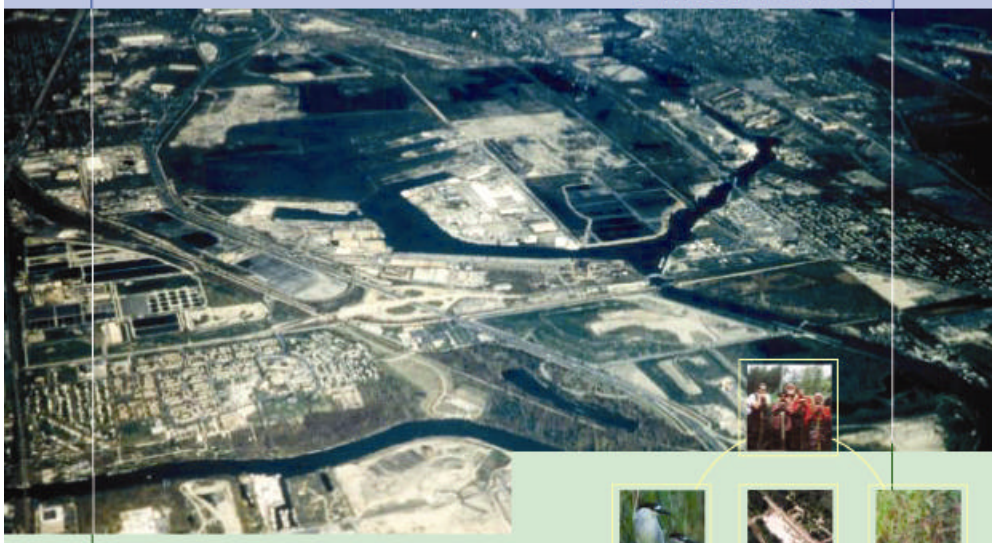
The Calumet Area

Ecological Management Strategy

Phase I Sites



2002

City of Chicago Department of Environment
Chicago's Environmental Fund
Illinois Department of Natural Resources

with assistance from
U.S.D.A. Forest Service North Central Research Station
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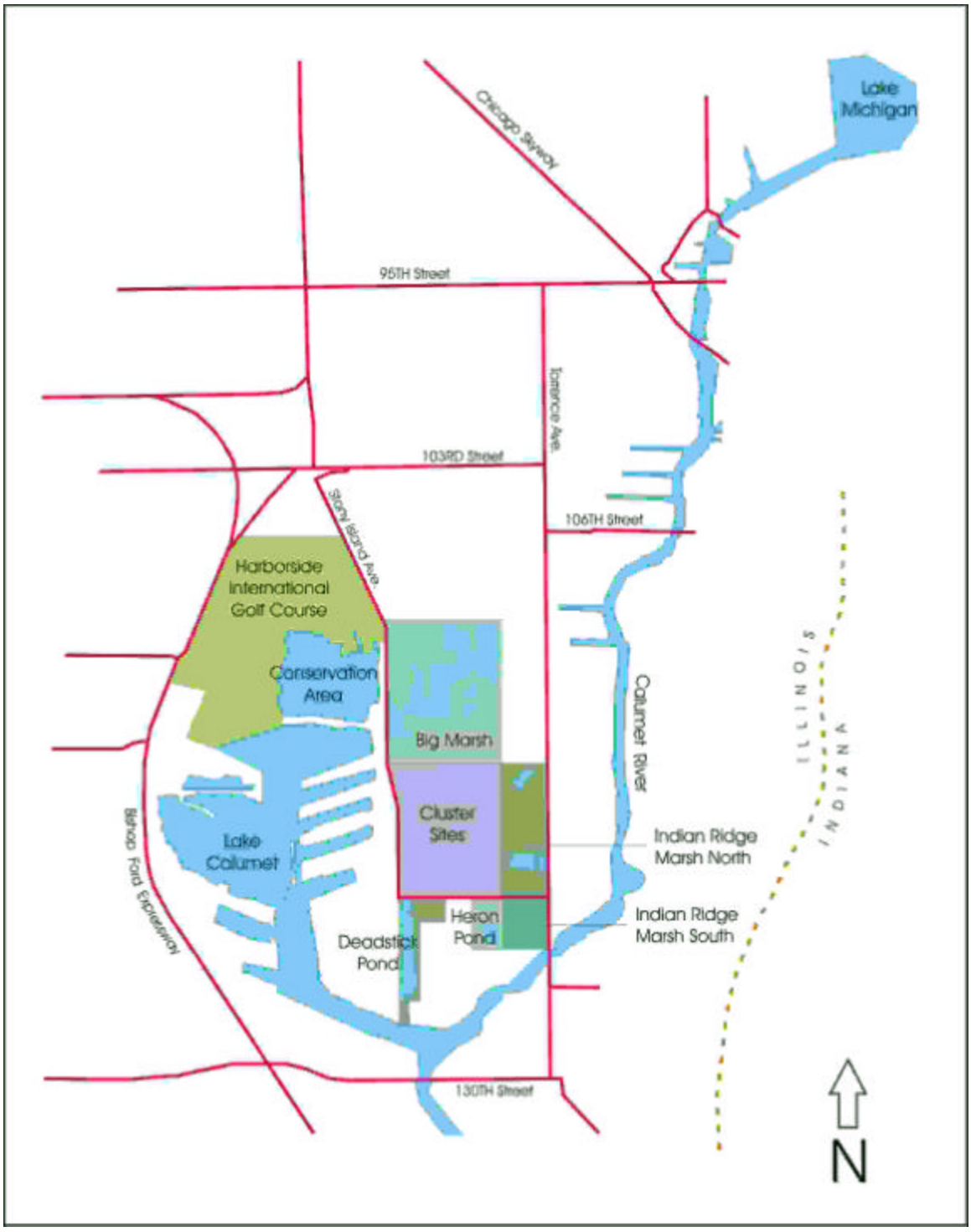

