, lakes, and rivers within the Study Area. The Fox River supports a modest fishery with many different forage and game species present. There is also a diverse and relatively abundant mussel population in the Fox River. Some of the common fish species in the local lakes include channel catfish, carp, crappie, largemouth bass, muskellunge, northern pike, bluegill, walleye, smallmouth bass, and pumpkinseed. Many of the non-game species in the Study Area waters are listed as SGCN in the Wisconsin Wildlife Action Plan. These include: gravel chub, greater redhorse, **lake chubsucker**, **lake sturgeon**, least darter, longear sunfish, Ozark minnow, redfin shiner, redside dace, river redhorse, slender madtom, **starhead topminnow**, **banded killifish**, black buffalo, **pugnose shiner**, western sand darter, and American eel. Similarly, the Illinois Wildlife Action Plan lists species bolded above plus the following as critical fish species: Iowa darter, blacknose shiner, blackchin shiner, longnose sucker, bowfin, and critical mussel species: creek heelsplitter, rainbow, black sandshell, salamander mussel, slippershell, spike, and purple wartyback.

The waters of Nippersink Creek and its tributary streams, as well as the numerous glacial lakes within the Study Area, support eighteen of these fish species of critical or SGCN including the Iowa darter, blacknose shiner, blackchin shiner, starhead topminnow, banded killifish, bowfin, lake chubsucker, river redhorse, redfin shiner, large scale stoneroller, mottled sculpin, southern redbelly dace, blacknose dace, brook stickleback, brown bullhead, American brook lamprey, central mudminow, and pugnose shiner.

Additionally these same aquatic resources also support eight mussel species identified as critical in the Illinois Wildlife Action Plan. These eight, the **creek heelsplitter**, **rainbow**, **black sandshell**, **slippershell**, **spike, fluted shell, ellipse** and **purple wartyback** are among 22 varieties of native mussels found in the Nippersink Creek watershed in Illinois.

Reptiles and Amphibians

The Hackmatack Study Area, with its many diverse wetland habitats, is home to a truly diverse group of reptiles and amphibians. This is especially unique and noteworthy in an area with so much intermixed development and cultivation. McHenry County Conservation District areas alone are home to 29 species including three salamanders, nine frogs, 10 snakes, and seven turtles (McHenry County Conservation District Biological Database, 2011).

Several of these species are listed as SGCN in the Wisconsin Wildlife Action Plan and/or as critical species in the Illinois Wildlife Action Plan. That Wisconsin list includes: **Blanding's turtle**, butler's garter snake, **eastern massasauga rattlesnake**, four-toed salamander, northern ribbon snake, pickerel frog, queen snake, mudpuppy, yellow-bellied racer, northern cricket frog, and **western ribbon snake**. The Illinois list includes the bolded species above plus the following: smooth green snake and Blanchard's cricket frog.

The more common frogs and toads occurring across the Study Area include spring peepers, green frogs, leopard frogs, bullfrogs, chorus frogs, Cope's gray tree frogs, Eastern gray tree frogs, and American toads. Important populations of the Blanding's Turtle, which is state-listed in both Wisconsin and Illinois are known to occur throughout the Hackmatack Study Area. (McHenry County Conservation District Ecological Database 2011).

Insects

Similar to many of the other species groups, the Study Area is home to a diverse group of insects. These invertebrates help form the base of the food chain that sustains higher forms of life within the native ecosystems of the Study Area. Six conservation areas in McHenry County have species lists for butterflies. The Alden Sedge Meadow has 33 species, Winding Creek has three species, Glacial Park has 57 species recorded, Hebron Peatland has 17 species, North Branch Preserve has 21 species, and Lake Elizabeth has 34 species. These range from fritillaries, swallowtails, and monarchs to sulphurs, skippers, and hairstreaks found within prairie, savanna, sedge meadow, and barren habitat types amongst others (McHenry County Conservation District Biological Database, 2011). While the Wisconsin Wildlife Action Plan lists 450 insects as SGCN for the entire state, it did not break the species down by Ecological Landscapes. However, the Illinois Wildlife Action Plan for the Northeastern Morainal Natural Division area lists the following species as critical: hoary elfin (woodland edge habitat), swamp metalmark (moist, open area habitat), Karner blue (open, sandy lupine habitat), elfin skimmer dragonfly (bog and fen habitat), Hine's emerald dragonfly (calcareous spring-fed marsh and sedge meadow habitat), silver-bordered fritillary (wet meadow habitat), and silvery checkerspot (woodland edge, roadside, marsh habitat).

A number of remnant-dependent butterflies have been identified by the Illinois Wildlife Action Plan as occurring in the prairies, wetlands, and savannas within the Hackmatack Study Area. These are those species most in need of conservation. These include the **silver bordered fritillary, Aphrodite fritillary, Edward's hairstreak, purplish copper, silvery blue, dion skipper, broad-winged skipper, mottled duskywing**, and **two-spotted skipper.** (Source: McHenry County Conservation District Ecological database)

Threatened and Endangered Species

The proposed Study Area provides habitat for 109 species of concern that include federal- and state-threatened and endangered species and FWS Birds of Conservation Concern. The list includes 49 birds, five fishes, five mussels, one amphibian, two reptiles, and 47 plants. Many of these are listed in their respective groupings above. Sixty-five separate populations of state-listed plants and 92 individual populations of state-listed animals are known to occur in the Illinois section of the Study Area alone.

Several federally-protected species in this Study Area occur in McHenry County and include the threatened prairie bush-clover and eastern prairie fringed orchid as well as the endangered whooping crane. Prairie bush-clover is endemic to midwestern prairies and prefers moist microenvironments; therefore, it is often outcompeted by woody competition (U.S. Fish and Wildlife Service Lespedeza Leptostachya Recovery Plan; U.S. Fish and Wildlife Service, Twin Cities, Minnesota; 1988). The eastern prairie fringed orchid requires full sun and occurs in tallgrass silt-loam or sand prairies, sedge meadows, fens, and occasionally sphagnum bogs.(U.S. Fish and Wildlife Service Eastern Prairie Fringed Orchid Recovery Plan; Fort Snelling, Minnesota; 1999).

Once extirpated from most of its historic breeding range, whooping cranes predominately nested in the northern tallgrass prairie but also depended on highly productive wetland ecosystems for nesting, over-wintering, and migratory stopover. Today, a newly established flock of over 60 birds, originating from captive-reared birds, use the Study Area during migration and possibly for breeding in the future.

3.4 Land Use and Management Status

The rich geologic past that sculpted the landscape leaving behind a great diversity of habitats, which house an even greater diversity of plant and animal species, gives the area a unique ecological value. The Study Area also has a long growing season, rich soils, and close proximity to Lake Michigan, Milwaukee, and Chicago, which gives the area a high economic value. Understanding land use and ownership is important for assessing the impact of conservation actions including establishing a new refuge. Over half of the Study Area is either cultivated crops (43 percent) or hay/pasture (12 percent), while nearly one-fifth is developed (18 percent). A similar amount of the Study Area is forest or wetlands (20 percent) with open water covering an additional four percent.

3.4.1 Ownership and Management

The vast majority of the Study Area is in private ownership. However, the area encompasses over 60 publicly- and privately-owned parks, preserves, and conservation areas with natural ecosystems totaling about 23,000 acres. Many of the parks and preserves in the Study Area primarily conserve natural ecosystems (as opposed to developed, multi-use recreational parks). Lake County Forest Preserve District, McHenry County Conservation District, Illinois DNR, and Wisconsin DNR own and manage the bulk of these natural areas.

In addition, private land trusts are active in the Study Area. The Land Conservancy of McHenry County has protected approximately 2,000 acres of land in McHenry County through private conservation easements and acquisition. The Geneva Lakes Conservancy, Kettle Moraine Land Trust, and Liberty Prairie Conservancy are also active in the area.

Natural Areas and Nature Preserves

Both Wisconsin and Illinois have programs that designate Natural Areas (WI) or Nature Preserves (IL). These programs assist private and public landowners in protecting high-quality natural areas and the habitats of endangered and threatened species. The State Natural Areas protect outstanding examples of native communities, significant geological formations, and archeological sites. The natural areas are surviving islands of native ecosystems that once existed across the area and offer visitors a chance to experience a variety of intact wetland, prairie, and glacial landscapes. Collectively, the Study Area contains 24 state-designated natural areas totaling about 3,444 acres.

Significant lands and facilities within the Study Area include Chain O'Lakes State Park, Bong State Recreation Area, Glacial Park, Lakewood Forest Preserve, Moraine Hills State Park, and Bloomfield Wildlife Area, The Richard Bong State Recreation Area is one of the largest open, undeveloped areas left in southeast Wisconsin.

Audubon Important Bird Areas

The Audubon Society's Important Bird Areas (IBA) Program is a global effort to identify and conserve areas that are vital to birds and other biodiversity. An IBA provides essential habitat for one or more species of birds and often comprises a mixture of public and private land. IBA designation is special recognition that these sites provide critical habitat for sensitive birds. The Study Area contains or is nearby to two IBAs:

1. Located in northeastern Illinois, the Lake-McHenry Wetlands Complex IBA comprises one of the state's largest concentrations of natural wetlands and glacial lakes. The IBA includes the Grass, Marie, Nippersink, Bluff, Fox, Pistakee, Channel, Petite, Catherine, and Redhead Lakes along with the Fox River and the surrounding lands that interconnect them.
2. Richard Bong State Recreation Area supports significant populations of grassland birds, such as Bobolink, Eastern Meadowlark, Henslow's Sparrow, Field Sparrow, and Savanna Sparrow.

Natural Area Inventory Sites

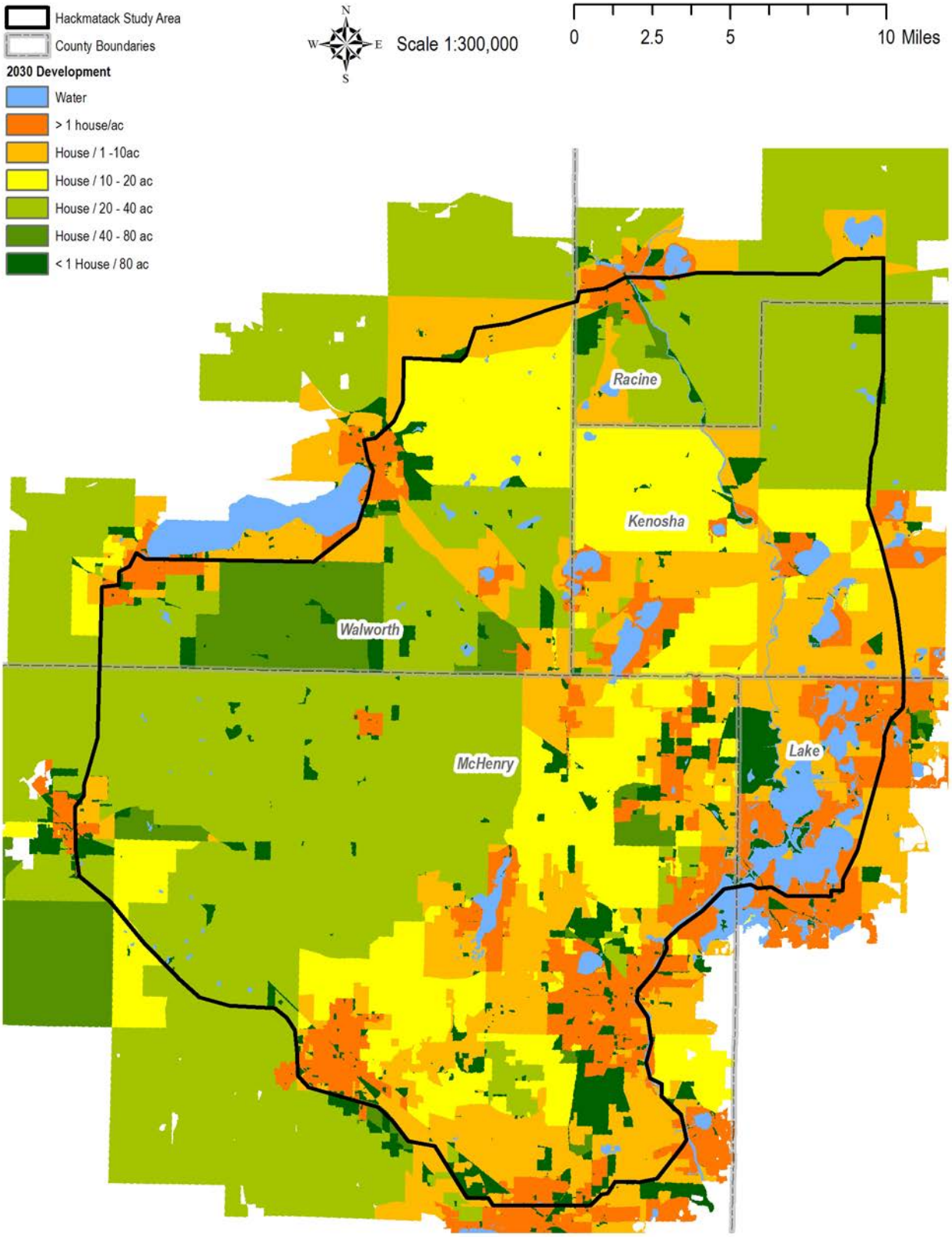
Both Illinois and Wisconsin have assembled an inventory of high-quality natural areas that support rare natural communities and endangered species. The sites identified within Illinois and Wisconsin include a rich diversity of native flora and fauna on both public and private lands. Information from the Natural Area Inventory is used to guide and support land acquisition and protection programs by all levels of government as well as private landowners and conservation organizations. The natural communities inventoried include bogs, fens, marshes, prairies, meadows, oak savannas, and woodlands. The Study Area includes 230 natural area inventory sites.

3.4.2 Land Use Trends

Residential Development

Less than two hours from the growing urban centers of Chicago and Milwaukee, the Study Area and its surroundings face steady development pressure. The State Wildlife Action Plans for both Wisconsin and Illinois cite fragmentation as a leading threat to the integrity of the area's habitats. Even though there is a strong conservation heritage and a good base of conserved lands, the area's habitats are still at risk of becoming islands in a rising sea of development (Figure 8). As these lands become increasingly fragmented and degraded, the wildlife that depend on them decline, as do the opportunities for experiencing such places.

Figure 8: Projected Residential Housing Development, 2030 (Source: Hammer et al., 2004)



According to a 2007 report in the Chicago Tribune, "[T]he population of the seven-county Chicago metro area experienced a growth rate of 63 percent between 1950 and 2006, and that rate jumps to 261 percent by removing the city of Chicago from the equation ." The article notes, "Scott Goldstein, housing expert for the Chicago-based Metropolitan Planning Council, said he believes Rockford won't be the last stop [in Chicago's sprawl], I absolutely think it's going to expand for many, many more miles." (Fermata, Inc., 2010).

A 1999 Openlands report, *Under Pressure: Land Consumption in the Chicago Region 1999-2028*, examined likely future development patterns in a 13-county area around Chicago including portions of Indiana and Wisconsin. According to the report, residential and commercial development is expanding faster than the population growth of the region. The report indicates that more than 50 percent of the Hackmatack Study Area is at medium to high risk of being developed by the year 2028 (Fermata, Inc., 2010).

The October 2010, *Go To 2040 Comprehensive Regional Plan* by the Chicago Metropolitan Agency for Planning (CMAP), describes significant demographic changes for the seven county region around the city of Chicago in the coming decades. Between 2010 and 2040, the region's population is expected to grow more than 25 percent. Historically this growth has happened rapidly in the outlying areas of the region. The demographics will also change in terms of age distribution, racial and ethnic background, and where people choose to live.

Between 1990 and 2000, McHenry County's population grew 42 percent. While that growth slowed to 18.7 percent between 2000 and 2010 to a total of 308,760 people, the *McHenry County 2030 Comprehensive Plan* adopted April 20, 2010 anticipates a projected population of 495, 000 by 2030. The plan recognizes the need for planning efforts that recognize the importance of groundwater use and recharge, protection of streams, rivers, lakes and wetlands and the wealth of McHenry County's natural resources. (http://www.mchenrycounty2030plan.com/)

Critical natural lands that surround Chicago such as Indiana Dunes, the Kankakee River, and the Hackmatack Study Area are directly in the path of this surge. While the economic recession has slowed this rate of growth, it is likely to return to full force with economic recovery. Some land within the Hackmatack Study Area has already been slated for development (Fermata, Inc., 2010).

Agriculture

As previously mentioned, over 50 percent of the Study Area is in agricultural land use. McHenry County, which includes the majority of the Study Area, is deeply rooted in agriculture, where it dominates the landscape. The 2030 Comprehensive Plan for McHenry County included a goal "to preserve the most productive farmland as a source for viable agricultural activities that will enhance the County's economy and contribute to its rural character." The plan also states that, "The County should encourage small-scale farming as a means of creating a larger degree of agricultural self-sufficiency around the large urban areas." Agriculture, and all the input businesses it supports, is important for the economy of McHenry County as well as other portions of the Study Area.

Aggregate Resources

The mining and production of crushed stone, sand, and gravel is an important use of the land in portions of the Study Area as well, especially McHenry County in Illinois. The 2030 Comprehensive Plan for McHenry County included a goal to "protect productive and valuable aggregate resources ensuring their availability for future generations" and states that "[t]he county has a generous supply of natural

aggregates….that are used to supply several industries including construction and agriculture." The mining industry, and the related industries it supports, is important for the economy of McHenry County as well as other portions of the Study Area.

3.4.3 Land Use Planning

Due to land use trends of the past (cultivation of natural areas) and the current land use trends mentioned above (urban sprawl development), landscape-level conservation has become a focus. As both the Illinois and Wisconsin Wildlife Action Plans note, landscape-level conservation that connects protected but fragmented landscapes (parks and preserves) is one key to ensuring long-term sustainability of native flora and fauna populations. Ecological corridors connecting sites both small and large maintain paths for migration and dispersal. Biodiversity also depends on restoration and management of native ecosystems. When landscapes are reconnected and restored, the result is a whole that is far greater than the sum of its parts (Fermata, Inc., 2010).

Protected lands within the Study Area exist within the much larger matrix of unprotected public and private lands that support natural systems in the region. Various groups have plans in place to further protect this landscape. The Chicago Wilderness collaboration has a Biodiversity Recovery Plan "to protect the natural communities of the Chicago region and to restore them to long-term viability, in order to enrich the quality of life of its citizens and to contribute to the preservation of global biodiversity." The Chicago Wilderness Green Infrastructure Plan was developed to bring the Biodiversity Recovery Plan to life and provide "a visionary, regional-scale map of the Chicago Wilderness region that reflects both existing green infrastructure—forest preserve holdings, natural area sites, streams, wetlands, prairies, and woodlands—as well as opportunities for expansion, restoration, and connection." The Regional Greenways and Trails Plan (2009) for northeastern Illinois and the Natural Areas Plan for southeastern Wisconsin (SEWRPC, 1997) identify actions to protect and manage critical habitats for plants and animals and generally improve ecosystems.