Phase I Sites

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LIST OF EXHIBITS

On behalf of the City of Chicago and Illinois Department of Natural Resources, we are pleased to present the Calumet Area Ecological Management Strategy. This strategy is the result of a tremendous amount of data gathering, input, and analysis from many people representing government, environmental non-profit organizations, academia and community representatives.

Governor George H. Ryan, former CDOE Commissioner and current Budget Director William F. Abolt, Mayor Richard M. Daley, and State Minority Leader Emil Jones announce a City-State partnership for the Calumet Area in June 2000

The Calumet Area Ecological Management Strategy demonstrates the current thinking of how to best address a complex and ecologically important area in the Calumet region. The Phase I Sites, being addressed in this strategy, comprise 1,480 acres and include important nesting and foraging habitat for black-crowned night heron, great egret, and many other aquatic bird species as well as important recreational and educational resources for the region.

Combined with the Calumet Land Use Plan, The Calumet Tax Increment Financing District and many research and educational initiatives underway with our partners, the Calumet Area Ecological Management Strategy sets the course for addressing key parcels in the region and outlining the steps needed to begin their renewal through cleanup and ecological rehabilitation.

We hope you find this document useful and it facilitates further engagement of your organization in this exciting initiative.

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Commissioner
Chicago Department of Environment

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Director
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ACKNOWLEDGEMENTS

The Calumet Area Ecological Management Strategy (EMS) is being coordinated by the Chicago Department of Environment, Chicago's Environmental Fund, and the Illinois Department of Natural Resources. In addition, partners advancing the development of the Ecological Management Strategy include the U.S.D.A Forest Service North Central Research Station and the City of Chicago consultant team composed of V3 Consultants, Ltd. and Jacobs/Ryan Associates.

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Greater Chicago, Northeastern Illinois Planning Commission, Cook County Department of Office Technology

Federal Government: Illinois-Indiana Sea Grant; Urban Resources Partnership, U.S. Army Corps of Engineers, U.S.D.A. Forest Service North Central Research Station, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. National Park Service, U.S. Natural Resources Conservation Service

Environmental Organizations and Museums: Bird Conservation Network, Brookfield Zoo, Chicago Academy of Sciences, Chicago Audubon Society, Chicago Ornithological Society, Chicago Wilderness, Chicago's Environmental Fund, Field Museum of Natural History, Friends of the Chicago River, Grand Calumet Task Force, Illinois Audubon Society, National Audubon Society, Openlands Project, Peggy Notebaert Nature Museum, Shedd Aquarium

Local Resident-led Organizations: Calumet Ecological Park Association, Calumet Heritage Partnership, Hammond Parks Foundation, Hegewisch Chamber of Commerce, Historic Pullman Foundation, Lake Calumet Ecosystem Partnership, Ridge Historical Society, Southeast Environmental Task Force, Wolf Lake Bi-State Gatherings

Industry: Acme Steel, Calumet Area Industrial Commission, Ford Motor Company, Southeast Chicago Development Commission, USA/Waste Management Corp.