The CMAP regional land use plan was the result of significant public input that consistently called for protection of the region's network of parks and open space. *Go To 2040* calls for an additional 150,000 acres of land to be preserved across the region over the next 30 years. The goal is to conserve a network of land and water that protects biodiversity, follows waterway corridors, expands existing preserves, and creates new preserves in the region. (http://goto2040.org/parks_open_space).

A few other organizations are focused on sensible development and expansion of local communities. Metropolis Strategies, formerly Metropolis 2020, promotes principles of economic development, redevelopment, and open space preservation. Metropolis Strategies has proposed actions to help the region develop in a manner that will protect its economic vitality, while maintaining its high quality of life.

In the Centennial Celebration of The Burnham Plan of Chicago in 2009, twenty-one green legacy projects were identified as critical to protect the green infrastructure of the region. The proposed Hackmatack NWR was recognized for its ability to preserve some of the region's most dramatic landscapes (http://www.openlands.org/special-projects/89-burnham-plan-centennial.html).

The regional growth strategies of the CMAP and the SEWRPC seek to reduce the region's excessive rate of land consumption, preserve important open spaces (especially environmental corridors), and promote improved water quality.

3.5 Socioeconomic Environment

3.5.1 Local Culture

The local culture of the Hackmatack Study Area is primarily focused around farming. However, with development over the years and urban sprawl from Chicago and Milwaukee, an urban culture has been introduced as well. And yet, the history of this area throughout the twentieth century demonstrates a prevailing public interest in preserving nature and its associated benefits for ecosystems, recreation, and innovative economic development.

3.5.2 Archeological and Cultural Resources

Native American History and Early Settlement

The earliest evidence of human activity near the Study Area dates to approximately 12,000 years ago, when highly nomadic Paleo-Indian clans came primarily to hunt larger animals at upland bogs and sloughs. These clans were followed by Archaic-Indians, Woodland-Indians, and Mississippian-Indians. By 2,000 years ago, there was a gradual shift from total dependence on hunting and gathering to a more settled culture that incorporated agriculture. These people lived in total dependence on the local ecosystems and helped shape the character and health of natural communities through practices, such as setting fires that supported their procurement of food, medicine, and materials important to their daily lives (Sullivan, 1997).

Eventually, the Illini and Potawatomi people inhabited the area. During the summer most of them inhabited “towns” near rivers or lakes, but during the winter they would move away to “hunting camps.” But then, with the arrival of French-Canadian and European settlers, came disease that practically eliminated most Native Americans. Eventually trading of goods, trapping, and fur trading became popular in the area. Over time, with more settlement and development, Europeans dominated the area, fires were suppressed, forest and prairies were cleared, and wetlands were drained (Sullivan, 1997).

The proposed Refuge lands fall squarely within the original Potawatomi estate. The federal government recognized the land as Potawatomi land since the United States came into being and officially confirmed the land as Potawatomi territory, as well as other Indian nations, under the 1825 treaty of Prairie du Chien. Shortly thereafter, an official proposed that the area, which includes the proposed Refuge lands would be part of a great Potawatomi Reservation. The federal government abandoned this plan, however, with the government's growing preference to remove all Indian nations to the West. In 1829, Potawatomi representatives ceded a large swath of territory in northern Illinois to the United States. In 1830, the federal government enacted into law its policy of Western removal via the Indian Removal Act.

The Potawatomi Community informed the Service and others of its continuing interest in and rights related to these lands and the greater Potawatomi estate. The Potawatomi have maintained a constant physical and not just historic connection to the proposed refuge lands.

Archeological and Geological Sites

Southeastern Wisconsin has a significant geologic heritage that has played an important role in both scientific research and in the industrial and architectural development of the area. The geologic sites on which this heritage is founded are few in number and disappearing rapidly. Nearly all remaining sites,

even those on public land, are threatened, in large part because their basic value and importance are unrecognized (SEWRPC, 1997).

A variety of inventories and surveys of historic sites have been conducted by various units and agencies of government in the southeast region of Wisconsin. The Study Area includes seven counties, most notably: Walworth, Racine, and Kenosha. These inventories and surveys have resulted in more than 14,000 historic sites in the region. As of 1985, 254 sites and 20 districts were listed on the National Register of Historic Places. Seven of these sites are within or adjacent to the Study Area (SEWRPC, 1997). One such site is Wehmhoff Mound in Kenosha County. This lone effigy mound was listed on the National Register of Historic Places in 1985.

Three significant geological areas exist within the southeastern Wisconsin portion of the Study Area as well. The Burlington Crevasse Fillings in Racine County is a good example of crevasse fill. The Voree Quarry in Walworth County is an old, water-filled quarry, exposing the unusual Brandon Bridge Formation of dolomite rock. The Lyons Glacial Deposits in Walworth County are outstanding examples of kettle and kame topography. All three sites are owned by a private conservancy (SEWRPC, 1997).

3.5.3 Human Population

The population base within a two-hour drive of the Hackmatack Study Area is estimated to be over 12 million. However, according to the 2010 US Census, the approximate population of the Study Area itself is 170,000. Increases in population from 1990-2000 varied across the Study Area ranging from zero to 7.3 percent, with an average of 2.6 percent for the decade. The population increase from 2000-2010 had less variability across the Study Area ranging from 0.32 to 4.19 percent and an average of 1.7 percent for the decade. The predicted change in population from 2010-2015 ranges from a decrease of 0.14 percent to an increase of 1.93 percent with an average of a 0.9 percent increase for the decade. The area immediately to the southeast of the Hackmatack Study Area has experienced dramatic growth and density in population. Growth patterns predict a more dramatic impact on the surrounding areas in the near future.

In addition, McHenry County’s Hispanic population currently stands at 11 percent. It rose by 4 percent in the last 10 years. This trend is expected to continue. Two school districts in the Study Area indicate that between 40 and 50 percent of their kindergarten populations are of Latino origin.

3.5.4 Economic Activities and Trends

The average household size across the Study Area ranges from two to three people with a median age of 35-45 years old. The majority of the Study Area has a median household income between 41,000 and 70,000 dollars per year with part of the southern portion of the Study Area earning between 70,000 to 84,000 dollars per year. A few isolated spots have a median household income between 84,000 to 110,000 dollars per year. However, the unemployment rate across the Study Area in 2010 was between 8 and 15 percent, with only a few areas between 4 and 8 percent (US Census, 2010).

In McHenry and Walworth Counties, of which portions occupy the majority of the Study Area, most employment is in manufacturing; educational, health, and social services; and retail trade. Fifty-four percent of the population has a high school diploma. Slightly more of the population (55 percent) has a high school diploma or has attended some college with no degree. An additional 20 percent and 15 percent of the population has a bachelor’s degree, respectively (US Census, 2010).

Important economically and near the Study Area, Lake Geneva has been recognized as one of the nation's distinctive destinations (one of the 2009 Dozen Distinctive Destinations listed by the National Trust for

Historical Preservation, with Woodstock listed in 2007). Furthermore, Chicago-O'Hare and Milwaukee Airports offer global air connections, and both are less than one hour's drive from the Study Area. Finally, rail service via Metra connects the Study Area and Chicago (Fermata, Inc., 2010).

3.5.5 Recreational Activities and Trends

Both Illinois (2009) and Wisconsin (2005) Statewide Comprehensive Outdoor Recreation Plans (SCORP) have documented that opportunities for outdoor recreation are in short supply in the densely populated regions of northeastern Illinois and southeastern Wisconsin.

The Illinois SCORP reports that the total amount of outdoor recreation land in Illinois is low in comparison to other states. Although Illinois has the fifth highest population of all states, the state ranks in the bottom 10 percent for the per-capita amount of lands and facilities for outdoor recreation among all states.

The Wisconsin SCORP divides the state into regions. The Hackmatack Study Area falls within the Lower Lake Michigan Coastal Region. According to Wisconsin's SCORP, nature-based and viewing/learning opportunities in this region are inadequate in proportion to the size of the population. The SCORP also identifies the top five Land Legacy Areas in each region—areas thought to be critical in meeting the state's present and future conservation and recreation needs. Two of the five areas are within the Hackmatack Study Area: Bong Grassland and Illinois Fox River. The SCORP states, “These sites should be considered the highest priority recreation areas to preserve and protect in each region,” Lastly, the Wisconsin SCORP identifies the recreation supply shortages in each region. Within the Lower Lake Michigan Coastal Region, the plan cites shortages in campgrounds, parks, mountain bike trails, water trails, wildlife areas, boat launches, fishing piers, and nature centers (Fermata, Inc., 2010).

It is not surprising, then, that according to the Service report titled, *Wildlife Watching Trends: 1991-2006*, the most populated states have participation rates below the national average for wildlife watching. Illinois ranks 42nd in the percent of population that participates in wildlife watching while Wisconsin ranks 21st. In 2006, Illinois and Wisconsin residents spent, on average, seven to eight days wildlife watching. And, on average, those participants spent 36-47 dollars per day on trips away from home to watch wildlife (Fermata, Inc., 2010).

Demographically, the majority of wildlife watchers in Illinois and Wisconsin are from rural areas; female, over 35 years old; and white, with a high school education or greater. The spread of participants across income levels is proportional to the population as a whole. This implies that wildlife watching appeals to people of all income levels (Fermata, Inc., 2010).

Currently within and near the Study Area, Glacial Park provides equestrian, snowmobile, and cross-country ski trails. Big Foot Beach State Park and Chain O'Lakes State Park offer quality boating, fishing, and camping opportunities. The Fox River and many other lakes within the project area provide great fishing and boating opportunities as well. Paddlers can canoe and kayak on the Nippersink Water Trail, while Wisconsin DNR Wildlife Areas and some McHenry County Conservation District sites offer hunting opportunities. The Richard Bong State Recreation Area and the White River State Trail provide horse riding and snowmobiling opportunities. And all of these areas offer great wildlife viewing. The wide range of managing entities within the Study Area increases visitors’ recreational choices, as each offers its own suite of outdoor activities (Fermata, Inc., 2010).

Furthermore, the Chicago Wilderness Leave no Child Inside initiative is working in the Chicago metropolitan area to raise awareness of the issue that fewer children experience nature today than in the

past. They have developed teacher and parent resources; and public events, programs, and sites where parents can discover nature with their children.

3.6 Conclusion

Data from the McHenry County Conservation District, the Illinois and Wisconsin DNRs and SEWRPC suggest that the Hackmatack Study Area supports richly diverse flora and fauna, including many species listed as state- or federally-threatened or endangered. In addition, the Service has identified numerous local bird species as Birds of Conservation Concern, a designation meant to stimulate conservation efforts to prevent these species from becoming threatened and endangered.

Two extensive studies support and expand upon these findings. In 2005, both Illinois and Wisconsin completed State Wildlife Action Plans. These plans inventoried the states' natural habitats and wildlife populations, and identified threats to those habitats and species, as well as conservation opportunities for keeping common species common and reversing the decline of sensitive species. These plans provide a scientifically rigorous ecological framework with which to assess the biological implications of creating Hackmatack NWR.

Both the Illinois and Wisconsin State Wildlife Action Plans note that conserving sensitive species requires the protection and restoration of high-quality habitats. Connecting these high quality habitats helps sustain an interdependent web of species and natural communities. Chicago Wilderness (a consortium of 250 regional businesses, conservation organizations, and public agencies in Wisconsin, Illinois, and Indiana) and SEWRPC have identified ecological corridors throughout the Hackmatack Study Area that will, if protected and restored, help ensure the long-term sustainability of local ecological systems and sensitive species (Fermata, Inc., 2010).

Chapter 4: Alternatives and Environmental Consequences

In this chapter

4.1 Environmental Consequences Related to Natural Resource Concerns
4.2 Environmental Consequences Related to Socioeconomic Environment, Outdoor Recreation, and Local Land Use

The following chapter examines the potential environmental consequences, or impacts, of implementing each alternative. Service Planners heard a wide variety of issues, concerns, and opportunities during the public scoping for this plan (Table 3). However, the issues discussed in detail in this chapter were deemed by the plan authors to be of primary relevance to Refuge establishment.

Table 3: Summary of Environmental Consequences Identified in Public Scoping by Alternative

Issues/Opportunities	Alternative A: Current Direction	Alternative B: Refuge and Landscape Conservation Area	Alternative C: Cores and Corridors (Preferred Alternative)	Alternative D: Partnership Initiative
Habitat/Species				
General State of the Environment	Stable to decreasing. Existing public and private conservation programs will continue.	Improved through habitat restoration, reduced land development, and environmental education.	Same as B.	Same as B.
Wetland Preservation and Restoration	Steady to gradual increase due to local efforts.	Increased by up to 1,300 acres from current cover.	Increased by up to 880 acres from current cover.	Increased by up to 800 acres from current cover.
Grassland Preservation and Restoration	Steady to gradual increase.	Increased by up to 23,800 acres from current cover.	Increased by up to 8,150 acres from current cover.	Increased by up to 6,100 acres from current cover.
Habitat Fragmentation	Steady to gradual improvement through existing programs.	Connecting corridors increase.	Five new corridors connect new habitat blocks.	Same as C but using private and public partnerships.
Biodiversity	Reduced due to habitat loss.	Stable to slight increase if new species pioneer.	Same as B.	Same as B.
Endangered Species	Steady to gradual decrease in endangered plant populations.	Increased protection for known plant populations on new Refuge lands.	Same as B.	Same as B.
Recreation and Education				
Recreational Opportunities	Stable to slight increase due to demand and ongoing programs.	Moderate increase in wildlife dependent recreation on Refuge lands.	Slight to moderate increase in wildlife dependent recreation on	Slight increase in wildlife dependent recreation on Refuge lands in

Issues/Opportunities	Alternative A: Current Direction	Alternative B: Refuge and Landscape Conservation Area	Alternative C: Cores and Corridors (Preferred Alternative)	Alternative D: Partnership Initiative
			Refuge lands.	coordination with partners.
Snowmobile Use	Nominal reduction as land changes ownership and/or development occurs.	Same as A. Also, Refuge and county will work with local clubs if a conflict is identified.	Same as B.	Same as A.
Horseback Riding	Nominal reduction as land changes ownership and/or development occurs.	Same as A. Also, Refuge and county will work with local clubs if a conflict is identified.	Same as B.	Same as B.
Hunting	Nominal reduction as land changes ownership and/or development occurs.	Increased opportunities due to future opening of Refuge lands.	Increased opportunities due to future opening of Refuge lands.	Stable to nominal reduction as land changes ownership and/or development occurs.
Environmental Education	New opportunities focus on existing conservation lands.	Increased due to new programs on Refuge lands.	Same as B.	Same as A.
Societal Issues				
Federal Government	Refuge designation has no effect on the rights, privileges, and responsibilities of adjacent private landowners.	Refuge designation has no effect on the rights, privileges, and responsibilities of adjacent private landowners.	Same as B.	Same as B.
Property Taxes	Stable to slight increase. Will follow local economic needs based on land development.	Stable to slight increase. Undeveloped lands do not require new services.	Stable to slightly less than B. Undeveloped lands do not require new services.	Stable to slightly less than C. Undeveloped lands do not require new services.
Sand and Gravel Deposits	No impact.	Little to no impact. Land purchased for Refuge may include deposits. Refuge will consider inclusion of rehabilitated lands.	Same as B.	Same as B.
Economy and Tourism	Slight increase due to ongoing programs.	Moderate increase in nature-based tourism.	Slight to moderate increase in nature-based tourism due to NWR status.	Slight increase in nature-based tourism.

4.1 Environmental Consequences Related to Natural Resource Concerns

Migratory Birds

The protected and/or restored habitats within each Refuge action alternative will have positive benefits for many migratory birds (Table 4). As discussed in Chapter 3, grassland-dependent birds will receive the most benefits from the restored prairies areas. However, oak savanna and wetland habitats will also provide unique or rare habitat for birds in this region.

Table 4: Current and Future Potential for Select Migratory Bird Species Populations

Bird Species (Examples)	Alternative B						
	Current Potential				Future Potential		
	FWS (Core)	FWS (Corridor)	Con. Land	Total	FWS (Core)	FWS (Corridor)	Total
Grassland							
Henslow's Sparrow	720	0	175	895	6040	0	6215
Short-eared Owl*	0.5	0	0.5	1	125	0	125.5
Upland Sandpiper	35	0	10	45	310	0	320
Dickcissel	1870	0	460	2330	15725	0	16185
Savanna							
Red-headed Woodpecker	310	0	175	485	330	0	505
Wetland							
Pied-billed Grebe	18	0	30	48	555	0	585
Least Bittern	15	0	25	40	400	0	425
Total Potential Benefit over Existing Condition (All Species)							**20517**

Bird Species (Examples)	Alternative C						
	Current Potential				Future Potential		
	FWS (Core)	FWS (Corridor)	Con. Land	Total	FWS (Core)	FWS (Corridor)	Total
Grassland							
Henslow's Sparrow	435	730	180	1345	2190	3711	6081
Short-eared Owl*	0.5	0.5	0.5	1.5	45	75	120.5
Upland Sandpiper	20	35	10	65	110	190	310
Dickcissel	1130	1900	470	3500	5700	9660	15830
Savanna							
Red-headed Woodpecker	190	330	185	705	195	425	805
Wetland							
Pied-billed Grebe	15	1	25	41	365	255	645
Least Bittern	10	1	15	26	265	185	465
Total Potential Benefit over Existing Condition (All Species)							**18573**

Bird Species (Examples)	Alternative D						
	Current Potential				Future Potential		
	FWS (Core)	FWS (Corridor)	Con. Land	Total	FWS (Core)	FWS (Corridor)	Total
Grassland							
Henslow's Sparrow	440	110	200	750	1525	460	2185
Short-eared Owl*	0.5	0	0.5	1	30	10	40.5
Upland Sandpiper	20	5	10	35	80	25	115
Dickcissel	1150	285	515	1950	3970	1205	5690
Savanna							
Red-headed Woodpecker	215	60	195	470	250	85	530
Wetland							
Pied-billed Grebe	1.5	2	30	33.5	255	160	445
Least Bittern	1	1.5	20	22.5	185	115	320
Total Potential Benefit over Existing Condition (All Species)							**6064**

All species listed above are Birds of Conservation Concern for FWS Region 3, Habitat. "Block Size" was not incorporated into calculations.

* Typically 1 breeding pair per 182 acres (used above); however, can use areas as small as 70 acres if located close to blocks of contiguous grassland.

Current Potential = Potential number of existing breeding pairs, based on 2006 National Land Cover Data, **Represents No Action Alternative within the spatial area of each Action Alternative.**

Future Potential = Potential number of breeding pairs added to the population with implementation of the given Alternative, Based on Potential Natural Data derived from soil type.

FWS (Core) = Primary Area for Refuge Land

FWS (Corridor) = Secondary Area for Refuge Land

Con. Land = Existing conservation estates adjacent to proposed Refuge land; all public ownerships included, assumed no change for future potential

4.2 Environmental Consequences Related to Socioeconomic Environment, Outdoor Recreation, and Local Land Use

4.2.1 Impact on Local Taxes and Economy

Alternative A – Current Direction (No Action)

There would be no expected change in the local economy under the No Action alternative, as current development rates, tax revenues, and business revenues would remain subject to market influence. Any changes would be due to existing influences and market forces and would not be associated with federal activities. A potential, but unsubstantiated, economic outcome of not having a refuge in the region would be loss of refuge visitor expenditures at local businesses and establishments and increased local costs to provide roads, schools, and other infrastructure as development increases.

Alternative B-D – Refuge Establishment

The fiscal impact to McHenry County and its townships, if a refuge is established, would depend on both the quantity of land acquired and the rate of acquisition. While land owned by the U.S. Government is not taxable by state or local authorities, the federal government has a program in place to compensate local governments for foregone tax revenues. The Refuge System typically makes an annual payment in lieu of taxes to local governments. The amount of the payment depends on the final Congressional budget appropriations for the Service for that year. Recently, the payment has been less than what the state or local government may have received through normal taxation. It should be noted that the parcels with the highest assessed value within the Study Area (i.e., residential, industrial, and retail) are parcels that have the least desirable characteristics for conservation.

Recreational use on refuges generated almost 1.7 billion dollars in total economic activity during fiscal year 2006 (FWS, 2006). The report, titled *Banking on Nature 2006: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation* was compiled by Service economists. According to the study, nearly 35 million people visited refuges in 2006, supporting almost 27,000 private sector jobs and producing about 543 million dollars in employment income. In addition, recreational spending on refuges generated nearly 185.3 million dollars in tax revenue at the local, county, state, and federal levels. The economic benefit is almost four times the amount appropriated to the Refuge System in Fiscal Year 2006. About 87 percent of refuge visitors travel from outside the local area (FWS, 2006). This information gives an indication of how the creation of a Hackmatack NWR could be of economic benefit to the local economy.

4.2.2 Snowmobile Use

Alternative A – Current Direction (No Action)

Currently, there are several dozen marked snowmobile trails in the Study Area (Figure 9). Most of these trails cross public and private lands and are maintained by local snowmobile clubs through informal

agreements with landowners. The seasonal use period for these trails is dependent upon the weather and snow depth. Local conditions can vary widely throughout the Study Area.

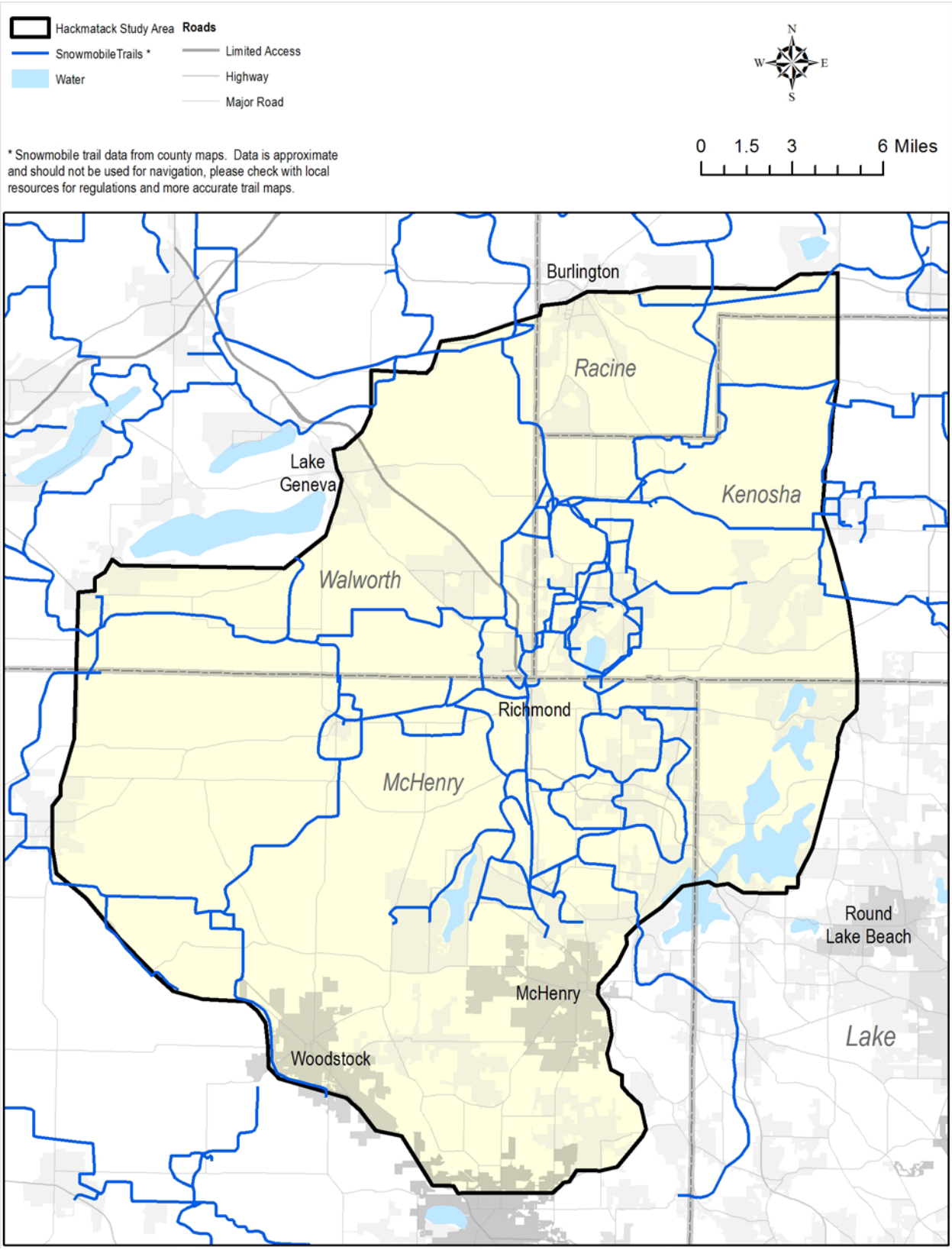
It is reasonable to expect that the number and length of snowmobile trails in the Study Area will see a nominal reduction as land changes ownership and/or development occurs. Local land use ordinances determine whether snowmobile use is compatible with residential expansion.

Alternative B-D – Refuge Establishment

Motorized vehicles on refuges are generally permitted only on designated roads during specified times of the year. Off-road vehicle use, including ATVs and snowmobiles, is generally not permitted due to impacts on vegetation, disturbance to wildlife and other refuge users, and safety and liability issues. However, the Service objective is not to eliminate or interrupt existing snowmobile trails.

It is possible that at some time in the future a landowner would offer land for sale to the Refuge that contains a portion of an existing snowmobile trail. We do not expect this situation to occur very often. The Service would work with the landowner and snowmobile clubs to either reroute the trail or encourage a third party to obtain a permanent trail easement prior to the federal purchase. McHenry County Conservation District has expressed an interest in working with landowners and the Service to secure trail easements if the situation arises. The DNR in Illinois and Wisconsin, the respective county governments, and local snowmobile clubs may also choose to be involved to secure an existing trail.

Figure 9: Location of Snowmobile Trails Drawn from Local Snowmobile Club Maps, 2010



4.2.3 Cultural Resources

Alternative A – Current Direction (No Action)

The No Action alternative could have a slight negative effect on the protection of historic and cultural resources, principally due to the lack of a continuous federal presence, which provides a clear responsibility for protection of these resources. Existing laws create an expectation on landowners and developers to take necessary precautions to ensure that no sites or structures on the National Historic register would be affected by their activities in the region. However, any undocumented sites, especially prehistoric sites, may not be protected under existing laws.

Alternative B-D – Refuge Establishment

The Service's protection of habitat would benefit cultural resources by ensuring that none of the substantial impacts related to development for residential or commercial uses would affect known or undiscovered cultural and historic resources on those lands. As with all federal activities, any activities involving soil disturbance will be reviewed by the Illinois or Wisconsin State Historical Preservation Office (SHPO) prior to any excavation work to ensure protection of cultural resources. Refuge staff would also promote archaeological research on refuge lands and add language from the Archaeological Resources Protection Act (ARPA) to appropriate public use materials to warn visitors about illegal looting, and maintain law enforcement personnel trained in ARPA enforcement.

4.2.4 Wildlife-dependent Recreation

Alternative A – Current Direction

The network of public and private conservation areas in the Study Area provide an array of recreation opportunities that would continue without refuge establishment. Glacial Park provides equestrian trails and camping. Lake Geneva and Chain O'Lakes State Park offer boating and fishing for residents and visitors. Long-distance hiking and bicycling are available on the Prairie Trail. Paddlers can canoe and kayak on the Nippersink Water Trail, and Wisconsin DNR Wildlife Areas offer hunting opportunities. The wide range of managed entities within the Study Area increases the visitor's recreational choices, as each offers its own suite of outdoor activities. However, opportunities for wildlife-dependent activities would continue to decrease on private lands as the region is developed.

Alternative B-D – Refuge Establishment

Each action alternative envisions core parcels, with a limited suite of recreational opportunities permitted under its management directives, working in concert with an interconnected network of publicly accessible lands that offer a broad range of recreation choices. However, refuges are required to emphasize wildlife-dependent recreation activities such as hunting and fishing, when compatible with wildlife, which may not be allowed on all nearby natural areas.

Beyond improving the Study Area's biological integrity, the conserved corridors connecting larger conserved areas offer potential recreational corridors, allowing visitors a less fragmented experience of the natural world. Increased access to parks and open space can improve activity levels among both residents and travelers.

Each of these alternatives envisions a connecting corridor between core Refuge units and/or existing conservation lands. The establishment of recreational trails along these corridors could be an ideal method to get visitors out into the environment. Future trails may be paved or unpaved and would need additional planning in order to be compatible with the terrain and Refuge purposes.

The proposed Refuge sits on the doorstep of literally millions of people who enjoy nature-based recreation. Both Illinois and Wisconsin Statewide Comprehensive Outdoor Recreation Plans have documented that opportunities for outdoor recreation are in short supply in the densely populated regions of northeastern Illinois and southeastern Wisconsin.

Designating a refuge in the Study Area would further diversify the region's recreational assets, protect quality natural habitats, and provide additional opportunities for wildlife-dependent recreation.

4.2.5 Environmental Education and Outreach

Alternative A – Current Direction (No Action)

The McHenry County Conservation District's Lost Valley Visitor Center, located in Glacial Park near McHenry, Illinois, opened to the public in August 2010. This 28,450 square foot facility hosts a number of environmental education programs, workshops, camps, and special events. An exhibit room, drop-in library, and research library (available by appointment) are open daily. The facility is also a regional center for the study of natural resources, housing under one roof the District's Natural Resource Management Department and Environmental Education Staff; the Research Field Station; the District's ecological data bases, resource library and map room; Restoration Internship Program, and the Ecological Restoration Certificate Program. In addition, the Illinois Nature Preserves Commission and the McHenry County Conservation Foundation have offices in the building.

Glacial Park has long been considered one of the jewels of the county's open space holdings, characterized by its rolling prairie, wetlands, delta kames, oak savanna, and the tranquil presence of Nippersink Creek. Encompassing 3,200 acres, Glacial Park is the District's most well-known conservation area, visited annually by more than 64,000 individuals. It supports nine miles of snowmobile trails, six miles of hiking trails, and four miles of horse trails; contains a five mile segment of the regional Prairie Trail, and offers canoeing and fishing in Nippersink Creek.

Alternative B & C – Refuge Establishment

The establishment of a refuge would bring new visibility and destination for local school groups and others wanting to learn about the natural environment. Initially, the Refuge land base will be small and the opportunities for onsite outdoor classroom locations may be limited. However, each of the Refuge alternatives envisions a connecting corridor between core Refuge units and/or existing conservation lands. The establishment of recreational trails along these corridors could be an ideal method to get students out into the environment.

The construction of a full-scale visitor or environmental education center may warrant consideration in the future as the Refuge grows. Another possibility is a smaller classroom/shelter to be placed on one or more of the Refuge units or development of facilities in conjunction with other conservation partners. Construction and operation costs can be substantial for any type of public building. Therefore, the need for any new facilities will have to be based on careful study of the market for environmental education destinations.

If a refuge is established, a Visitor Services Plan will be written to help guide the growth of an environmental education and outreach program.

Alternative D – Partnership Initiative

This alternative would have an outcome similar to Alternative A. The McHenry County Conservation District's Lost Valley Visitor Center located in Glacial Park would continue to be a focal point for onsite environmental education. However, the presence of some Refuge lands, and the connecting corridors, would open the possibility of some Refuge-connected education and outreach programs.

Appendix A: Land Protection Plan

In this appendix

A.1 Introduction and Purpose
A.2 Project Description
A.3 Refuge Purposes
A.4 Land Acquisition Policy for Urban Refuges
A.5 Status of Resources to be Protected
A.6 Land Protection Priorities
A.7 Land Conservation Options
A.8 Land Conservation Methods
A.9 Service Land Protection Policy
A.10 Funding for Land Acquisition or Easement Purchase
A.11 Socioeconomic and Cultural Impacts

A.1 Introduction and Purpose

This Land Protection Plan (LPP) identifies the land conservation boundary for the proposed Hackmatack National Wildlife Refuge (NWR, Refuge). The U.S. Fish and Wildlife Service (FWS, Service), with input from the public, local governments, and numerous organizations, has delineated a region of biologically significant land in the Hackmatack Study Area. These acres are encompassed by the recommend acquisition boundary established in Alternative C: Cores and Corridors of the Environmental Assessment (EA) for the proposed Hackmatack NWR. The goal is to protect land throughout core sites and corridors through acquisition, conservation easements, partnerships with local governments, and the voluntary efforts of private landowners. The purposes of this LPP are to:

- provide landowners and the public with an outline of Service policies, priorities, and protection methods for land in the project area,
- assist landowners in determining whether their property lies within the proposed acquisition boundary, and
- inform landowners about the long-standing policy of acquiring land only from willing sellers. (The Service will not buy any lands or easements if the owners are not interested in selling.)

The LPP presents the methods the Service and interested landowners can use to accomplish their objectives for wildlife habitat within the Refuge boundary.

A.2 Project Description

Early in 2010, the Service began to study the merits of establishing a refuge along the border of Wisconsin and Illinois. The proposed Hackmatack NWR was presented as a tool to connect the disparate dots of conserved land in southeast Wisconsin and northeast Illinois into a cohesive picture of landscape-level conservation. The concept is to create a new refuge that forms the nucleus of a regional conservation identity. A core conserved area owned and managed by the Service as a refuge would anchor this conservation initiative. Its far-reaching ecological and social impact would come from extensive

partnerships with the many public and private landowners committed to furthering conservation in the region.

The Service's preferred alternative, Alternative C: Cores and Corridors, would link and expand upon existing conservation areas to benefit migratory birds and endangered species. The larger block sizes associated with the cores would provide sufficient habitat for nesting grassland birds and waterfowl that are sensitive to fragmented habitat and edges. The corridors would assist terrestrial migration of small mammals, herptiles, and plants that may be impacted by a changing climate.

Land protection methods for the conservation core areas (11,193 acres) would include acquisition, conservation easement, and Non-Governmental Organizations (NGOs)/private opportunities aimed at creating contiguous natural habitat. The conservation corridors would connect the cores primarily through use of partnership efforts and to a lesser degree with land acquisition. Specific, narrow corridors can't be identified at this time as detailed land status and partnerships would determine the ultimate siting. However, a continuous corridor of a minimum of 600 feet wide would be considered complete.

Please see the EA for more details on the Refuge proposal.

A.3 Refuge Purposes

The following purposes, identified from existing law, have been acknowledged for the establishment of the Refuge:

"for any other management purpose, for migratory birds…." 16 U.S.C. §715d (Migratory Bird Conservation Act), and

"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 ..." 16 U.S.C. §3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986),

"for the development, advancement, management, conservation, and protection of fish and wildlife resources" 16 U.S.C. 742a et seq. (Fish and Wildlife Act of 1956).

"and land, or interests therein, which are suitable for-- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources,(3) the conservation of endangered species or threatened species listed by the Secretary pursuant to section 1533 of this title, or (4) carrying out two or more of the purposes set forth in paragraphs (1) through (3) of this section…" 16 U.S.C. §460(k), (Refuge Recreation Act, as amended).

A.3.1 Goals of Hackmatack NWR

Goals for the proposed Hackmatack NWR were developed within the framework of the Refuge System's mission statement, the Refuge Improvement Act, the Refuge's primary purposes, and other Service policy and directives. The goals are intentionally broad statements that describe desired future conditions and guide the management of the Refuge in the interim period and the development of management objectives and strategies for the CCP. They are:

- Protect and enhance habitats for federal trust species and species of management concern, with special emphasis on grassland-dependent migratory birds and protection of wetlands and grasslands.

- Create opportunities for hunting, fishing, wildlife observation and photography, and environmental education and interpretation, while promoting activities that complement the purposes of the Refuge and other protected lands in the region.
- Promote science, education, and research through partnerships to inform land management decisions and encourage continued responsible stewardship of the natural resources of the Hackmatack NWR.

A.4 Land Acquisition Policy for Urban Refuges

The Service seeks to provide Refuge visitors with an understanding and appreciation of fish and wildlife resources through environmental education and interpretation and through wildlife-oriented recreational experiences to the extent these activities are compatible with the purposes for which a Refuge is established.

1. The official Service land acquisition policy for urban Refuges is to acquire lands and waters in or adjacent to metropolitan statistical areas to protect fish and wildlife resources and habitats that will provide the public wildlife-oriented recreation, education, and interpretation opportunities.
2. Some urban Refuges may protect habitats of great significance to the conservation of fish and wildlife resources, including endangered and threatened species. However, the primary purpose for establishment of new urban Refuges will be to foster environmental awareness and outreach programs, and to develop an informed and involved citizenry that will support fish and wildlife conservation. If Service lands already exist in the same urban area, the Service will only acquire additional habitat types of sufficient size to meet habitat needs as determined by the Regions, as well as by education, interpretation, and recreation needs that are not currently being met by the existing Refuge or other state or county agencies. These Refuges will provide public use benefits associated with fish and wildlife resources that include, but are not limited to, bird watching, fishing, scientific research, environmental education, open space in an urban setting, and protection of cultural resources.

Management, operational, and acquisition considerations for urban Refuges will include:

a. Education, interpretation, and wildlife-oriented recreation value;
b. Opportunities for partnerships with state and local governments, private individuals, or citizens groups;
c. Potential role of non-profit or volunteer groups for management purposes;
d. Adequacy of buffer areas and habitat corridors where possible that contribute appreciably to the long-term preservation of habitats.

A.5 Status of Resources to be Protected

A.5.1 Wildlife and Habitat Resources

Two habitat types account for most of the sensitive species in the Study Area: wetlands and grasslands. Historically, as much as 22 percent of the Study Area may have been wetland while 21 percent may have been grassland; an additional five percent may have been savanna. The remainder of the landscape was most likely forest and mixed forest/prairie. The glacial history of the Study Area produced a rich variety

of wetlands and water bodies including fens, bogs, marshes, swamps, ponds, lakes, and streams that attract abundant and diverse wildlife. While prairie was a dominate vegetation community on the landscape historically, only a patchwork of these grasslands too rugged or wet for agriculture still exist today.