Chicago Area Consulting Firms: Applied Ecological Services, Envirocom, Jacobs-Ryan Associates, Kudrna & Associates, TAMS Consultants, Tetra Tech EM, V3 Consultants, The Wetlands Initiative, Wolff Clements and Associates

Foundations: Gaylord and Dorothy Donnelley Foundation, Max McGraw Wildlife Foundation

Other: New Academy of Nature and Culture; Nature, Polis and Ethics

This document was primarily written and edited by: Nicole Kamins and Suzanne Malec of Chicago Department of Environment, Lynne Westphal and Cherie LeBlanc of U.S.D.A. Forest Service North Central Research Station. Additional assistance was provided by Christine Esposito of Terracom Public Relations, Dan Ludwig of Illinois Department of Natural Resources, Ders Anderson of Openlands Project, and Douglas Stotz of the Field Museum. Original drafts were constructed by V3 Consultants.

OVERVIEW

Many exciting projects are underway in the Calumet region of Chicagoland and Northwestern Indiana. This area is home to industry and valuable open space, both of which need rehabilitation. Abandoned and often contaminated brownfields lie adjacent to important habitat remnants split by various ownership interests and degraded by development. Many of the original wetlands have been filled with a variety of materials to create "usable" land throughout the region, leaving a mosaic of disconnected open spaces.

A variety of parties, including the City of Chicago, the State of Illinois, residents, government agencies, conservation organizations, local museums and industrial groups, are collaborating to concurrently rehabilitate both the open spaces and the industrial parcels of the area. A key goal is to show that economic and ecological efforts can advance together – that they do not conflict.

The EMS is the product of extensive effort by these diverse groups and individuals. Its purpose is to develop a framework, or macroplan, for areas of the Calumet region that have key ecological significance, with the long-term goal of enhancing their individual and collective ecological functioning. Ecological enhancement will improve plant and animal health, and increase overall biodiversity. The quality of wildlife habitat will improve, providing more refuges for wetland species. Shoreline restoration will stabilize eroding banks, and control sediment and pollutant runoff. Educational and recreational opportunities will expand – where they do not interfere with wildlife and habitat priorities – with installation of birding overlooks, interpretive signs and recreational paths.

There was a time when the Calumet region was one of the largest wetland complexes in central North America. Before Europeans settled in the Great Lakes basin, the Calumet wetlands formed a single, uninterrupted ecosystem.

It is impossible to return the Calumet area to pre-settlement conditions due to the vast development and disturbance that have taken place over the years. Instead, three guidelines will serve as the filter through which individual regional and site-specific management decisions will be made:

?? **Preserve** existing plant and animal habitats with high biological value;
?? **Improve** existing plant habitats that will maximize the potential for native diversity and ecological health; and
?? **Create** new habitats, where feasible, that will meet the range of needs for individual native species and communities.

Because the Calumet area is expansive, planning and implementation will take place in phases. Phase I sites – areas that are important and host threatened species – are covered in this report. While this edition of the EMS serves as a template for managing ecological sites throughout the Calumet region, its focus is on Phase I areas.

Wetland rehabilitation is the top priority for the Phase I sites. This document serves as the macro-scale strategy for them; individual site decisions will be guided by the EMS goals listed herein. Site-by-site priorities for rehabilitation, as well as site designs and specifications, will proceed as funding becomes available. Phase II sites will consist of a variety of habitats including upland. As a result, the EMS management priorities will likely change for them.

Development and implementation of the EMS will be a continuous and dynamic process. On-the-ground results for one portion of the project will inform and enhance efforts elsewhere. New data will expand planning and remediation capabilities. Processes will continue to be refined.

The tools are in hand. The vision is grand, and realistic. Its achievement promises a renewal of nature, neighborhoods, and a new landscape for the Calumet area.

Introduction

A NEW VISION FOR THE CALUMET REGION

Calumet River

In southern Chicagoland and Northwestern Indiana, threatened and endangered birds nest in remnant wetlands, looking over industrial properties in an area known as the Calumet Region (Exhibit I). The juxtaposition of these natural and built landscapes tells the story of Chicago's past: the steel industries and railroads that helped build the city positioned themselves in the midst of ecologically valuable marshes teeming with life that once blanketed the region. Today, the area is known for its wetlands, woodlands, waterbodies and prairies, its landfills, its numerous active and inactive factories and mills, and its extensive economic potential for attracting new, cleaner industries.