Table 5 displays the current land cover types of the proposed Refuge. Please see Chapter 3 of the EA and the Appendices for more information on the wildlife and habitat resources of the proposed Refuge.

Table 5: Habitat Types within the Land Protection Area (i.e., lands identified under Alternative C) for the Hackmatack NWA Environmental Assessment

2006 National Land Cover Description	Alt C Core (Acres)	Alt C Corridor (Acres)
Open Water	54	97
Developed, Open Space	349	543
Developed, Low Intensity	142	261
Developed, Medium Intensity	12	31
Developed, High Intensity	7	18
Barren	0	31
Deciduous Forest	694	1,234
Coniferous Forest	1	1
Mixed Forest	78	55
Scrub/Shrub	5	8
Grassland/Herbaceous	85	64
Pasture/Hay	1,310	2,236
Cultivated Crops	8,290	7,995
Woody Wetlands	135	771
Emergent Herbaceous Wetland	33	17
Total Acres	**11,193**	**13,362**

A.5.2 Threats to the Resource

Several grassland bird species are declining throughout their range. The Service is the primary federal agency responsible for conserving these species. Recent research has shown that large blocks of grasslands, such as those proposed in this Refuge project, may be key to reversing the downward trend. The proposed Refuge could eventually restore and connect a landscape that includes large blocks of grasslands, wet prairies, and natural stream watercourses.

Agricultural and urban land use practices have drastically changed the land cover of the Study Area since Euro-American settlement. The current vegetation is primarily agricultural cropland (over 50 percent). Remaining forests occupy only about 10 percent of the land and consist of oak, maple-basswood, and lowland hardwoods.

The rate of urban development and intensive agricultural uses are dependent on current economic factors. Please see Chapter 3 of the EA for more discussion on threats to natural resources.

A.5.3 Continuing Partnership Effort

The threats to the resource described above make preserving land in the proposed Refuge both crucial and challenging. As real estate values increase due to the influx of people from the Chicago metropolitan area, the need to act quickly to preserve key parcels remaining in McHenry County becomes more apparent. For that reason, the Service recognizes the need to collaborate with other conservation organizations in the region. Therefore, the Refuge would work to combine efforts with those of many partners. These partners use their individual mission statements to focus protection and restoration efforts. Taken together, those mission statements cover the protection of farmland, threatened and endangered species, scenic areas, grassland habitats, and open space that the local community has identified as significant.

A.6 Land Protection Priorities

All of the lands included in the preferred action area have significant resource values and high potential for ensuring habitat connectivity between the Refuge and surrounding conservation lands. In general, the availability of land from willing sellers and the availability of funding at that time will influence the actual order of land protection. However, as landowners offer parcels, and as funds become available, Refuge managers will base the priority for land protection on several factors. Priority is assigned as follows:

Priority 1 (Core Areas): Priority 1 parcels contain most of the lands and habitats that meet the threshold for federal protection. They are:

- parcels that contain a significant amount of functioning undisturbed or relatively undisturbed grasslands, oak savanna, or wetlands of significant importance that support federal trust species (e.g., federally-listed species, migratory birds);
- parcels that contain potentially significant habitat for federally-listed species found within the Refuge acquisition boundary;
- parcels that are of significant importance to the Fox River or Nippersink watersheds;
- parcels that have a significant value for migratory birds, with prime nesting and foraging habitats for federal-or state-listed species; and/or
- parcels that help to restore or maintain habitat connectivity.

Priority 2 (Corridors): Priority 2 parcels are all those that contribute to making connection corridors between core units and existing conservation lands. Within the corridors a higher protection priority will be given to:

- riparian corridors or wetlands associated with or hydrologically connected to core units;
- parcels that contribute to recreational trails; and
- disturbed grasslands or wetlands that can be easily restored.

Corridor Selection Criteria and Desirable Features

The following selection criteria will be used to develop the best possible routes for future connecting habitat corridors.

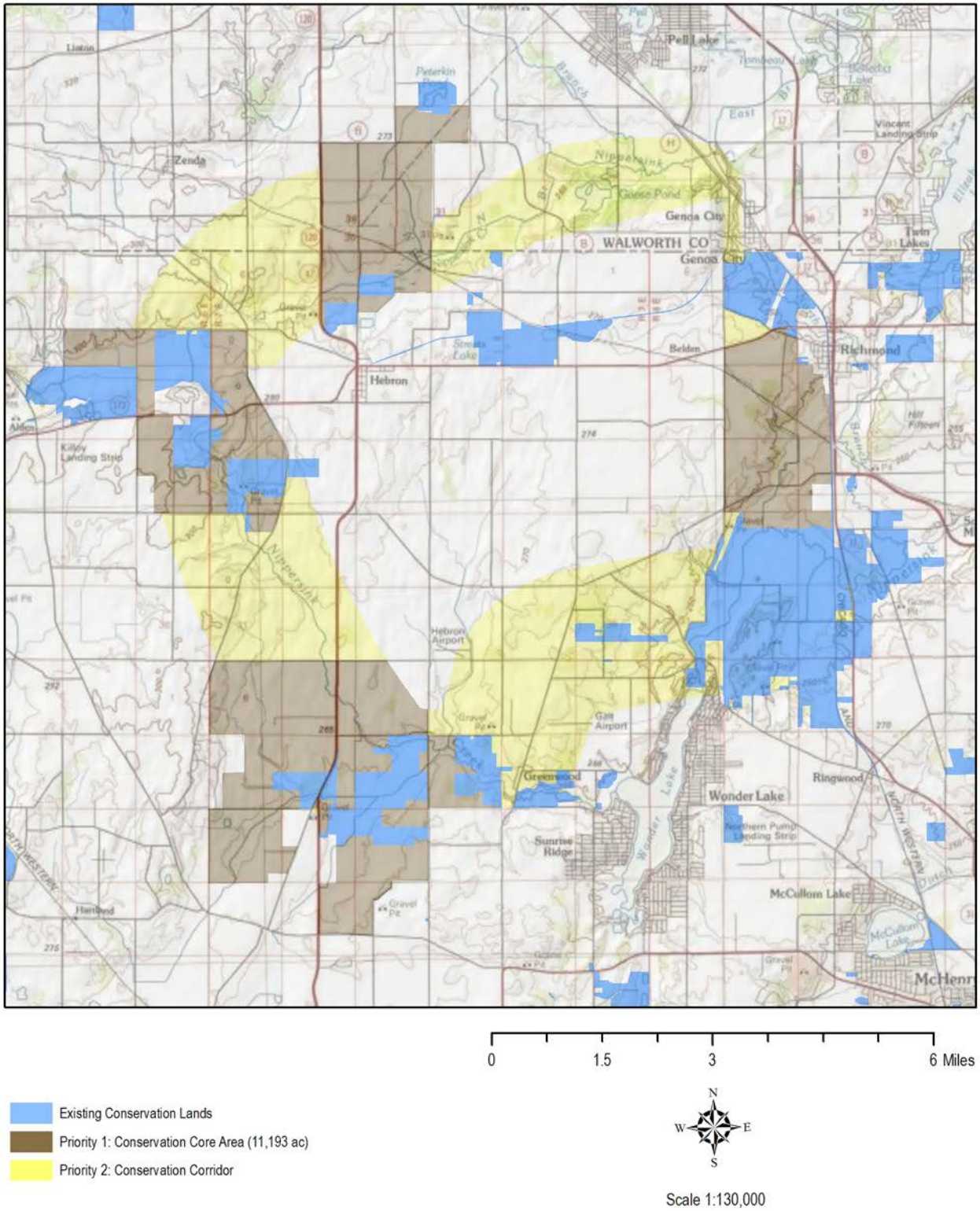
- No development.
- Native habitats.
- Wide enough for wildlife corridor as well as room for a multi-use trail; minimum 600 feet wide; assume average of 660 feet (1/8 mile; 80 acres/mile).
- Shortest possible route between core areas when the property can meet other criteria.
- Willing participant landowners only.
- Use existing corridors when possible.
- Avoid roads when possible.
- The corridors have permanent protection.
- Avoid high economic value land when possible.
- Corridors contain areas of woody vegetation as well as grassland to facilitate movement of animals and plants dependent upon both habitat types.
- Trails are located on corridor edges, not through the center, to avoid habitat fragmentation.

Possible means to create the corridors:

- Partners take the lead in developing the corridors.
- If Service is involved in acquiring the corridors.
    - Partner acquires rights to any areas to be used by snowmobiles prior to Service acquisition of any rights; Service works with partners to minimize any potential negative impacts of the trail's location.
    - Easements are first priority; include rights to establish a multi-use trail.
    - Voluntary partnerships with landowners are possible but may not result in areas that allow trail development.
    - Use willing-seller acquisition as the last resort.
- Service or partners obtain rights to restore habitats in the corridor or at least maintain existing habitats where they are compatible with Service interests.

See Figure 10 (below) for a map depicting land protection priorities for the proposed Hackmatack NWR.

Figure 10: Land Protection Priorities for the Proposed Hackmatack NWR (USFWS, 2011)



The Service intends to minimize the need to acquire residences and buildings on these lands, while protecting and restoring habitat, so parcels of this nature will be evaluated on a case-by-case basis. The Service reserves the right to be flexible with the detailed priority list, because a number of factors also influence the priority of land protection, including the availability of willing sellers and the availability of funding. In addition, the Service must be flexible in its methods and priorities of land protection to meet the needs of individual landowners.

Service policy in acquiring land is to acquire only the minimum interest necessary to meet refuge goals and objectives and acquire it only from willing sellers.

A.7 Land Conservation Options

The following options will be used to implement this LPP.

Option 1. Management or Land Conservation by Others

A great deal of land in, adjacent to, and ecologically important to the proposed Hackmatack NWR is already owned or managed by conservation partners. It should also be emphasized that the protection of the Hackmatack NWR fits well into a large landscape scale wildlife and habitat corridor that is being pieced together in the area. Hackmatack NWR would serve as an important keystone in this conservation effort. The following partners both manage easements or own properties that are ecologically associated with the proposed Refuge:

- McHenry County Conservation District
- Illinois Department of Natural Resources
- Wisconsin Department of Natural Resources
- Illinois Nature Preserves Commission
- The Land Conservancy of McHenry County
- Several Local Land Trusts

Option 2. Less-than-full Acquisition

Under option 2, the Refuge will protect and manage land by purchasing only a partial interest, typically in the form of a conservation easement. This option leaves the parcel in private ownership, while allowing control over the land use in a way that enables the Refuge to meet the goals for the parcel or that provides adequate protection for important adjoining parcels and habitats. The structure of such easements will provide permanent protection of existing wildlife habitats while also allowing habitat management or improvements and access to sensitive habitats, such as for endangered species or migratory birds. It will also allow for public use where appropriate. The Refuge Manager will determine, on a case-by-case basis, and negotiate with each landowner, the extent of the rights to be purchased. Those may vary, depending on the configuration and location of the parcel, the current extent of development, the nature of wildlife activities in the immediate vicinity, the needs of the landowner, and other considerations.

In general, any less-than-fee acquisition will maintain the land in its current configuration with no further subdivision. Easements are a property right and typically are perpetual. If a landowner later sells the property, the easement continues as part of the title. Properties subject to easements generally remain on the tax rolls, although the change in market value may reduce the assessment. The Service does not pay

refuge revenue sharing on easement rights. Where conservation easements are identified, the Service will be interested primarily in purchasing development and some wildlife management rights. Easements are best when only minimal management of the resource is needed, but there is a desire to ensure the continuation of current undeveloped uses and to prevent fragmentation over the long-term and in places where the management objective is to allow vegetative succession, such as when:

- a landowner is interested in maintaining ownership of the land, does not want it to be further developed, and would like to realize the benefits of selling development rights;
- current land use regulations limit the potential for adverse management practices;
- the protection strategy calls for the creation and maintenance of a watershed protection area that can be accommodated with passive management; or
- only a portion of the parcel contains lands of interest to the Service.

The determination of value for purchasing a conservation easement involves an appraisal of the rights to be purchased, based on recent market conditions and structure in the area. The Land Protection Methods section further describes the conditions and structure of easements.

Option 3. Land Acquisition

Under option 3, the Service will acquire parcels in full title from willing sellers, thereby purchasing all rights of ownership. This option provides the most flexibility in managing priority lands and ensuring the protection in perpetuity of nationally significant trust resources.

Generally, the lands acquired will require more than passive management (e.g., controlling invasive species, mowing or prescribed burning, planting, or managing for the six priority public uses). The Service only proposes full acquisition when adequate land protection is not assured under other ownerships, active land management is required, or when the current landowner would be unwilling to sell a partial interest like a conservation easement.

In some cases, it may become necessary to convert a previously acquired conservation easement to full acquisition: for example, when an owner is interested in selling the remainder of interest in the land. These requests will be evaluated on a case-by-case basis.

A.8 Land Conservation Methods

Three methods of acquiring either a full or a partial interest in the parcels identified for Service land protection are detailed below. They are: (1) purchase (e.g., complete title, or a partial interest like a conservation easement), (2) donation, and (3) exchange.

Purchase: For most of the tracts in the boundary, the proposed method is listed as *Acquisition* or *Easement*; however, the method ultimately used depends partly on the landowner's wishes.

Purchase involves buying the parcel of land outright from a willing seller with full title (all rights, complete ownership), as the availability of funding allows.

Easement purchase refers to the purchase of limited rights (less than full) from an interested landowner. The landowner would retain ownership of the land, but would sell certain rights identified and agreed upon by both parties. The objectives and conditions of proposed conservation easements would recognize

lands for their importance to wildlife habitat or outdoor recreational activities and any other qualities that recommend them for addition to the Refuge System.

Donation: Donations with full title or conservation easement in the approved areas will be encouraged and welcomed. The planning team is not aware currently of any formal opportunities to accept donations of parcels in the land protection boundary.

Exchange: The Service has the authority to exchange land in Service ownership for other land that has greater habitat or wildlife value. Inherent in this concept is the requirement to get dollar-for-dollar value with, occasionally, an equalization payment. Exchanges are attractive, because they usually do not increase federal land holdings or require purchase funds; however, they also may be very labor-intensive and take a long time to complete.

A.9 Service Land Protection Policy

Once a refuge land protection boundary has been approved, the refuge manager may contact neighboring landowners to determine whether any are interested in selling. If a landowner expresses an interest and gives permission, a real estate appraiser will appraise the property to determine its market value. Once an appraisal has been approved, an offer can be presented for the landowner's consideration.

The Service's long-established policy is to work with willing sellers as funds become available. Appraisals conducted by Service or contract appraisers must meet federal as well as professional appraisal standards. Federal law requires the Service to purchase properties at their market value, which typically is based on comparable sales of similar types of properties.

The planning team based the land protection boundary on the biological importance of key habitats. That gives the Service the approval to negotiate with landowners that may be interested or may become interested in selling their land in the future. With those internal approvals in place, the Service can react more quickly as important lands become available. Lands in that boundary do not become part of the refuge unless their owners sell or donate them to the Service.

A landowner may choose to sell land to the Service and retain the right to occupy an existing residence. That is a "life use reservation." It applies during the seller's lifetime but can also apply for a specific number of years. A discount from the appraised value of the buildings and land will be applied to cover the "rent" or use reservation. The occupant would be responsible for the upkeep on the reserved premises. The refuge would own the land, and pay revenue sharing to the appropriate taxing authority.

In rare circumstances, at the request of a seller, the Service can use "friendly condemnation" to help determine value or to obtain clear title to the land. Although the Service has a long-standing policy of acquiring land only from willing sellers, it also has the power of eminent domain, as do other federal, state, and local government agencies. A friendly condemnation proceeding can be used when the Service and a seller cannot agree on property value, and both agree to allow a court to determine fair market value. When a title company cannot determine the rightful owner of a property, friendly condemnation can be used to clear title. The Service does not expect to use friendly condemnation very often, if at all. The Service would not use condemnation otherwise, as it counters good working relations with the public.

A.10 Funding for Land Acquisition or Easement Purchase

Funding to buy land comes primarily from the Land and Water Conservation Fund (LWCF), which derives from certain user fees, the proceeds from the disposal of surplus federal property, the federal tax

on motor boat fuels, and oil and gas lease revenues. About 90 percent of that fund now derives from Outer Continental Shelf oil and gas leases. The federal government receives about 40 percent of that fund to acquire and develop nationally significant conservation lands. Another source of funding to purchase land is the Migratory Bird Conservation Fund (MBCF), which derives from Federal Duck Stamp revenue.

The planning team recommends using both funds to buy either full or partial interests in lands in the project area. The Service will use LWCF funds to acquire land and easements that consist mainly of upland grasslands or forests. A request for MBCF funds would be appropriate for properties that include emergent wetlands and waters important for waterfowl. Another potential source for funding in that category is the North American Wetlands Conservation Fund.

A.11 Socioeconomic and Cultural Impacts

No significant adverse socioeconomic or cultural impacts are expected due to the refuge proposal. A net positive benefit is expected to result for the local community. Towns will benefit from increased refuge revenue sharing payments and lower potential costs from these parcels, savings on the cost of community services, increased property values, increased watershed protection, maintenance of scenic values, and increased revenues for local businesses from refuge visitors who participate in bird watching, hunting, and wildlife observation.

During public involvement for the study, most local residents and town officials were enthusiastic about Service land protection. Many people encouraged the planning team to develop a larger proposal. Land protection by the Service, while aimed at protecting trust resources, watersheds, and other natural resource values, would also maintain the rural character of the area.

Please see the EA for more information on socioeconomic and cultural impacts.

Appendix B: Pre-acquisition Compatibility Determinations

In accordance with the provisions of Service refuge planning policy (603 FW 2) the pre-acquisition compatibility determinations covering any lands acquired in full or easement for the proposed Hackmatack National Wildlife Refuge (NWR, Refuge) are as follows:

Uses:
Pre-acquisition compatibility of wildlife dependent uses (hunting, fishing, wildlife observation and photography, environmental education and interpretation) occurring on lands within the proposed Hackmatack NWR.

Refuge Name:
Hackmatack National Wildlife Refuge

Establishing and Acquisition Authority(ies):
Lands acquired by the Service for the proposed Hackmatack NWR would be purchased under the authority of the Migratory Bird Conservation Act of 1929, the Refuge Recreation Act of 1962, the Fish and Wildlife Act of 1956, and the Emergency Wetland Resources Act of 1986.

Refuge Purpose(s):

"for any other management purpose, for migratory birds…." 16 U.S.C. §715d (Migratory Bird Conservation Act of 1929), and

"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 ..." 16 U.S.C. §3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986),

"for the development, advancement, management, conservation, and protection of fish and wildlife resources" 16 U.S.C. 742a et seq. (Fish and Wildlife Act of 1956).

"and land, or interests therein, which are suitable for-- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources,(3) the conservation of endangered species or threatened species listed by the Secretary pursuant to section 1533 of this title, or (4) carrying out two or more of the purposes set forth in paragraphs (1) through (3) of this section…" 16 U.S.C. §460(k), (Refuge Recreation Act, as amended).

National Wildlife Refuge System Mission:

"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 the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

Description of Uses:

The uses being reviewed are six wildlife-dependent recreational uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation). These are priority uses

outlined in the National Wildlife Refuge System Improvement Act of 1997. We will identify which uses may be occurring on lands within the proposed authorized refuge boundary and whether these uses can continue under Service ownership.

All six uses are known to occur on the public and private lands within the proposed Refuge boundary. Hunting and fishing occur primarily on the rural lands of the area on a limited basis. Housing developments, roads, and intense croplands limit the amount of acreage available for upland game hunting. Fishing occurs along the Fox River and Nippersink Creek and on a few open water bodies within the proposed boundary. Wildlife observation and photography are enjoyed by local residents, especially on the county and state public lands. Environmental education and interpretation is primarily limited to programs sponsored by McHenry County Conservation District and local school initiatives.

All activities on new refuge lands would follow applicable local, state, and federal laws, except where the Refuge designates additional restrictions to ensure compatibility with Refuge purposes.

Availability of Resources:

The Hackmatack NWR could be administered in several ways depending on the pace of refuge development. In beginning stages, the new Refuge would probably be managed as a satellite refuge by staff of Horicon NWR or the Leopold Wetland Management District. Management of specific parcels could also be conducted through formal cooperative agreements with the State of Illinois and the State of Wisconsin, or with county government conservation agencies. As the restored land base increases, the complexity of habitat management and administration also increases, and the new Refuge would probably be assigned its own funding, equipment, and staff. Generally, a fully staffed refuge of this size could eventually have about seven staff members and an annual operating budget of approximately $700,000.

Anticipated Impacts of Use:

The continuation of existing wildlife-dependent recreational use is consistent with fish and wildlife management principals in that it recognizes, in the case of hunting, the concepts of harvestable surplus and carrying capacity. White-tailed deer and Canada Goose numbers can increase to levels causing increased cropland damage without the control provided by hunting. The potential of floral and faunal degradation reduces biodiversity and negatively impacts other wildlife using the same habitat, including threatened and endangered species. The Refuge goal to maintain diversity and increase abundance of waterfowl and other migratory bird species could be impaired without an active hunting program to manage big game and predator populations.

Public Review and Comment:

Public review and comment were provided through the publishing of this Compatibility Determination as an appendix to the Environmental Assessment for the proposed Refuge.

Determination:

_____ Use is Not Compatible

____X____ Use is Compatible with Following Stipulations:

Stipulations Necessary to Ensure Compatibility:

To ensure compatibility with Refuge purposes and the mission of the National Wildlife Refuge System, (NWRS, Refuge System) wildlife-dependent recreational uses can occur on Hackmatack NWR with the following stipulations:

1. All wildlife-dependent recreational uses must be conducted in accordance with local, state and federal regulations unless the U.S. Fish and Wildlife Service places additional restrictions on the activities to ensure compliance with all applicable laws, regulations, and policies.
2. Wildlife-dependent recreational uses will be limited or excluded from areas containing sensitive or rare plant communities if that use would severely damage or extirpate the natural community type.
3. Wildlife-dependent uses will be subject to modification if onsite monitoring by Refuge personnel uncovers unanticipated negative impacts to natural communities, wildlife species, or their habitats.

Justification:

The National Wildlife Refuge System Improvement Act of 1997 specifies that these are the six priority uses of the Refuge System. As noted in the description of use and anticipated impact sections, the allowed priority uses will have overall minimal impact to fish and wildlife populations and associated habitat. Stipulations above will ensure proper control of the means of use and provide management flexibility should detrimental impacts develop. Allowing these uses also further the mission of the Refuge System by providing renewable resources for the benefit of the American public while conserving fish, wildlife, and plant resources on this tract.

Signature: Refuge Supervisor: _____

Signature and Date

Concurrence: Regional Chief: _____

Signature and Date

Mandatory 10- or 15-year Re-evaluation Date: 2027

Appendix C: Conceptual Management Plan

In this appendix

C.1 Introduction
C.2 Purpose of Conceptual Management Plan
C.3 Mission of the Service and the Refuge System
C.4 Laws Guiding the Refuge System
C.5 Purpose of Establishment and Land Acquisition Authority
C.6 Goals of Hackmatack NWR
C.7 Refuge Management
C.8 Administration
C.9 Conclusion

C.1 Introduction

Early in 2010, the U.S. Fish and Wildlife Service (FWS, Service) began to study the merits of establishing a national wildlife refuge (NWR, refuge) along the border of Wisconsin and Illinois. The proposed Hackmatack NWR was presented as a tool to connect the disparate dots of conserved land in southeast Wisconsin and northeast Illinois into a cohesive picture of landscape-level conservation. The concept is to create a new refuge that forms the nucleus of a regional conservation identity. A core conserved area owned and managed by the Service as a refuge would anchor this conservation initiative. Its far-reaching ecological and social impact would come from extensive partnerships with the many public and private landowners committed to furthering conservation in the region.

For years, conservation organizations across the greater Chicago metropolitan area have worked to identify key lands for conservation, open space, and greenways. At the heart of their work lies a vision of sustainable communities that value and nurture healthy ecosystems, recreational opportunities close to home, and vibrant economies. In portions of McHenry and Lake Counties in Illinois and Walworth, Racine, and Kenosha Counties in Wisconsin, a coalition of residents saw an opportunity to take a big step toward that vision.

The initial Study Area encompassed 350,000 acres. The proposed Refuge would ultimately improve or restore over 12,000 acres of drained wetland basins, historic prairie, and forest habitats; and it would conserve habitat corridors between protected parcels so that the region functions ecologically as an interconnected whole.

This document, the final Conceptual Management Plan (CMP), provides further detail on the Service's preferred action and how the lands identified therein would be administered should a refuge be established.

C.2 Purpose of Conceptual Management Plan

The Hackmatack NWR Environmental Assessment (EA) examines the feasibility of establishing a refuge in McHenry County, Illinois and Walworth County, Wisconsin. In Chapter 3 of the EA, three alternatives are described and considered for a potential refuge, with Alternative C (Cores and Corridors) presented as the Service's preferred action. This alternative will not be implemented until it has been officially reviewed and authorized.

If approved, Alternative C, the "Cores and Corridors" alternative, would link and expand upon existing conservation areas to benefit migratory birds and endangered species. The larger block sizes associated with the cores would provide sufficient habitat for nesting grassland birds and waterfowl that are sensitive to fragmented habitat and edges. The corridors would assist terrestrial migration of small mammals, herptiles, and plants that may be impacted by a changing climate (see chapter 2 of the EA).

Land protection methods for the conservation core areas (12,019 acres) would include acquisition, conservation easement, and Non-Governmental Organizations (NGOs)/private opportunities aimed at creating contiguous natural habitat. The conservation corridors would connect the cores primarily through use of partnership efforts and to a lesser degree with full acquisition. Specific, narrow corridors can't be identified at this time as detailed land status and partnerships would determine the ultimate siting. However, a continuous corridor of a minimum of 600 feet wide would be considered complete.

The establishment of a refuge would bring new visibility and destination for local school groups and others wanting to learn about the natural environment. Initially, the Refuge land base will be small and the opportunities for onsite outdoor classroom locations may be limited. However, each of the Refuge alternatives envisions a connecting corridor between core Refuge units and/or existing conservation lands. The establishment of recreational trails along these corridors could be an ideal method to get students out into the environment.

The Service developed this CMP to describe the management direction for a proposed Hackmatack NWR, as defined in Alternative C, and outline possible interim habitat management priorities and compatible public uses on newly acquired lands, should a refuge be approved. The activities described in this CMP will direct the pursuit and management of land acquisitions, conservation easements, and other land interests until a Comprehensive Conservation Plan (CCP) is developed. By Service policy, a CCP must be developed within 15 years of the actual establishment of the Refuge (i.e., acquisition of first land parcel). Any major changes in the activities described in this CMP, any new activities, and our development of the CCP would be subject to public review and comment in accordance with the provisions of Service refuge planning policy (602 FW 1, 2 and 3) and Service and U.S. Department of the Interior policy implementing the National Environmental Policy Act (NEPA) of 1969 (Department of Interior Manual 516, Appendix 1).

C.3 Mission of the Service and the Refuge System

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. As part of the Department of the Interior, the Service manages all refuges within the National Wildlife Refuge System (NWRS, Refuge System), as well as 66 national fish hatcheries, 78 ecological services field stations, and 64 fish and wildlife assistance offices. The agency also enforces federal wildlife laws, honors international treaties, assists foreign governments in their conservation efforts, and oversees the Wildlife and Sport Fish Restoration Program (formerly known as Federal Assistance), which distributes hundreds of millions of dollars from excise taxes on fishing and hunting equipment to state fish and wildlife agencies.

The mission of the Refuge System is to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. The Refuge System now comprises over 150 million acres of public land and waters on 555 refuges and wetland management districts. More than 40 million visitors each year participate in such outdoor pursuits as hunting, fishing, wildlife observation and photography, and environmental education and

interpretation on refuge lands. Lands acquired through conservation easements, partnerships, etc. are managed as part of the Refuge System.

C.4 Laws Guiding the Refuge System

A number of laws, policies, and regulations, including the following, govern our acquisition and management of land in the proposed Hackmatack NWR.

National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act). This act guides the development and operation of the Refuge System. It clearly identifies the mission of the Refuge System, requires the Secretary of the Interior to maintain the biological integrity, diversity and environmental health of refuge lands, mandates a "wildlife first" policy on refuges, and requires comprehensive conservation planning. It also designates six wildlife-dependent recreational uses as priority public uses of the Refuge System: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. This act amended the National Wildlife Refuge System Administration Act of 1966, which continues to serve as the parent legislation for the Refuge System.

National Wildlife Refuge System Administration Act of 1966. This act defines the Refuge System, including refuges, areas for the protection and conservation of fish and wildlife threatened with extinction, wildlife ranges, wildlife management areas, and waterfowl production areas. It also authorizes the Secretary of the Interior to permit any use of an area, provided the use is compatible with the major purposes for establishing the area.

Migratory Bird Treaty Act of 1918. The Migratory Bird Treaty Act protects all migratory birds and their parts (including eggs, nests, and feathers) from illegal trade. The Migratory Bird Treaty Act is a domestic law that acknowledges the United States' involvement in four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. The bird resource is considered shared because these birds migrate between countries at some point during their annual life cycle.

Endangered Species Act (ESA) of 1973 (as amended). This act directs all federal agencies to participate in endangered species conservation by protecting endangered and threatened species and restoring them to a secure status in the wild. Section 7 of the act charges federal agencies to aid in the conservation of species listed as threatened or endangered under the ESA, and requires federal agencies to ensure that their activities will not jeopardize the continued existence of ESA-listed species or adversely modify designated, critical habitats.

National Environmental Policy Act of 1969 (NEPA). NEPA requires that all federal agencies consult fully with the public in planning any action that may significantly affect the quality of the human or natural environment. The final EA that this document accompanies is formatted to assist the Service in complying with NEPA if the proposed Refuge moves forward.

Land and Water Conservation Act (LWCF). The LWCF uses monies from certain user fees, the proceeds from the disposal of surplus federal property, the federal tax on motor boat fuels, and oil and gas lease revenues (primarily outer Continental Shelf oil monies) to fund matching grants to states for outdoor recreation projects and to fund land acquisition for various federal agencies.

Migratory Bird Conservation Act of 1929. The Migratory Bird Conservation Act provides for the acquisition of suitable habitats for use as migratory bird refuges, and the administration, maintenance, and development of these areas, under the administration of the Secretary of the Interior.

Archeological Resources Protection Act of 1979 (ARPA). ARPA provides protection for archeological resources on public lands by prohibiting the "excavation, removal, damage or defacing of any archeological resource located on public or Indian lands," and sets up criminal penalties for those acts. It also encourages the increased cooperation and exchange of information between governmental authorities, the professional archeological community, and private individuals having archeological resources or data obtained before 1979.

National Historic Preservation Act of 1966 (NHPA). NHPA requires all federal agencies to consider the effects of their undertaking on properties meeting criteria for the National Register of Historic Places and ensures that historic preservation fully integrates into the ongoing programs and missions of federal agencies.

C.5 Purpose of Establishment and Land Acquisition Authority

Refuge lands can be acquired under various legislative and administrative authorities for specified purposes. Land acquisition for the proposed Hackmatack NWR would be authorized by the Migratory Bird Conservation Act of 1929, the Refuge Recreation Act of 1962, the Fish and Wildlife Act or 1956, and the Emergency Wetland Resources Act of 1986.

The purposes of a refuge are derived from the legislative authorities under which it was established. The purposes guide the long-term management of the refuge, prioritize future land acquisition, and play a key role in determining the compatibility of proposed public uses. The purposes of the Hackmatack NWR as proposed in the EA would include:

" for any other management purpose, for migratory birds…." 16 U.S.C. §715d (Migratory Bird Conservation Act), and

"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 ..." 16 U.S.C. §3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986),

"for the development, advancement, management, conservation, and protection of fish and wildlife resources" 16 U.S.C. 742a et seq. (Fish and Wildlife Act of 1956).

"and land, or interests therein, which are suitable for-- (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources,(3) the conservation of endangered species or threatened species listed by the Secretary pursuant to section 1533 of this title, or (4) carrying out two or more of the purposes set forth in paragraphs (1) through (3) of this section…" 16 U.S.C. §460(k), (Refuge Recreation Act, as amended).

C.6 Goals of Hackmatack NWR

Goals for the proposed Hackmatack NWR were developed within the framework of the Refuge System's mission statement, the Refuge Improvement Act, the Refuge's primary purposes, and other Service policy and directives. The goals are intentionally broad statements that describe desired future conditions. They guide the management of the Refuge in the interim period and the development of management objectives and strategies for the CCP. The goals are to:

- Protect and enhance habitats for federal trust species and species of management concern, with special emphasis on grassland-dependent migratory birds and protection of wetlands and grasslands.
- Create opportunities for hunting, fishing, wildlife observation and photography, and environmental education and interpretation, while promoting activities that complement the purposes of the Refuge and other protected lands in the region.
- Promote science, education, and research through partnerships to inform land management decisions and encourage continued responsible stewardship of the natural resources of the Hackmatack NWR.

C.7 Refuge Management

The following section describes in general terms the approach and philosophy that the Service proposes to apply to the future Hackmatack NWR during the Refuge development phase. Priorities for management during this interim period would include: habitat restoration, monitoring and inventory of migratory birds, unique plant communities, and building community support.

Management, recruitment, and protection of migratory birds

The landscape composition around the proposed Refuge presents a great opportunity to make significant contributions to the conservation of grassland birds. Grasslands throughout the physiographic area are being significantly degraded by succession and through colonization of these areas by invasive plant species. The expansion of fast spreading invasive species and natural woody vegetation into grassland habitats very quickly makes these habitats unsuitable for grassland bird species. A well planned and organized invasive species control program would be crucial to grassland management, as well as management of the other habitats at the proposed Refuge.

Management of forested upland habitat and forested wetland habitats would support nesting interior-forest-dwelling birds of concern. Non-forested wetland habitat would provide spring and fall migratory waterfowl and shorebird habitat. The Hackmatack NWR area presently contains a patchwork of wetlands and grasslands, which, if connected, could greatly enhance habitat for these species of conservation concern.

Fish and wildlife-dependent recreational opportunities

The Refuge Improvement Act establishes six priority public uses on refuges. Those priority uses depend on the presence, or the expectation of the presence of wildlife. These uses are: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. Although these priority uses must receive our consideration in planning for public use, they also must be compatible with the purpose for which the Refuge was established and the mission of the Refuge System. Compatibility determinations, which evaluate the impacts of the use in the context of species or habitats, aid in making those decisions. As lands are acquired in the Hackmatack NWR, compatibility determinations would be used to decide the public use opportunities that may permitted.

Public use opportunities contribute to the long-term protection of wildlife resources by promoting understanding, appreciation, and support for wildlife conservation. The six priority public uses would be accommodated where they do not have a significant negative impact on wildlife. All the proposed public use activities are contingent upon availability of staff and funding to develop and implement these programs. Refuge staff would promote opportunities for volunteers and develop community appreciation

and public support for the Refuge. They would work with school districts and teachers to develop an environmental education program featuring unique species or communities at the Refuge. The Refuge Manager would open newly acquired lands for hunting if they can biologically, ecologically, and safely accommodate hunting within state guidelines. Newly acquired lands that traditionally have been hunted would remain open until the planning process is completed. Before closing any newly acquired lands, the Service would complete a separate public review process.

An increase in public use would result from the new trails, parking areas, fishing access, interpretive overlooks, and observation platforms that would be a part of the preferred action. The Service would allow public access for day use on most of the newly acquired lands. Any hunting on the Refuge would be based on the Illinois and Wisconsin hunting seasons and be consistent with the Refuge's Annual Hunt Plan.

The Refuge also would provide interpretive and environmental education programs and increase partnership opportunities to interpret the Refuge and the watershed. The plans for increased public use opportunities may cause concern for Refuge neighbors due to the perception that new visitors to the Hackmatack NWR may have adverse impacts on privacy, traffic, frequency of trespass on non-Refuge owned lands, etc. The Service evaluates impacts of public uses, not only to wildlife, but also to neighboring landowners and the local community. This "good neighbor policy" strives to avoid such potential conflicts by careful placement of public use areas and trails, clear posting of Refuge boundaries, open communication with our Refuge neighbors, and a Refuge-based law enforcement presence. In the absence of a Refuge law enforcement officer, cooperative agreements with local and state police and conservation officers help to eliminate such conflicts.

Appropriate Refuge Uses Policy

The initial decision-making process a refuge manager follows when first considering whether or not to allow a proposed use on a refuge involves an evaluation of the appropriateness of a given activity on a refuge. The refuge manager must find a use to be appropriate before undertaking a compatibility review of the use. If a proposed use is not found to be appropriate, the refuge will not allow the use and will not prepare a compatibility determination. By screening out proposed uses that are not appropriate to the refuge, the refuge manager avoids unnecessary compatibility reviews. By following the process for finding the appropriateness of a use, the refuge manager strengthens and fulfills the Refuge System mission.

Compatibility and Priority Uses

Throughout the remainder of this document the reader will be introduced to the terms "compatibility" and "compatible use(s)." A compatible use is a proposed or existing wildlife-dependent recreational use or any other use of a refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the Refuge System mission or the purposes of the refuge. The refuge manager would not initiate or permit a new use of a refuge or expand, renew, or extend an existing use unless it has been determined that the use is consistent with the mission of the Refuge System and the purposes of each specific refuge. Further, the same use may be deemed compatible on some refuges but not others due to refuge-specific differences.

The Refuge Improvement Act establishes six priority public uses on refuges. Those priority uses depend on the presence, or the expectation of the presence, of wildlife. These uses are: hunting, fishing, wildlife observation and photography, and environmental education and interpretation. Although these priority uses must receive our consideration in planning for public use, they also must be compatible with the purpose for which the refuge was established and the mission of the Refuge System. Compatibility

determinations, which evaluate the impacts of a use that has been determined to be appropriate in the context of species or habitats, aid in making those decisions. As lands are acquired for the Hackmatack NWR, compatibility determinations would be used to decide what public use opportunities are compatible and can be permitted.