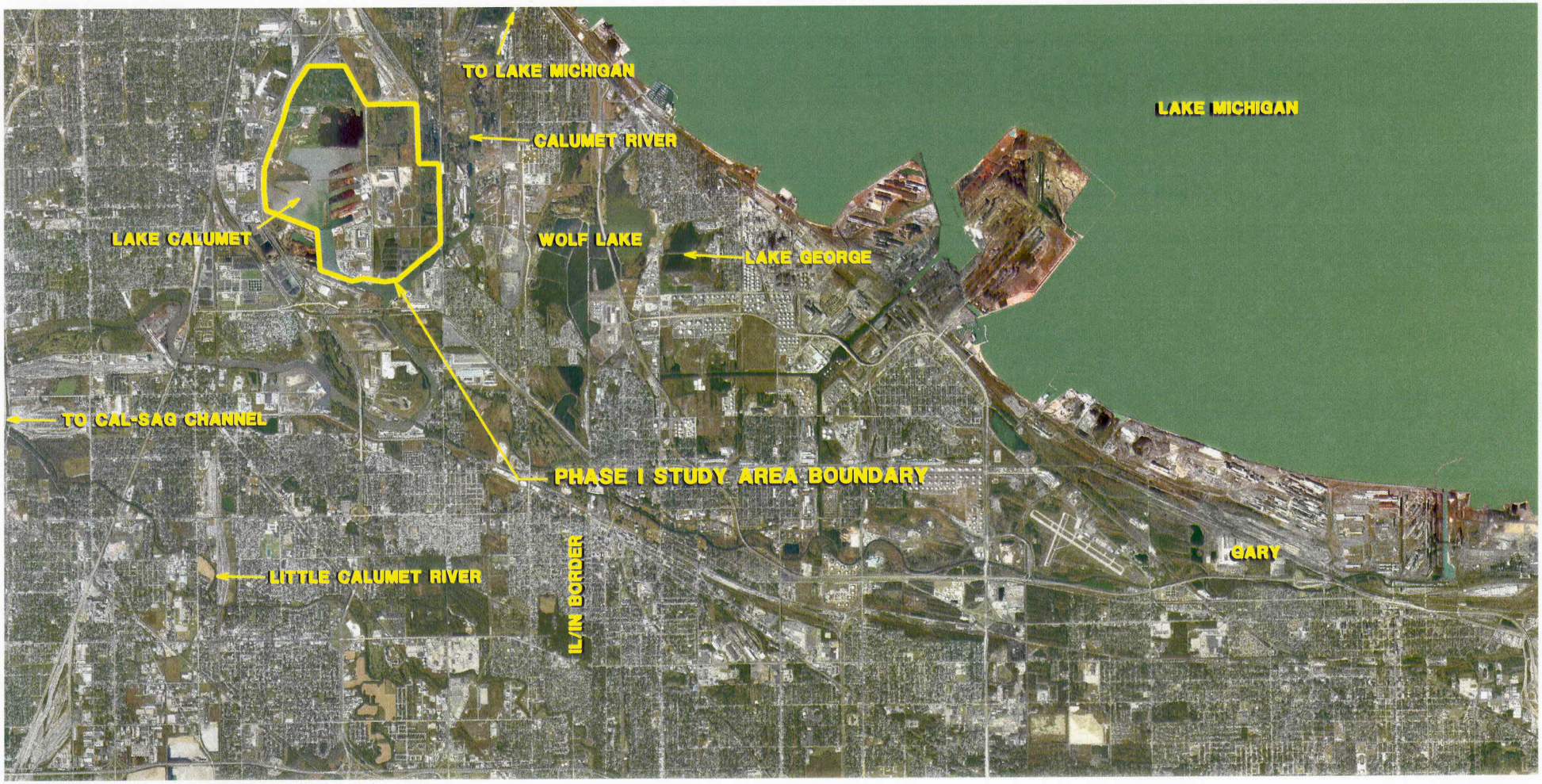
Planning for the Calumet region is complicated because many different private, local, state and federal agencies own or have jurisdiction over various sites or natural areas. Historically, there has been no regional ecological planning.

In June 2000, Chicago Mayor Richard M. Daley and Illinois Governor George H. Ryan announced a significant new partnership for the Calumet area. It focuses on an economic-ecosystem approach to rehabilitate and revitalize the 20-square mile region. Today, a variety of state and local agencies are working with local residents and other stakeholders to create a unified management effort for the Calumet area.

The Chicago Department of Planning and Development (CDPD) has largely completed several major reports that will help shape land use in the Calumet Region. The CDPD's *Calumet Area Land Use Plan* explores the region's natural history and patterns of human use and development, and makes broad recommendations about the future use of different parcels of land. The Plan recommends 3,000 acres of land for industrial redevelopment and more than 4,800 acres for open space. The open space will be set aside and managed by various state and local agencies as the Calumet Open Space Reserve (see Appendix II for more information about the *Calumet Area Land Use Plan.*) A separate CDPD report, entitled *Calumet Open Space Reserve,* takes a detailed look at the waterways and parcels of land that will be part of the reserve. It identifies present ownership of specific sites, briefly describes their past uses and environmental quality, and suggests improvements and potential future use.

The Calumet Area Ecological Management Strategy creates a framework of ideas and approaches for protecting and rehabilitating land identified in the *Calumet Open Space Reserve.* It focuses specifically on the ecological health of the region's diverse natural areas.

EXHIBIT I: LOCATION OF EMS PHASE I AREA WITHIN THE CALUMET REGION



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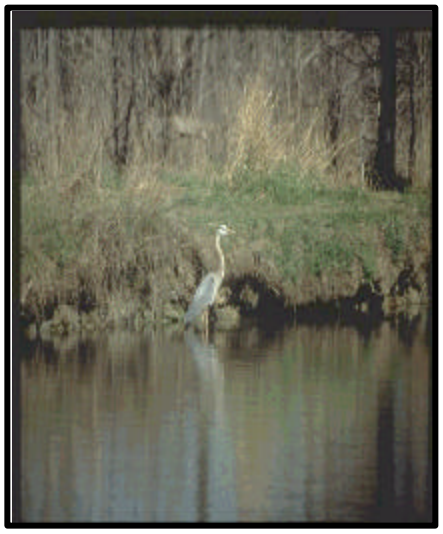
HISTORY OF THE CALUMET ECOLOGICAL AREA



Great Blue Heron

The coexistence today of industrialized lands and high-quality wetland habitats is the defining feature of the Calumet area. This seemingly contradictory landscape evolved through a vibrant history of important industrial development and the random and accidental protection of marshlands which were extensive. The era of industrial development shaped the growth of the Chicago metropolitan area, the Midwest, and during two world wars, the nation. In the pre-settlement era, thousands of years longer, a rich diversity of aquatic and shoreland bird habitat evolved. The birds would not relinquish the area, as long as there remained some habitat of significant scale in which to find refuge.

In the earlier decades of the 19th century, the first written reports describing the fowl and fauna of the Calumet area were published. It became well-known to Chicago's growing population, still used to looking for wild foods from a frontier diet to add to the more agricultural products beginning to flow into the city. It was an area well-known for its "incalculably numerous wildfowl" and its "remarkable run of fish." These astounding populations were sustained by a great diversity of habitats… "innumerable sloughs bayous, morasses, ponds and mudholes of endless variety and shape." James Webb from Fort Dearborn related the results of a morning's hunt in the Calumet area in 1822. "I dare not name the number we would collect of a morning lest you might doubt the accuracy of my memory…there were swan, pelican, geese, brandt, canvasbacks, redheads, mallards, teal of every variety, and ducks of every kind which breed upon this continent" (Harpel, 1880s-1890s).

1870s and 1880s pollution from industries in Pullman, Riverdale and others along the Calumet River, and the straightening of the meandering Calumet River by the U.S. Army Corps of Engineers began the 130-year period of habitat destruction which resulted in the filling and draining of marshes, excavation of sand and deposition of industrial and municipal waste, some of it benign, some of it not. The complex natural system of freshwater estuaries and wetlands connected to Lake Michigan were dredged, dammed and channelized. Pullman dredged clay from Lake Calumet and initiated major shoreline changes, beginning the degradation of the rich shoreline of reeds and wild rice that fish and birds were dependent upon. A growing network of roads and railroads divided and compartmentalized the various habitat remnants.

While pre-settlement marsh assemblages were extensive, today much of it has been lost. Compare Exhibit I dated 2001 with Exhibit II, the 1930s ISGS Geologic Quadrangle map, which shows the relatively unaltered shape of the Calumet area environs.

Once the development era began, many heavy industries located in the Calumet area. They produced brick, glass, creosote, lubricants, paint, and, most importantly, steel. Steel was used to make the famous Pullman train cars as well as refrigerated cars produced by George Hammond's plant. Calumet-area steel also went into tractors, bulldozers, skyscrapers and automobiles that were distributed throughout the Midwest.