Public use opportunities contribute to the long-term protection of wildlife resources by promoting understanding, appreciation and support for wildlife conservation. The six priority public uses will be accommodated where they do not have a significant negative impact on wildlife. All the proposed public use activities are contingent upon availability of staff and funding to develop and implement these programs. The Refuge will promote opportunities for volunteers and develop community appreciation and public support for the Refuge. Refuge staff would work with school districts and teachers to develop an environmental education program featuring unique species or communities at the Refuge.

Other Uses and Limitations

In addition to the priority uses described above, many other uses may also be determined to be appropriate and compatible with management of the Refuge. Some examples of these types of uses from other refuges include: cross-country skiing, berry picking, stargazing, haying, grazing of livestock, collection of edible wild plants for personal use, furbearer management, etc. The site-specific conditions and wildlife resources at each refuge will dictate the additional uses that may be permitted. Since these conditions vary from refuge to refuge, particular uses may be permitted at one refuge and precluded at another.

Although a refuge use may be both appropriate and compatible, the Refuge Manager retains the authority to prohibit or modify the use if potential conflicts are perceived. For example, on some occasions, two appropriate and compatible uses may interfere with each other. In these situations, even though both uses are appropriate and compatible, the Refuge Manager may need to limit or entirely restrict one of the uses in order to provide the greatest benefit to refuge resources and the public. For proposed uses that might develop after the preparation of this document, the Refuge would apply the same procedure outlined above to make an appropriateness finding without additional public review and comment. If a proposed use is determined to be appropriate, a determination of whether or not the use is compatible will be made and will include an opportunity for public involvement in the decision making process.

C.8 Administration

The proposed Refuge may be managed as a stand-alone refuge or as part of a refuge complex. Generally, a stand-alone refuge has a dedicated staff and equipment and is managed locally. As part of a complex, the Hackmatack NWR would likely have less onsite staff and would share staff and equipment with one or more other refuges. Sometimes, a refuge initially is part of a complex, but as it grows in size and complexity, it is then separated to become a “stand-alone” refuge. Under the “complex” scenario, the refuge staff of another refuge would have the responsibility for managing the newly established refuge. The Horicon NWR, based in Mayville, Wisconsin, would be the closest and most likely station to initially manage the new Hackmatack NWR properties.

During the startup period, the Service would seek funding to station staff onsite. Staff likely consisting of a refuge manager, wildlife biologist, and maintenance worker would be phased in at that time. In the long-term, the Service’s Midwest Regional Office would evaluate the need for additional full-time staff based on management needs, project loads, public use activities, etc. and could move forward with providing additional staff when justified. The ability to fill staff positions would depend on availability of funds.

Facilities

Because no actual lands have been acquired as of yet, it is difficult to discuss specifics of facilities and improvements that may be appropriate to effectively manage the Refuge. This document will discuss general approaches adopted by the Service elsewhere when establishing a new refuge. The following are a few likely future facilities and guidelines for management.

No new facilities are proposed for the Refuge at this time. Initially, a Refuge headquarters/visitor contact station may be established through the adaptive reuse of buildings potentially acquired through land acquisition (e.g., a farm house or rural residence). A pole building or barn may be used for equipment storage. In the long-term, the Service would establish permanent facilities in or near the Hackmatack NWR through new construction or reuse of existing structures for use as a Refuge administrative office and maintenance shop.

Small gravel parking areas may be constructed in some areas to provide for adequate and safe parking of vehicles in potential public use areas. The installation and use of lighting will take into account the impact of light pollution.

The proposed Hackmatack NWR has good access via state and local roads. Existing access roads on acquired properties would be evaluated for use depending on access needs, presence of sensitive species and/or habitats, public use, and other potential future needs. Some roads may be retained and improved while others may be abandoned and removed. Legal access to inholdings and homes would be maintained.

Other potential future onsite improvements, including additional trails, improved access roads, observation platforms, photography blinds, etc. may be discussed in a future CCP. The construction of new facilities or conversion of existing structures are contingent upon availability of funds and acquisition of appropriate land.

Where facility construction, operation, or maintenance may conflict with the conservation of federally-listed, endangered, or threatened species, appropriate measures (e.g., buffers, seasonal restrictions, etc.) will be identified and implemented to avoid adverse effects. This will be done in consultation with the Service's Endangered Species Program.

Generally, public use areas would be open from dawn to dusk and wildlife sanctuary areas would be seasonally closed to the public and others (except emergency, police, and fire response). Special Use Permits would be issued to researchers, educational groups, etc. on an as needed basis providing that the activities are compatible with Refuge management goals and contribute to biological survey or baseline data needs.

Funding

Refuge staff would maintain a current inventory of management needs in the Service Maintenance Management System and Refuge Operating Needs System databases and update their costs and priorities annually. Those databases provide a mechanism for each unit of the Refuge System to identify its essential staffing, mission-critical projects, and major needs and form a realistic assessment of the funding needed to meet each station's goals, objectives, and strategies.

Staffing

As mentioned above, the staffing situation on refuges is based on a number of factors including refuge size and complexity, proximity to other refuges, and funding. Based on these and other factors, the proposed Refuge may be managed as a stand-alone refuge or as a unit of a refuge complex. A stand-alone refuge has a dedicated staff and equipment and is managed locally, whereas a unit of a complexed refuge would share staff and equipment with other refuge units. At this time it is difficult to delineate staffing specifics for the proposed Hackmatack NWR because of uncertainties associated with the refuge's size, complexity, resource issues, funding, etc.

In general, the staffing strategy for the proposed Hackmatack NWR would include several new positions to be established. A refuge manager would provide direction and supervision for all activities, and ensure the effective oversight and community outreach for the successful management of acquisitions, easements, and perhaps a cooperative "private lands" program. A wildlife biologist would assist in delivering the full range of wildlife conservation and restoration projects on public land, provide technical assistance, assist in the restoration and management of new acquisitions, and monitor and inventory wildlife and habitat use and condition. A maintenance worker/engineering equipment operator position would assist in meeting the maintenance and heavy equipment work obligations of the Refuge. In the long-term, the Service's Midwest Regional Office would evaluate the need for additional full-time staff based on management needs, project loads, and public use activities.

Partnerships

Public and private partnerships will be essential to the success of the future management of the Refuge. Primary management responsibility of specific Refuge parcels could be conducted through formal cooperative agreements with the State of Illinois and the State of Wisconsin or with county government conservation agencies. The McHenry County Conservation District in particular could be a very active partner in providing land management assistance.

Public use areas of the Refuge would be open to the public year-round from dawn to dusk. The Refuge may restrict access at times because of the incompatibility of a use, concerns about human safety, or illegal activities and law enforcement investigations. Staff would establish formal, cooperative agreements with local law enforcement departments and the county sheriff and state police, to provide protection, enforcement, and appropriate law enforcement response. The Refuge would also establish fire suppression agreements with local volunteer fire departments to coordinate fire suppression activities. The Service's Fire Management Program would also be actively involved in this regard.

The Service recognizes the inability of any one organization to solve the problems of habitat fragmentation and land acquisition. Therefore, the Service would work to combine efforts with those of many partners, such as The Nature Conservancy, Friends of Hackmatack, McHenry County Conservation District, Openlands, the Trust for Public Land, Ducks Unlimited, Illinois Audubon Society, Wisconsin DNR, Illinois DNR, Natural Resource Conservation Service, township governments, as well as numerous other partners yet to be identified. Staff would also look for opportunities to work with farmers and landowners to manage the land in ways that benefit the goals and interests of the Refuge and its neighbors.

Acquisition Management

Protection of lands would be accomplished through acquisition (about 75 percent of the acres) and establishment of conservation easements (about 25 percent of the acres). See Appendix A, Land Protection Plan for details about the boundary for the proposed Hackmatack NWR. Working with others, the Service delineated 12,000 acres of biologically significant land in the proposed Hackmatack NWR.

The Service plans to acquire land in several core units and along corridors that connect conservation lands.

Operations and Planning

Refuges are managed according to an annual work plan (AWP) that summarizes goals and objectives of the upcoming year. Specific actions for on-the-ground work such as operation procedures, wildlife inventories, habitat management, public use, etc. are covered in detail in refuge-specific management plans. An AWP may generally state, for example, that 150 acres of invasive plant species will be controlled on the Refuge, setting a target and goal for invasive species management. The Invasive Species Management Plan would provide more detail, such as various species to be controlled, location of invasive species, control methods, timing of control, monitoring of effectiveness of the application, re-treating areas, monitoring, etc.

Long-term planning, outlined earlier, includes the preparation of a CCP. A CCP describes the desired future conditions of a refuge and provides long-range guidance and management direction to achieve the purposes of the refuge. A CCP is consistent with and helps fulfill the mission of the Refuge System and acts to maintain and, where appropriate, restore the ecological integrity of each refuge and the Refuge System. The National Wildlife Refuge System Improvement Act of 1997 mandates that the Service write CCPs for all refuges and reevaluate them every 15 years or as needed. NEPA mandates that Refuge staff and planners incorporate, as appropriate, either an environmental assessment or an Environmental Impact Statement in the CCP to satisfy NEPA requirements. The planning project provides a unique opportunity for the Service to involve individuals and local communities in the long-term management of the Refuge.

C.9 Conclusion

Should the Refuge proposal go forward, the Service and the Refuge System will work toward the biological, cultural, and public use goals that have been outlined herein. Partnerships with landowners, neighbors, conservation organizations, and local, county, state, and other federal government agencies are a crucial component of a successful Hackmatack NWR.

Appendix D: Species List

Compiled list of Illinois State-listed Endangered and Threatened Plant and Animal Species from the Nippersink Watershed. Sources include McHenry County Conservation District McHenry (MCCD), Illinois Natural Areas Inventory, ENCAP study.

Plants – 29 State-listed plant species (included 1 Federally-listed species)

Scientific Name	Common Name		Status
Aster furcatus	Forked aster		ST
Calopogon tuberosus	Grass pink orchid		SE
Cardamine pratensis palustris	Cuckoo flower		SE
Carex cryptolepis	Small yellow sedge		SE
Carex virdula	Green yellow sedge		ST
Chamaedaphne calyculata	Leatherleaf		ST
Circaea alpina	Small enchanter's nightshade		SE
Cypripedium candidum	White lady's slipper		ST
Cypripedium parviflorum makasin	Small yellow lady's slipper		SE
Drosera rotundifolia	Round-leaved sundew		SE
Epilobium strictum	Downy willow herb		ST
Eriophorum virginicum	Rusty cotton grass		SE
Filipendula rubra	Queen of the prairie		SE
Larix laricina	Tamarack		ST
Lathyrus ochroleucus	Pale vetchling		ST
Lechea intermedia	Savanna pinweed		ST
Menyanthes trifoliate	Buckbean		ST
Pinus banksiana	Jack pine		SE
Pinus resinosa	Red pine		SE
Platanthera leucophaea	Eastern prairie fringed orchid	Fed	SE
Pogonia ophioglossoides	Snake-mouth orchid		SE
Salix serissima	Autumn willow		SE
Sarracenia purpurea	Pitcher plant		SE
Sparganium emersum	Dwarf bur reed		SE
Triglochin maritime	Common bog arrow grass		ST
Utricularia cornuta	Horned bladderwort		SE
Utricularia intermedia	Flat-leaved bladderwort		ST
Vaccinium macrocarpon	Large cranberry		SE
Viola conspersa	Dog violet		ST

Birds – 15 State-listed bird species

Ammodramus henslowii	Henslow's sparrow		ST
Asio flammeus	Short-eared owl		SE
Bartramia longicauda	Upland sandpiper		SE
Botaurus lentiginosus	American bittern		SE
Chlidonias niger	Black tern		SE
Circus cyaneus	Northern harrier		SE
Egretta caerulea	Little blue heron		SE
Gallinula chloropus	Common moorhen		ST

Compiled list of Illinois Endangered and Threatened Species in Nippersink watershed.

Grus canadensis	Sandhill crane	ST
Ixobrychus exilis	Least bittern	ST
Laterallus jamaicensis	Black rail	SE
Nycticorax nycticorax	Black-crowned night-heron	SE
Rallus elegans	King rail	SE
Sterna forsteri	Forster's tern	SE
Xanthocephalus xanthocephalus	Yellow-headed blackbird	SE

Mussels – 5 State-listed mussel species

Alasmidonta viridis	Slippershell mussel	ST
Cyclonaias tuberculata	Purple wartyback	ST
Elliptio dilatata	Spike	ST
Ligumia recta	Black sandshell	ST
Villosa iris	Rainbow	SE

Reptiles and Amphibians – 1 State-listed reptile species

Embydoidea blandingii	Blanding's turtle	ST

Fish – 7 State-listed fish species

Etheostoma exile	Iowa darter	ST
Fundulus diaphanous	Banded killifish	ST
Fundulus dispar	Northern starhead topminnow	ST
Maxostoma carinatum	River redhorse	ST
Notropis anogenus	Pugnose shiner	SE
Notropis heterodon	Blackchin shiner	ST
Notropis heterolepis	Blacknose shiner	ST

State-listed species TOTAL 57

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Common Group Name	Common Name		Species	(See below for Code Legend)
Grebes	**Horned Grebe**	WB	Podiceps auritus	PIFBCP WWAP NAWMP
	Pied-Billed Grebe	WB	Podilymbus podiceps	PIFBCP IWAP NAWMP
Cormorants	**Double-Crested Cormorant**	WB	Phalacrocorax auritus	R3CP PIFBCP NAWMP
Bitterns	**American Bittern**	WB	Botaurus lentiginosus	R3CP PIFBCP IWAP WWAP NAWMP
	Least Bittern	WB	Ixobrychus exilis	R3CP PIFBCP IWAP NAWMP
Herons	**Black-Crowned Night-Heron**	WB	Nycticorax nycticorax	R3CP PIFBCP IWAP NAWMP
	Cattle Egret	WB	Bubulcus ibis	PIFBCP
	Great Blue Heron	WB	Ardea herodias	IWAP NAWMP
	Great Egret	WB	Ardea alba	PIFBCP IWAP WET NAWMP
	Green Heron	WB	Butorides virescens	
	Little Blue Heron	WB	Egretta caerulea	NAWMP
Pelicans	**American White Pelican**	WB	Pelecanus erythrorhynchos	PIFBCP NAWMP
Swans	**Mute Swan**	WB	Cygnus olor	
	Tundra Swan	WB	Cygnus columbianus	NAWCP
Geese	**Canada Goose**	WF	Branta canadensis	
	Snow Goose	WF	Chen caerulescens	
Ducks	**American Black Duck**	WF	Anas rubripes	NAWCP
	American Wigeon	WF	Anas americana	NAWCP
	Blue-Winged Teal	WF	Anas discors	R3CP WWAP NAWCP
	Bufflehead	WF	Bucephala albeola	
	Canvasback	WF	Aythya valisineria	R3CP PIFBCP WWAP NAWCP
	Common Goldeneye	WF	Bucephala clangula	PIFBCP NAWCP
	Common Merganser	WF	Mergus merganser	
	Gadwall	WF	Anas strepera	
	Greater Scaup	WF	Aythya marila	
	Green-Winged Teal	WF	Anas crecca	
	Hooded Merganser	WF	Lophodytes cucullatus	
	Lesser Scaup	WF	Aythya affinis	R3CP PIFBCP WWAP NAWCP
	Mallard	WF	Anas platyrhynchos	R3CP NAWCP
	Northern Pintail	WF	Anas acuta	R3CP NAWCP
	Northern Shoveler	WF	Anas clypeata	
	Redhead	WF	Aythya americana	PIFBCP WWAP NAWCP
	Ring-Necked Duck	WF	Aythya collaris	
	Ruddy Duck	WF	Oxyura jamaicensis	
	Wood Duck	WF	Aix sponsa	R3CP NAWCP
Vultures	**Turkey Vulture**		Cathartes aura	
Hawks and Eagles	**American Kestrel**		Falco sparverius	
	Bald Eagle		Haliaeetus leucocephalus	
	Broad-Winged Hawk		Buteo platypterus	PIFBCP
	Cooper's Hawk	SW	Accipiter cooperii	PIFBCP IWAP
	Northern Harrier	GB	Circus cyaneus	R3CP IWAP WWAP
	Osprey		Pandion haliaetus	
	Red-Shouldered Hawk		Buteo lineatus	
	Red-Tailed Hawk		Buteo jamaicensis	
	Rough-Legged Hawk		Buteo lagopus	
	Sharp-Shinned Hawk	SW	Accipiter striatus	PIFBCP
Quails, Turkeys, and Fowl	**Northern Bobwhite**		Colinus virginianus	
	Ring-Necked Pheasant		Phasianus colchicus	
	Wild Turkey		Meleagris gallopavo	
Rails, Gallinules, and Coots	**Black Rail**	WB	Laterallus jamaicensis	NAWMP
	King Rail	WB	Rallus elegans	R3CP PIFBCP IWAP WWAP NAWMP

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Common Group Name	Common Name		Species	(See below for Code Legend)
Rails, Gallinules, and Coots	**Sora**	WB	Porzana carolina	PIFBCP NAWMP
	Virginia Rail	WB	Rallus limicola	PIFBCP IWAP NAWMP
Rails, Gallinules, and Coots	**Common Moorhen**	WB	Gallinula chloropus	NAWMP PIFBCP IWAP
Rails, Gallinules, and Coots	**American Coot**	WB	Fulica americana	NAWMP
Cranes	**Sandhill Crane**	WB	Grus canadensis	PIFBCP IWAP NAWMP
	Whooping Crane	WB	Grus americana	R3CP WWAP NAWMP
Plovers	**Black-Bellied Plover**	SB	Pluvialis squatarola	USSCP
	Killdeer	SB	Charadrius vociferus	USSCP
	Semipalmated Plover	SB	Charadrius semipalmatus	USSCP
Sandpipers	**Least Sandpiper**	SB	Calidris minutilla	USSCP
	Pectoral Sandpiper	SB	Calidris melanotos	USSCP
	Semipalmated Sandpiper	SB	Calidris pusilla	USSCP
	Solitary Sandpiper	SB	Tringa solitaria	USSCP WWAP
	Spotted Sandpiper	SB	Actitis macularia	USSCP
	Stilt Sandpiper	SB	Calidris himantopus	USSCP
	Upland Sandpiper	SB	Bartramia longicauda	USSCP R3CP PIFBCP IWAP WWAP
	Western Sandpiper	SB	Calidris mauri	USSCP
Shorebirds	**American Woodcock**	SB	Scolopax minor	USSCP R3CP WWAP
	Common Snipe	SB	Gallinago gallinago	USSCP PIFBCP
	Dunlin	SB	Calidris alpina	USSCP WWAP
	Greater Yellowlegs	SB	Tringa melanoleuca	USSCP R3CP IWAP
	Lesser Yellowlegs	SB	Tringa flavipes	USSCP
	Short-Billed Dowitcher	SB	Limnodromus griseus	USSCP
Gulls and Terns	**Black Tern**	WB	Chlidonias niger	R3CP PIFBCP IWAP WWAP
	Forster's Tern	WB	Sterna forsteri	R3CP PIFBCP IWAP WWAP WET
	Herring Gull	WB	Larus argentatus	
	Ring-Billed Gull	WB	Larus delawarensis	
Pigeons and Doves	**Mourning Dove**		Zenaida macroura	
	Rock Dove		Columba livia	
Cuckoos	**Black-Billed Cuckoo**	SW	Coccyzus erythropthalmus	R3CP IWAP WWAP
	Yellow-Billed Cuckoo		Coccyzus americanus	WWAP
True Owls	**Barred Owl**		Strix varia	
	Eastern Screech-Owl		Otus asio	
	Great Horned Owl		Bubo virginianus	
	Northern Saw-Whet Owl		Aegolius acadicus	
	Short-Eared Owl	GB	Asio flammeus	R3CP PIFBCP WWAP
Nightjars	**Common Nighthawk**		Chordeiles minor	
Swifts	**Chimney Swift**		Chaetura pelagica	
Hummingbirds	**Ruby-Throated Hummingbird**		Archilochus colubris	
Kingfishers	**Belted Kingfisher**		Megaceryle alcyon	
Woodpeckers	**Downy Woodpecker**	SW	Picoides pubescens	
	Hairy Woodpecker	SW	Picoides villosus	IWAP
	Northern Flicker	SW	Colaptes auratus	R3CP IWAP
	Red-Bellied Woodpecker	SW	Melanerpes carolinus	
	Red-Headed Woodpecker	SW	Melanerpes erythrocephalus	R3CP PIFBCP IWAP WWAP
	Yellow-Bellied Sapsucker	SW	Sphyrapicus varius	PIFBCP
Tyrant Flycatchers	**Acadian Flycatcher**	SW	Empidonax virescens	R3CP PIFBCP WWAP WET
	Eastern Kingbird		Tyrannus tyrannus	IWAP
	Eastern Phoebe		Sayornis phoebe	