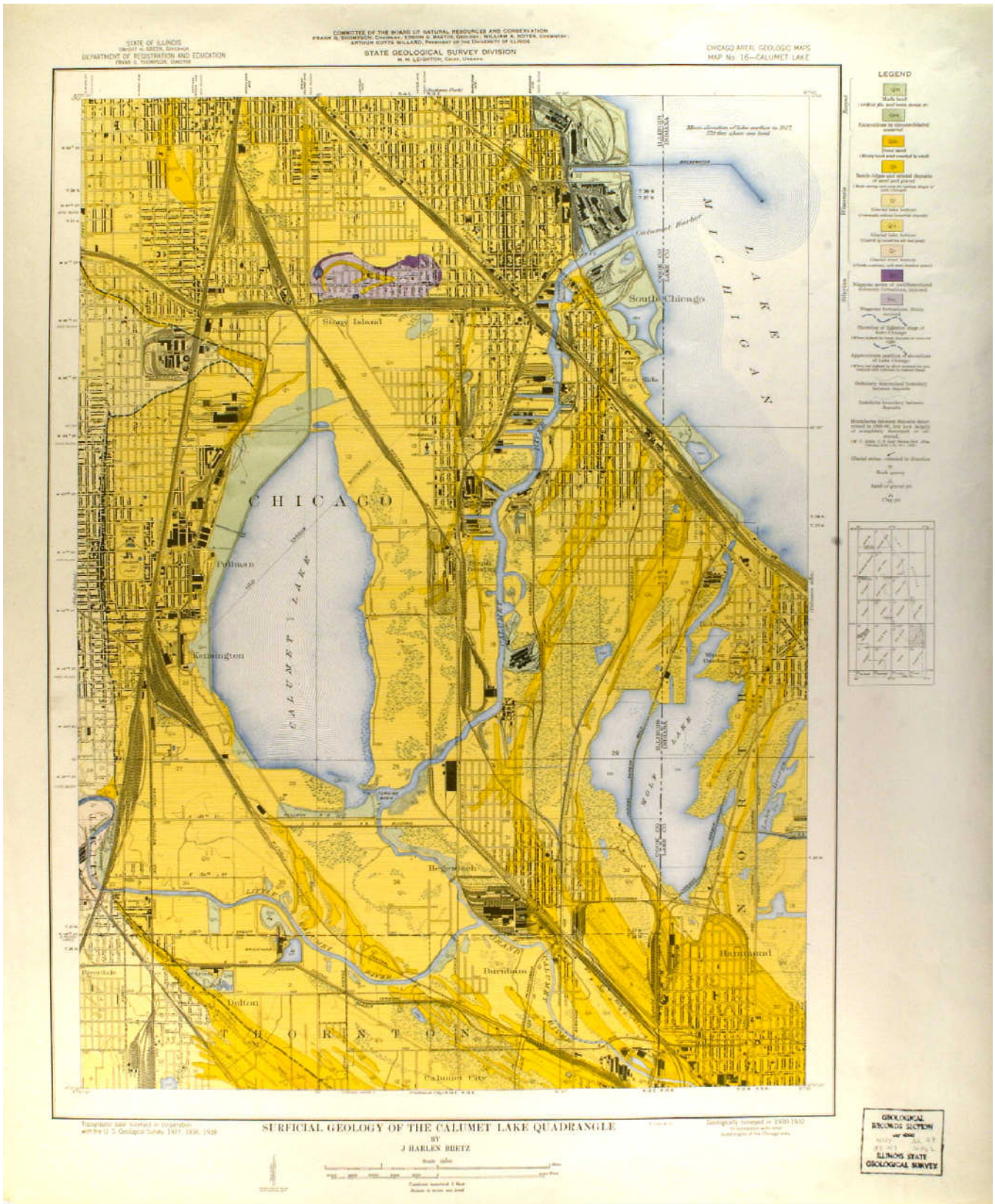
Recognizing the increasing loss of the natural habitats of the Calumet area, the Burnham and Bennett Plan of Chicago (1909) recommended the protection of the best remaining natural landscapes stretching from 93rd Street in a continuous 7-mile long greenway corridor to 154th Street south of the City of Chicago border. It also recommended that the north bank of the Little Calumet River be protected as parkland westward to Blue Island. While many prime habitats in this corridor were lost to development, filling, roads and rail, many of the best habitats remain. These sites include: Van Vlissingen Prairie North and South, Railroad Prairie, Big Marsh, Deadstick Pond, Hegewisch Marsh, Beaubien Woods, Burnham Prairie, Dolton Prairie and a portion of the north bank of the Little Calumet River. The potential remains to achieve substantial portions of the Burnham Plan in the Calumet area.

In the 1920s and 1930s, a deepwater port was proposed in Lake Calumet, and with the opening of the St. Lawrence Seaway in 1959, it appeared the Lake would indeed become a major shipping harbor. The southern tip of Lake Michigan was an ideal location for a massive expansion of the nation's steel industry. World Wars I and II, and the great prosperity of the nation pre-1929 and post-WWII kept the mills producing.