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Tyrant Flycatchers	**Eastern Wood Pewee**		Contopus virens	
	Great Crested Flycatcher	SW	Myiarchus crinitus	
	Least Flycatcher		Empidonax minimus	WWAP
	Willow Flycatcher		Empidonax traillii	WWAP
	Yellow-Bellied Flycatcher	SW	Empidonax flaviventris	PIFBCP
Larks	**Horned Lark**		Eremophila alpestris	
Swallows and Martins	**Bank Swallow**		Riparia riparia	
	Barn Swallow		Hirundo rustica	
	Cliff Swallow		Petrochelidon pyrrhonota	
	Northern Rough-Winged Swallow		Stelgidopteryx serripennis	
	Purple Martin	GB	Progne subis	PIFBCP
	Tree Swallow		Tachycineta bicolor	
Shrikes	**Northern Shrike**		Lanius excubitor	
Jays, Magpies, and Crows	**American Crow**		Corvus brachyrhynchos	
	Blue Jay		Cyanocitta cristata	
Titmice	**Black-Capped Chickadee**		Poecile atricapillus	
	Tufted Titmouse		Baeolophus bicolor	
Nuthatches	**Red-Breasted Nuthatch**		Sitta canadensis	
	White-Breasted Nuthatch	SW	Sitta carolinensis	
Creepers	**Brown Creeper**	SW	Certhia americana	PIFBCP
Wrens	**Carolina Wren**		Thryothorus ludovicianus	
	House Wren		Troglodytes aedon	
	Marsh Wren	WB	Cistothorus palustris	PIFBCP IWAP
	Sedge Wren	GB	Cistothorus platensis	R3CP PIFBCP
Gnatcatchers	**Blue-Gray Gnatcatcher**		Polioptila caerulea	
	Ruby-Crowned Kinglet		Regulus calendula	
Thrushes	**American Robin**		Turdus migratorius	
	Eastern Bluebird	SW	Sialia sialis	IWAP
	Swainson's Thrush	SW	Catharus ustulatus	PIFBCP
	Veery		Catharus fuscescens	WWAP
	Wood Thrush	SW	Hylocichla mustelina	R3CP IWAP WWAP
	Yellow-Breasted Chat	SW	Icteria virens	PIFBCP
Mockingbirds and Thrashers	**Brown Thrasher**	SW	Toxostoma rufum	WWAP
	Gray Catbird	SW	Dumetella carolinensis	
	Northern Mockingbird		Mimus polyglottos	
Waxwings	**Cedar Waxwing**		Bombycilla cedrorum	
Starlings	**European Starling**		Sturnus vulgaris	
Vireos	**Bell's Vireo**		Vireo bellii	
	Blue-Headed Vireo		Vireo solitarius	
	Red-Eyed Vireo		Vireo olivaceus	
	Warbling Vireo		Vireo gilvus	
	White-Eyed Vireo		Vireo griseus	
	Yellow-Throated Vireo		Vireo flavifrons	
Wood Warblers	**American Redstart**		Setophaga ruticilla	
	Black-And-White Warbler		Mniotilta varia	PIFBCP
	Black-Throated Blue Warbler		Dendroica caerulescens	R3CP
	Black-Throated Green Warbler		Dendroica virens	WWAP
	Blue-Winged Warbler		Vermivora pinus	R3CP PIFBCP WWAP
	Canada Warbler		Wilsonia canadensis	R3CP PIFBCP WWAP
	Chestnut-Sided Warbler		Dendroica pensylvanica	

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Wood Warblers	**Common Yellowthroat**		Geothlypis trichas					
	Hooded Warbler		Wilsonia citrina					
	Magnolia Warbler		Dendroica magnolia	PIFBCP				
	Nashville Warbler		Vermivora ruficapilla					
	Northern Waterthrush		Seiurus noveboracensis	PIFBCP				
	Nothern Parula		Parula americana					
	Ovenbird		Seiurus aurocapillus					
	Palm Warbler		Dendroica palmarum					
	Tennessee Warbler		Vermivora peregrina	PIFBCP				
	Wilson's Warbler		Wilsonia pusilla					
	Worm-Eating Warbler		Helmitheros vermivorus	R3CP	PIFBCP	WET		
	Yellow Warbler		Dendroica petechia					
	Yellow-Rumped Warbler		Dendroica coronata					
Tanagers	**Scarlet Tanager**	SW	Piranga olivacea					
	Summer Tanager		Piranga rubra					
Cardinals, Grosbeaks, and Allies	**Dickcissel**	GB	Spiza americana	R3CP	PIFBCP	WWAP		
	Indigo Bunting		Passerina cyanea					
	Northern Cardinal		Cardinalis cardinalis					
	Rose-Breasted Grosbeak		Pheucticus ludovicianus					
New World Sparrows and Allies	**American Tree Sparrow**		Spizella arborea					
	Chipping Sparrow		Spizella passerina					
	Clay-Colored Sparrow		Spizella pallida					
	Dark-Eyed Junco		Junco hyemalis	PIFBCP				
	Eastern Towhee	SW	Pipilo erythrophthalmus					
	Field Sparrow	GB	Spizella pusilla	R3CP	PIFBCP	WWAP		
	Fox Sparrow		Passerella iliaca					
	Grasshopper Sparrow	GB	Ammodramus savannarum	R3CP	WWAP			
	Henslow's Sparrow	GB	Ammodramus henslowii	R3CP	PIFBCP	IWAP	WWAP	WET
	Lark Sparrow	GB	Chondestes grammacus	PIFBCP	WWAP			
	Lincoln's Sparrow		Melospiza lincolnii					
	Savannah Sparrow	GB	Passerculus sandwichensis					
	Song Sparrow	GB	Melospiza melodia					
	Swamp Sparrow		Melospiza georgiana					
	Vesper Sparrow		Pooecetes gramineus	WWAP				
	White-Crowned Sparrow		Zonotrichia leucophrys					
	White-Throated Sparrow		Zonotrichia albicollis					
New World Blackbirds and Allies	**Bobolink**	GB	Dolichonyx oryzivorus	R3CP	PIFBCP	IWAP	WWAP	
	Brown-Headed Cowbird		Molothrus ater					
	Common Grackle		Quiscalus quiscula					
	Eastern Meadowlark	GB	Sturnella magna	R3CP	IWAP	WWAP		
	Red-Winged Blackbird		Agelaius phoeniceus					
	Rusty Blackbird		Euphagus carolinus					
	Western Meadowlark	GB	Sturnella neglecta	R3CP	PIFBCP	WWAP		
	Yellow-Headed Blackbird	WB	Xanthocephalus xanthocephalus	PIFBCP	IWAP			
New World Blackbirds and Allies	**Baltimore (Northern) Oriole**	SW	Icterus galbula	R3CP	IWAP			
	Orchard Oriole	SW	Icterus spurius					
Finches	**American Goldfinch**		Carduelis tristis					
	Common Redpoll		Carduelis flammea					
	House Finch		Carpodacus mexicanus					
	White-Winged Crossbill		Loxia leucoptera					
Old World Sparrows	**House Sparrow**		Passer domesticus					

MCCD - NRM

BIRDS Species

McHenry County Conservation District

12/14/2009

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Common Group Name	Common Name	Species	(See below for Code Legend)

LEGENDS:

GB	Grassland Bird	USSC	United States Shorebird Conservation Plan
SB	Shorebird	NAW	North American Waterbird Conservation Plan
SW	Savanna/Woodland Bird	NAW	North American Waterfowl Management Plan
WB	Waterbird	PIFBC	Partners in Flight - Bird Conservation Plan
WF	Waterfowl	R3CP	Region 3 Conservation Priority Species
		IWAP	Illinois Wildlife Action Plan
		WWA	Wisconsin Wildlife Action Plan
		FET	Federal Endangered or Threatened Species
		IET	Illinois Endangered or Threatened Species
		WET	Wisconsin Endangered or Threatened Species

MCCD - NRM

STREAM - Fish List
McHenry County Conservation District

12/14/2009

Stream: ***Nippersink Watershed*** **Basin** *Fox*

Family	Common Name	Species	(See Code Legend at end of report)
Percidae	**Banded Darter**	Etheostoma zonale	
Cyprinodontidae	**Banded Killifish**	Fundulus diaphanus	IET
Cyprinidae	**Bigmouth Shiner**	Notropis dorsalis	
Ictaluridae	**Black Bullhead**	Ictalurus melas	
Centrarchidae	**Black Crappie**	Pomoxis nigromaculatus	
Cyprinidae	**Blackchin Shiner**	Notropis heterodon	IET
Cyprinidae	**Blacknose Dace**	Rhinichthys atratulus	
Cyprinidae	**Blacknose Shiner**	Notropis heterolepis	IET
Percidae	**Blackside Darter**	Percina maculata	
Cyprinodontidae	**Blackstripe Topminnow**	Fundulus notatus	
Centrarchidae	**Bluegill**	Lepomis macrochirus	
Cyprinidae	**Bluntnose Minnow**	Pimephales notatus	
Amiidae	**Bowfin**	Amia calva	
Atherinidae	**Brook Silverside**	Labidesthes sicculus	
Gasterosteidae	**Brook Stickleback**	Culaea inconstans	
Ictaluridae	**Brown Bullhead**	Ictalurus nebulosus	
Cyprinidae	**Bullhead Minnow**	Pimephales vigilax	
Umbridae	**Central Mudminnow**	Umbra limi	
Cyprinidae	**Central Stoneroller**	Campostoma anomalum	
Ictaluridae	**Channel Catfish**	Ictalurus punctatus	
Cyprinidae	**Common Carp**	Cyprinus carpio	
Cyprinidae	**Common Shiner**	Notropis cornutus	
Cyprinidae	**Creek Chub**	Semotilus atromaculatus	
Catostomidae	**Creek Chubsucker**	Erimyzon oblongus	
Cyprinidae	**Emerald Shiner**	Notropis atherinoides	
Percidae	**Fantail Darter**	Etheostoma flabellare	
Cyprinidae	**Fathead Minnow**	Pimephales promelas	
Sciaenidae	**Freshwater Drum**	Aplodinotus grunniens	
Catostomidae	**Golden Redhorse**	Moxostoma erythrurum	
Cyprinidae	**Golden Shiner**	Notemigonus crysoleucas	
Esocidae	**Grass Pickerel**	Esox americanus vermiculatus	
Centrarchidae	**Green Sunfish**	Lepomis cyanellus	
Cyprinidae	**Hornyhead Chub**	Nocomis biguttatus	
Percidae	**Iowa Darter**	Etheostoma exile	IET
Percidae	**Johnny Darter**	Etheostoma nigrum	
Catostomidae	**Lake Chubsucker**	Erimyzon sucetta	
Centrarchidae	**Largemouth Bass**	Micropterus salmoides	
Cyprinidae	**Largescale Stoneroller**	Campostoma oligolepis	IWAP
Percidae	**Least Darter**	Etheostoma microperca	
Percidae	**Logperch**	Percina caprodes	
Lepisosteidae	**Longnose Gar**	Lepisosteus osseus	
Cottidae	**Mottled Sculpin**	Cottus bairdi	
Catostomidae	**Northern Hog Sucker**	Hypentelium nigricans	
Esocidae	**Northern Pike**	Esox lucius	
Cyprinodontidae	**Northern Starhead Topminnow**	Fundulus dispar	IET
Centrarchidae	**Orange-Spotted Sunfish**	Lepomis humilis	

MCCD - NRM

STREAM - Fish List
McHenry County Conservation District

12/14/2009

Stream: ***Nippersink Watershed*** **Basin** *Fox*

Family	Common Name	Species	(See Code Legend at end of report)
Cyprinidae	**Pugnose Minnow**	Opsopoeodus emiliae	
Cyprinidae	**Pugnose Shiner**	Notropis anogenus	WET IET
Centrarchidae	**Pumpkinseed**	Lepomis gibbosus	
Catostomidae	**Quillback**	Carpiodes cyprinus	
Cyprinidae	**Red Shiner**	Cyprinella lutrensis	
Centrarchidae	**Redear Sunfish**	Lepomis microlophus	
Cyprinidae	**Redfin Shiner**	Notropis umbratilis	WET
Catostomidae	**River Redhorse**	Moxostoma carinatum	WET IET
Centrarchidae	**Rock Bass**	Ambloplites rupestris	
Cyprinidae	**Sand Shiner**	Notropis stramineus	
Catostomidae	**Shorthead Redhorse**	Moxostoma macrolepidotum	
Centrarchidae	**Smallmouth Bass**	Micropterus dolomieui	
Cyprinidae	**Southern Redbelly Dace**	Phoxinus erythrogaster	IWAP
Cyprinidae	**Spotfin Shiner**	Notropis spilopterus	
Cyprinidae	**Spottail Shiner**	Notropis hudsonius	
Ictaluridae	**Stonecat**	Noturus flavus	
Cyprinidae	**Striped Shiner**	Notropis chrysocephalus	
Cyprinidae	**Suckermouth Minnow**	Phenacobius mirabilis	
Ictaluridae	**Tadpole Madtom**	Noturus gyrinus	
Percidae	**Walleye**	Stizostedion vitreum	
Centrarchidae	**Warmouth**	Lepomis gulosus	
Moronidae	**White Bass**	Morone chrysops	
Centrarchidae	**White Crappie**	Pomoxis annularis	
Catostomidae	**White Sucker**	Catostomus commersoni	
Moronidae	**Yellow Bass**	Morone mississippiensis	
Ictaluridae	**Yellow Bullhead**	Ictalurus natalis	
Percidae	**Yellow Perch**	Perca flavescens	

73 FISH Species

LEGEND:

R3CP	**Region 3 Conservation Priority Species**
IWAP	**Illinois Wildlife Action Plan**
WWA	**Wisconsin Wildlife Action Plan**
FET	**Federal Endangered or Threatened Species**
IET	**Illinois Endangered or Threatened Species**
WET	**Wisconsin Endangered or Threatened Species**

MCCD - NRM

HERPETOLOGICAL Species
McHenry County Conservation District

12/14/2009
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Group Name / Family	Common Name	Most Recent Siting Year	Species	Primary Habitat (See Code Legend at end of report)				
FROGS								
Bufonidae	**American Toad**	2009	Bufo Americanus	Mesic Prairie				
Ranidae	**Bullfrog**	2009	Rana catesbeiana	Marsh				
Hylidae	**Cricket Frog**	2008	Acris crepitans	Wet Prairie				
Ranidae	**Green Frog**	2009	Rana clamitans	Rivers & Streams				
Hylidae	**Grey Treefrog Complex**	2009	Hyla versicolor-chrysoscelis	Savanna				
Ranidae	**Northern Leopard Frog**	2009	Rana pipiens	Marsh	IWAP			
Ranidae	**Pickerel Frog**	1930	Rana palustris	Marsh				
Hylidae	**Spring Peeper**	2006	Pseudacris crucifer	Wooded Ponds				
Hylidae	**Western Chorus Frog**	2009	Pseudacris triseriata	Marsh				
SALAMANDERS								
Ambystomatidae	**Blue-Spotted Salamander**	1995	Ambystoma laterale	Woodlands				
Proteidae	**Mudpuppy**	1931	Necturus maculosus	Rivers & Streams				
Ambystomatidae	**Tiger Salamander**	2008	Ambystoma tigrinum	Savanna	IWAP			
SNAKES								
Colubridae	**Brown Snake**	2009	Storeria dekayi	Savanna				
Colubridae	**Chicago Garter Snake**	2009	Thamnophis semifasciata	Mesic Prairie				
Colubridae	**Eastern Garter Snake**	2006	Thamnophis sirtalis sirtalis	Mesic Prairie				
Colubridae	**Fox Snake**	2009	Elaphe vulpina	Mesic Prairie				
Colubridae	**Milk Snake**	1991	Lampropeltis triangulum	Mesic Prairie				
Colubridae	**Northern Water Snake**	2007	Nerodia sipedon	Rivers & Streams				
Colubridae	**Plains Garter Snake**	2006	Thamnophis radix	Mesic Prairie	IWAP			
Colubridae	**Queen Snake**	1942	Regina septemvittata	Rivers & Streams				
Colubridae	**Redbelly Snake**	2008	Storeria occipitomaculata	Mesic Prairie				
Colubridae	**Smooth Green Snake**	2009	Opheodrys vernalis	Mesic Prairie	IWAP			
TURTLES								
Emydidae	**Blanding's Turtle**	2009	Emydoidea blandingii	Marsh	IWAP	IET	WWAP	WET
Kinosternidae	**Common Musk Turtle/Mud**	1942	Sternotherus odoratus	Rivers & Streams				
Emydidae	**False Map Turtle**	1908	Graptemys pseudogeographi	Rivers & Streams				
Emydidae	**Map Turtle**	2005	Graptemys geographica	Rivers & Streams				
Emydidae	**Painted Turtle**	2009	Chrysemys picta	Marsh				
Chelydridae	**Snapping Turtle**	2009	Chelydra serpentina	Rivers & Streams	IWAP			
Trionychidae	**Spiny Softshell Turtle**	2009	Apalone spinifera	Rivers & Streams				

LEGEND:

R3CP	Region 3 Conservation Priority Species
IWAP	Illinois Wildlife Action Plan
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MCCD - NRM

STREAM - Mussel List
McHenry County Conservation District

12/14/2009

Stream: ***Nippersink Watershed*** **Basin** *Fox*

Species	Common Name	Most Recent Siting Date	(See Code Legend at end of report)			
Actinonaias ligamentina	**Mucket**	8/5/2005				
Alasmidonta marginata	**Elktoe**	8/5/2005	R3CP			
Alasmidonta viridis	**Slippershell mussel**	10/20/2009	R3CP	IWAP	IET	WET
Amblema plicata	**Threeridge**	8/5/2005	R3CP			
Anodontoides ferussacianus	**Cylindrical papershell**	10/20/2009				
Cyclonaias tuberculata	**Purple wartyback**	8/5/2005	IWAP	IET	WET	
Elliptio dilatata	**Spike**	8/26/2005	IET			
Fusconaia flava	**Wabash pigtoe**	10/20/2009				
Lampsilis cardium	**Plain pocketbook**	10/20/2009				
Lampsilis siliquoidea	**Fatmucket**	9/12/1995				
Lasmigona complanata	**White heelsplitter**	10/20/2009				
Lasmigona compressa	**Creek heelsplitter**	10/20/2009	IWAP			
Lasmigona costata	**Fluted-shell**	10/20/2009				
Leptodea fragilis	**Fragile papershell**	8/15/1995				
Ligumia recta	**Black sandshell**	10/20/2009	R3CP	IWAP	IET	
Pleurobema sintoxia	**Round pigtoe**	10/20/2009	R3CP			
Pyganodon(=Anodonta)grandis	**Giant floater**	10/20/2009				
Quadrula pustulosa	**Pimpleback**	8/5/2005	R3CP			
Strophitus undulatus	**Squawfoot**	8/26/2005				
Toxolasma parvus	**Lilliput**	7/13/2002				
Venustaconcha ellipsiformis	**Ellipse**	7/7/2005	WET			
Villosa iris	**Rainbow**	8/15/2002	IET	WET		

22 Mussel Species

LEGEND:

R3CP	**Region 3 Conservation Priority Species**
IWAP	**Illinois Wildlife Action Plan**
WWA	**Wisconsin Wildlife Action Plan**
FET	**Federal Endangered or Threatened Species**
IET	**Illinois Endangered or Threatened Species**
WET	**Wisconsin Endangered or Threatened Species**

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Appendix F: Planning and New or Expanded National Wildlife Refuge – FAQs

U.S. Fish & Wildlife Service

National Wildlife Refuge System

Planning a New or Expanded National Wildlife Refuge

Frequently Asked Questions

Where does funding for land acquisition for wildlife refuges come from?

Typically, money to acquire land for national wildlife refuges comes from the Land and Water Conservation Fund and/or the Migratory Bird Conservation Fund, both of which were established through federal law. The Land and Water Conservation Fund derives its money primarily from the sale of products on federal land, such as offshore oil and gas leases. Funds for the Migratory Bird Conservation Fund are derived from the sale of federal duck stamps.

If I own land in one of the focus areas, would I ever be forced to sell?

No. Focus areas are not refuge boundaries. They are planning units. All habitat restoration and preservation by the Service would be on a voluntary basis (willing buyer/willing seller only) and only lands in which the Service acquires a realty interest would become part of the Refuge. Actual Refuge boundaries would ultimately conform to specific land tracts as they are purchased from willing sellers within the focus areas. Lands identified in the focus areas are in private and public ownership. It is not the intent of the Service to acquire lands already in public ownership. Only the presence of willing sellers and only after detailed planning would lands be acquired for the Refuge.

Fish and Wildlife staff at Tamarac Wetland Management District staff near Detroit Lakes, Minnesota, works with a private landowner on a restoration project. Photo credit: FWS

If I own land in or around an area that the Service says has high natural resource values, will my property ever be condemned?

No. While the Service has this authority, it doesn't use it except to clear title or preserve critically imperiled endangered species (both of these scenarios are rare). The latter is not the case in with this project. Service policy is to acquire land only from willing sellers. Landowners retain all of the rights, privileges, and responsibilities of private land ownership. The presence of Refuge lands does not afford the Service any authority to impose restrictions on any private lands. Service control of access, land use practices, water management practices, hunting, fishing, and general use is limited only to those lands in which the Service purchases an appropriate realty interest.

Will my rights as a property owner be infringed as a result of refuge designation?

No. If lands are developed into a national wildlife refuge, the Service will have no more authority over private land within or adjacent to the boundaries of the refuge than any other landowner. Landowners retain all the rights, privileges, and responsibilities of private land ownership, including the right of access, control of trespass, right to sell, and payment of taxes.

U.S. Fish and Wildlife Service

If I sell my land to the Service, are there any relocation benefits?

Yes. 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 expenses incurred in selling real property to the government.

Are their ways the Service can acquire an interest in land without buying it outright?

Yes. One way is by purchasing an easement from the landowner. A conservation easement involves the acquisition of certain rights that can help achieve fish and wildlife habitat objectives (for instance, encouraging certain practices such as delaying haying fields until ground nesting birds have left the nest). Easements become part of the title to the property and are usually permanent. If a landowner sells the property, the easement continues as part of the title.

Lease agreements are another tool. Leases are short-term agreements for full or specified use of the land in return for an annual rental payment that generally includes occupancy rights. For example, the Service could lease 40 acres of grassland habitat to provide safe nesting for ground nesting birds. Under this scenario, the landowner would agree not 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, with 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 will continue to be met.

How will the creation of a wildlife refuge affect the area's tax base?

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 the following formulas which provides the largest return to the counties: (1) $.75 per acre; (2) 25 percent of the net receipts collected from refuge lands in the county; or (3) three-quarters of 1 percent of the appraised value. Using this method, lands are reappraised every five years to reflect current market values.

It must be noted that revenue sharing payments are only made when lands are purchased in fee title. Less-than-fee purchases (such as conservation easements) remain in private ownership and thus are subject to taxation.

Environmental education at Minnesota Valley NWR in Bloomington, Minn. Photo credit: FWS

U.S. Fish and Wildlife Service

Golden-winged Warbler. Photo credit: FWS

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 distributes taxes to distribute refuge revenue sharing payments in the same proportion as it would for tax monies received.

In developing the Refuge, will drainage be changed in a way that could adversely affect my property?

No. Detailed hydrologic planning will be undertaken for all water-related activities on Service lands to ensure that Service activities do not alter drainage in any way that would cause flooding or drainage problems to private lands. 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 the Service has acquired an appropriate realty interest from a willing seller (e.g., fee title ownership, flowage easement, cooperative agreement). The Service would comply with all Federal and state regulations regarding development, some of which are specifically intended to ensure that the actions of one landowner do not adversely affect another. If Service activities inadvertently created a water-related problem for any private landowner (flooding, soil saturation or deleterious increase in water table height, etc.), the problem would be corrected at the Service's expense.

Through the Service's Partner's for Wildlife program, the Service has restored over 10,000 wetlands in the Midwest Region, which includes Wisconsin and Illinois, without consequence. The expertise gained through this experience and by coordinating with partners like the North American Waterfowl Management Plan, the States Departments of Natural Resources, the Natural Resource Conservation Service, The Nature Conservancy, and others, will help us achieve the wetland goals of this Refuge and not adversely effect others.

If the Service acquires land in an active drainage district with an easement for maintenance of drainage, does that district retain the right of access for maintenance of drainage ditches, tile and outlets?

Yes. Like any landowner, the Service is subject to any outstanding rights (easements) on any of the land it acquires.

What is the Service's policy regarding crop damage resulting from increases in the wildlife population? Does the Service intend to make wildlife food plots part of its management plan?

The Service policy is to use tools such as hunting, lure crops, and habitat manipulation to assure that wildlife, particularly local Canada Geese, do not cause depredation problems on neighboring farmland. While the development of wildlife food plots is not a primary objective of this Refuge, it does remain an option, depending on the site, type of wildlife, and type of food plot. Service policy is to use the most natural means available to meet wildlife objectives. If a localized depredation problem were to arise, the Service, working in concert with the USDA Animal Damage Control Division, would be available to assist in developing a damage abatement program specific to the problem.

Some people contend that the Service is destroying farmland when land is taken out of agricultural production and restored as wetlands, grasslands or other habitat; how do you respond?

Restoring wetlands, grasslands, and other natural habitats protects our nation's long-term ability to produce food and fiber crops. Soil will rebuild itself when indigenous vegetative cover is restored. On the other hand, development can degrade soil and extensive commercial or dense residential development makes it very unlikely that the land will ever be restored to agricultural purposes in the future. If the nation's lawmakers someday decide these areas are needed for agricultural production, it will be there.

U.S. Fish and Wildlife Service

Is a federal national wildlife refuge automatically closed to hunting, fishing and other recreational issues?

No. The alternatives considered in refuge planning are mandated by Congress (Public Law 105-57, Oct. 9, 1997) to allow compatible wildlife-dependent recreational public uses such as hunting, fishing, wildlife observation and photography, environmental education and interpretation. Goals and objectives are identified for the refuge (with public input), and the specific public uses are determined based on their consistency with the objectives established for the refuge. A refuge that serves as production areas for a federally endangered species is likely to offer less access for people during periods when the endangered species is present than at other times of the year. In the Midwest Region, most national wildlife refuges offer public recreational opportunities. A few are closed, including small islands or caves where endangered species or colonial nesting birds are present.

Why is the federal government involved in planning wildlife refuges? Why shouldn't states manage their own refuges?

The purpose of creating new refuges and expanding existing refuges is to preserve wildlife, plants and their habitat for the benefit of present and future generations of Americans. Wildlife and habitat simply do not conform to state boundaries, and neither does citizen investment in the nation's natural resources. For example, preserving migratory waterfowl habitat requires a comprehensive approach because flight patterns for particular species can extend across the entire length of the country. Conservation practices in one state would be jeopardized or even nullified by lesser efforts in another state along the flight pattern. Citizenship, too, extends beyond state lines, and we all have an investment in preserving this country's unique or endangered species and habitats regardless of where we live. While state departments of natural resources are responsible for managing the bulk of wildlife and habitat issues, federal involvement in refuge planning reflects this broader public interest.

Some people say the federal government does not have authority to acquire land. Is this true?

No. The United States Constitution provides the following: "All legislative powers herein granted shall be vested in a Congress of the United States..." (Article 1, Section 1, Clause 1); and that, Congress shall have power, "to make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this Constitution in the Government of the United States, or any Department or Officer thereof." (Article 1, Section 8, Clause 18). One of the first related laws passed by Congress was in 1820 and is cited in the U.S. Code of Federal Regulation (41 USC 14). It states: "No land shall be purchased on account of the United States except under a law authorizing such purchase."

Section 304 of the Emergency Wetlands Resources Act of 1986 (Public Law 99-645) specifically states "The Secretary is authorized to purchase wetlands or interests in wetlands, which are not acquired under the authority of the Migratory Bird Conservation Act of 1929."

The Service is mandated by the U.S. Congress to conserve, protect and restore migratory birds, threatened and endangered species and interjurisdictional fish. These are collectively referred to as Federal Trust Resources. A system of national wildlife refuges, beginning in 1903, exists today because of this national public interest.

Mother and son birding at Big Muddy NWR in Missouri. Photo credit: FWS

Appendix G: List of Preparers

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Appendix H: Glossary of Terms and Abbreviations Used

Alternatives: Different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the National Wildlife Refuge System (NWRS, Refuge System) mission, and resolving issues. A reasonable way to fix an identified problem or satisfy a stated need [40 CFR 1500.2 (cf. "management alternative")].

Anadromous fish: Fish species that ascend rivers from the sea for breeding, such as Chinook salmon.

Biological Integrity: Biotic composition, structure and functioning at genetic, organism and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms and communities.

Candidate species/Candidate for listing: Species for which there is sufficient information on file about their biological vulnerability and threats to propose listing them as threatened or endangered.

Compatible Use: A wildlife-dependent recreational use, or any other proposed or existing use on a refuge that will not materially interfere with or detract from the purposes of the refuge or the Refuge System mission.

Compatibility Determination: A document that assesses whether or not a use is compatible with the National Wildlife Refuge (NWR, refuge) purpose.

Comprehensive Conservation Plan (CCP): A document that describes the desired future conditions of a refuge or planning unit and provides long-range guidance and management direction to achieve the purposes of the refuge; helps fulfill the mission of the Refuge System; maintains and, where appropriate, restores the ecological integrity of each refuge and the Refuge System; helps achieve the goals of the National Wilderness Preservation System; and meets other mandates.

Conceptual Management Plan (CMP): An overview of how the land will be managed until a Comprehensive Conservation Plan (CCP) for the refuge is completed. It does not provide extensive detail related to management or show exactly where public use facilities would be located.

Conservation: Managing natural resources to prevent loss or waste. Management actions may include preservation, restoration, and enhancement.

Conservation easement: A non-possessory interest in real property owned by another, imposing limitations or affirmative obligations with the purpose of returning or protecting the property's conservation values.

Cooperative agreement: A legal instrument reflecting a relationship between the Federal Government and a recipient when the principle purpose is to fund a project to support or stimulate activities that are not for the direct benefit or use of the Federal Government but instead for a public purpose that the government participates substantially in.

Corridor: Areas in a landscape that contain and connect natural areas, open spaces and scenic or other resources. They often lie along streams, rivers, or other natural features.

Cultural resources: The collective evidence of the past activities and accomplishments of people such as the remains of sites, structures, or objects used by people in the past; typically greater than 50 years old.

Endangered species: A plant or animal species listed under the Endangered Species Act of 1973 that is in danger of extinction throughout all or a significant portion of its range.

Enhance: Increasing the level or values provided by the action.

Environmental Assessment (EA): A systematic analysis to determine if proposed federal actions would result in a "significant effect on the quality of the human environment" thereby requiring either the preparation of an Environmental Impact Statement (EIS) or a determination of a Finding of No Significant Impact (FONSI).

Environmental education: Curriculum-based education aimed at producing a citizenry that is knowledgeable about the environment and its associated problems, aware of how to help solve those problems, and motivated to work toward solving them.

Federal land: Public land owned by the Federal Government, including national forests, national parks, and national wildlife refuges.

Finding of No Significant Impact (FONSI): Supported by an environmental assessment, a document that briefly presents why a federal action will have no significant effect on the human environment, and for which an Environmental Impact Statement, therefore, will not be prepared [40 CFR 1508.13].

Full acquisition: The acquisition of most or all of the rights to a tract of land; a total transfer of property rights with the formal conveyance of a title. While a full acquisition involves most rights to a property, certain rights may be reserved or not purchased, including water rights, mineral rights, or use reservation (e.g., the ability to continue using the land for a specified time period, such as the remainder of the owner's life).

Groundwater: Water located beneath the ground surface in soil pore spaces and in the fractures of rock formations.

Interpretation: A process that aims to reveal meanings and relationships through the use of original objects by firsthand experience of illustrative media rather than simply to communicate factual information. It typically involves visitor observation of onsite presentations by expert guides about biological, ecological, or cultural topics pertinent to the site or the Refuge System in general.

Invasive plant species: A non-native plant to the ecosystem that lacks natural controls and tends to aggressively dominate the plant community, often forming extensive mono-cultures

Land Protection Plan (LPP): A document that identifies and prioritizes lands for potential Service acquisition from willing landowners, and describes other methods of providing protection.

Migrating neotropical birds: Birds that breed in Canada and the United States during the Northern Hemispheric summer and spend the Northern Hemispheric winter in Mexico, Central America, South America, or the Caribbean Islands.

National Environmental Policy Act of 1969 (NEPA): Requires all federal agencies to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in planning and implementing environmental actions.

National Wildlife Refuge (NWR, refuge): A designated area of land or water or an interest in land or water within the Refuge System, such as refuges, wildlife management areas, waterfowl production areas, and other areas under Service jurisdiction for the protection and conservation of fish and wildlife and plant resources.

National Wildlife Refuge System (NWRS, Refuge System): All lands, waters, and interests therein administered by the U.S. Fish and Wildlife Service as wildlife refuges, wildlife ranges, wildlife management areas, waterfowl production areas, and other areas for the protection and conservation of fish, wildlife, and plant resources.

Native plant: A plant that has grown in the region since the last glaciation and occurred here before European settlement.

Non-native species: A plant or animal species not native to the area and introduced intentionally or unintentionally.

Non-priority public use: Any use other than a compatible wildlife-dependent recreational use.

Partnership: A contract or agreement among two or more individuals, groups of individuals, organizations, or agencies in which each agrees to furnish capital or some service in kind (e.g., labor) for a mutually beneficial enterprise.

Priority public use: Wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation, which receive priority consideration in refuge planning and management.

Public involvement: Offering an opportunity to interested individuals and organizations potentially affected by actions or policies to become informed and provide input. Public input is thoroughly studied and given thoughtful consideration in shaping decisions about managing refuges.

Purposes of the Refuge: "The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit." (601 FW 1)

Refuge Revenue Sharing: Compensation to local governments for foregone tax revenues from land acquired by the Service. The amount of the annual payment depends on the final Congressional budget appropriations for the Service for that year.

Restoration: Recreating environmental conditions similar those when there was less human influence on the landscape.

Riparian: Of or relating to land lying immediately adjacent to a water body and having specific characteristics of that area, such as vegetation influenced by that water body.

Scoping: A process for identifying the "scope of issues" to be addressed in planning refuge activities.

Species of special concern: A species or population, which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploration that, in the foreseeable future, may result in its becoming threatened.

Surface water: Water collecting on the ground or in a stream, river, lake, wetland, or ocean.

Urban refuge: Acquired lands and waters in or adjacent to metropolitan statistical areas (over 100,000 people) to protect fish and wildlife resources and habitats that will provide the public wildlife-oriented recreation, education, and interpretation opportunities.

Water table: The level at which the subsurface materials that are saturated with groundwater in a given vicinity.

Wetland: Areas such as lakes, marshes, ponds, swamps, or streams that are inundated by surface or groundwater long enough to support plants and animals that require saturated or seasonally saturated soils.

Wildfire: Unplanned ignition of a wildland fire (such as a fire caused by lightning, volcanoes, unauthorized and accidental human-caused fires) and escaped prescribed fires.

Wildlife-dependent recreational use: "A use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation." (605 FW 1). These are the six priority public uses of the Refuge System Administration Act of 1966, as amended. Wildlife-dependent recreational uses, other than the six priority public uses, are those that depend on the presence of wildlife.

Abbreviations Used

ARPA: Archaeological Resources Protection Act
CCP: Comprehensive Conservation Plan
CMP: Conceptual Management Plan
EA: Environmental Assessment
EE: Environmental Education
ESA: Endangered Species Act of 1973
FONSI: Finding of no significant impact
FTE: Full-time employee
FWS: U.S. Fish and Wildlife Service
IBA: Important Bird Area
NEPA: National Environmental Policy Act
NWMD: Northeastern Morainal Natural Division
NRCS: National Resource Conservation Service
NWR: National Wildlife Refuge
NWRS: National Wildlife Refuge System
Service: U.S. Fish and Wildlife Service
SEWRPC: Southeastern Wisconsin Regional Planning Commission
SGCN: Species of Greatest Conservation Need
SHPO: State Historical Preservation Office
Refuge System: National Wildlife Refuge System
TNC: The Nature Conservancy
TPL: The Trust for Public Land
USFWS: U.S. Fish and Wildlife Service