But the 1960s through the 1990s became an era of unrealized visions. The old steel mills collapsed economically under competition from newer facilities built elsewhere in the country and internationally. The deepwater port in Lake Calumet never fully evolved, and while portions of the south end of the Lake developed with a mix of shipping and waste reclamation facilities, the middle and north end of the lake remained undeveloped. A third airport for the region was proposed in the Calumet area but never took off and was dropped by the City. In the midst of this 30-year period, the waste disposal industry expanded activity and created a new landscape that became dominant once the steel mills were dismantled. Today, the area is home to a growing and more diverse industry. An example is the Ford Supplier Park development (See page 136 for details.)

EXHIBIT II: SURFICIAL GEOLOGY OF THE CALUMET LAKE QUADRANGLE

PUBLISHED 1943; GEOLOGY SURVEYED 1930-1932



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Impacts of Development

Lake Calumet and the Calumet River

Slag, the most common fill material found on sites, is the fused material separated from iron ore during smelting in the steel making process. River dredging spoils, cinders, fly ash and other types of waste were deposited on sites. Some local neighborhoods now stand on fill that was deposited into the pre-settlement wetlands. For example, the neighborhoods surrounding Indian Ridge Marsh, such as Hegewisch, South Deering and East Side all developed in a similar manner; that is, submerged lands were sold to speculators, and nearby industries provided the fill materials to create solid ground (Weston 1998). By 1996, fill deposits covered an estimated 1.6 million acres (60.2 square miles) of the Calumet Region in both Illinois and Indiana.[1]

Despite past and present fragmentation and pollution, the remaining Calumet wetlands are among the most ecologically significant in Illinois. The region has long been a popular birding spot in the Upper Midwest because the wetlands and their relative isolation attract numerous bird species. Eleven Calumet area wetland sites were listed in the Illinois Natural Areas Inventory (INAI). In 1980, the U.S. Army Corps of Engineers designated certain wetlands as the highest priority in its Special Areas Management Program (SAMP). The ENCAP Study (1983) comprehensively inventoried the richness of the bird populations. The National Park Service listed most of the Calumet Area wetlands as important natural resources in its 1998 *Calumet Ecological Park Feasibility Study*.

An Area Well-Studied

Visions for the future of the Calumet area have been guided by multiple publications in addition to those already mentioned. In 1994, the Chicago Department of Environment released *Natural Areas and Potential Natural Areas of Chicago: An Inventory Report*, which highlighted the Calumet area as a particularly valuable ecological region because of its remaining intact wetlands. In 1997 the Chicago Department of Planning and Development, the Chicago Park District, and the Forest Preserve District of Cook County published *Cityspace: An Open Space Plan for Chicago*. The *Cityspace* report identified the need for a comprehensive ecological management plan for the entire Calumet region. On a regional level, Chicago Wilderness, a coalition of over 130 conservation organizations, noted the Calumet region as important for habitat preservation and improvement in its *Biodiversity Recovery Plan*. In 1999 CDOE released *The Lake Calumet/Southern Lake Michigan Economic-Ecosystem Initiative,* funded by Illinois-Indiana Sea Grant. The report identified three candidate sites in the Calumet area for concurrent brownfield redevelopment and ecological rehabilitation. The Department's July 1999 *Nature Center Feasibility Study* described several Calumet region sites that would be good locations for a hub of environmental education and passive recreation.

[1] Information about the extent of fill was taken from Kay et al. 1997.

Adding to the synergy was the creation of the Lake Calumet Ecosystem Partnership (LCEP) in November 1998 to leverage resources and engage Calumet area stakeholders in an environmental vision for the region.

EARLY BEGINNINGS OF THE EMS

In 1997, as a result of independent strategic planning exercises, a number of Chicago-area agencies were beginning to place a priority on Calumet area issues and projects. The Calumet Government Working Group formed to enable and encourage information sharing among different agencies. In the beginning, this group dealt mainly with the problems affecting wetlands in the Calumet area. Discussion centered on high water levels and the inability of plants to regenerate and serve as habitat for the nesting black-crowned night heron (*Nycticorax nycticorax*), an Illinois endangered species. The working group recognized the need for a proactive and comprehensive strategy to manage all of the major ecological parcels in the Calumet region. To address this need, the group initiated the Calumet Area Ecological Management Strategy (EMS).

First Tour of Calumet Area for the EMS with Consultants and Partners

From its inception, the EMS has sought to develop ecological management guidelines for privately and publicly owned properties in the Calumet region that have significant or potentially significant ecological features and related public-use potential. The strategies and processes developed for these sites will serve as a model for ecological management in the greater region.

This report focuses on the five Phase I sites – Indian Ridge Marsh, Heron Pond, Deadstick Pond, Big Marsh, and Lake Calumet – which together form a nearly contiguous area with multiple habitats and collective ecological significance (Exhibit III). The study area for Phase I extends from 103rd Street on the north to the Calumet River on the south. Doty Avenue and Torrence Avenue serve as the western and eastern boundaries, respectively. The immediately adjacent areas are also of concern. They consist of Harborside Golf Course, West Pullman Creek, Gull Island, the Cluster Site, the Metropolitan Water Reclamation District (MWRD) Sidestream Elevation Pool Aeration (SEPA) Station and roadsides along Doty and Stony Island Avenues. While the Cluster Site is not a primary site in Phase I, it has a significant impact on all of the adjacent properties. Big Marsh, Indian Ridge Marsh, Heron Pond and Deadstick Pond, for example, are affected by contaminated leachate from the Cluster Site landfills.

EXHIBIT III: EMS PHASE I STUDY AREA SITES

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NOTE: PRIMARY SITES WITHIN THE EMS ARE IN YELLOW, SECONDARY SITES ARE IN WHITE.

PURPOSE AND GOALS OF THE CALUMET AREA EMS

The purpose of Phase I of the EMS is to develop a framework or macroplan for areas of the Calumet region that have key ecological significance in order to enhance their individual and collective ecological functioning. Ecological enhancement will improve plant and animal health and increase overall biodiversity. The quality of wildlife habitat will also improve, creating more refuges for a variety of species. Shoreline restoration will stabilize eroding banks and control sediment and pollutant runoff. Educational and recreational opportunities will expand, where possible, with the installation of birding overlooks, interpretive signs, and recreational paths. To that end, the City of Chicago will build a Calumet Area Environmental Center to serve as the base for educational, research, and interpretive opportunities in the area.

The EMS also has several long-term goals:

- ?? Improve water, sediment, and soil quality in the Calumet area
- ?? Create a better understanding of outside influences on water and air quality and their subsequent influences on local wildlife
- ?? Maintain current populations of endangered or threatened species, and improve the quality of their health and habitats
- ?? Enhance the sustainable coexistence of vital industry and healthy ecosystems
- ?? Provide additional opportunities for citizens to interact with nature in the Calumet Area

Emphasis on Wetlands

Wetlands are a significant focus of the EMS. Locally, regionally and nationally, wetlands have disappeared at an alarming rate. Once seen as disease-breeding swamps, wetlands are recognized today as a vital ecological resource. The Chicago metropolitan area, in large part because of the Calumet region, has some of the richest wetlands left in Illinois. The Calumet area wetlands, even the degraded ones, are important habitat for animals and plants, many of which are threatened or endangered species for which all habitat patches are critical. Healthy, functioning wetlands provide vital environmental services – such as cleaning and detoxifying water and preventing floods – helping to create a safer, healthier environment for humans.

Wetlands are the primary ecological structure of concern for the Phase I sites. The EMS's Phase II sites are more varied in habitat and contain more high-quality habitat remnants. Some are designated Illinois Natural Areas Inventory[2] (INAI) sites, while the Phase I sites are, in general, more degraded. The Phase II sites also contain dunes, savannas, and other upland assemblages. This will necessitate a shift in goals and priorities for the Phase II sites. But in the Phase I sites, *wetlands are the primary focus*.

There are many choices to make in evaluating the ecological potential of the wetlands in Phase I. Preservation and management are top priorities for these sites, along with human health and safety concerns. The importance of large wetlands and complexes for many

[2] Illinois Natural Areas Inventory (INAI) sites are those designated by the State as high-quality remnants providing key habitat for wildlife. There are 11 INAI sites in the Calumet region.

species is discussed further in the Appendix I: Illinois Endangered and Threatened Birds of the Calumet Region. Passive recreation, such as birding, hiking and environmental education opportunities are the most likely activities to be advocated as a result of this strategy, for they are unlikely to conflict with the ecological priorities. Opportunities for active recreation like biking and fishing will be incorporated only when they do not conflict with ecological goals.

Restoration versus Rehabilitation

It is important to note that restoration to pre-settlement conditions across the region is *not* a goal of the EMS. Wherever possible, sites will be returned to full and sustainable ecological health using pre-settlement conditions as a guide. The human impact on the Calumet Region has been so great, however, that in many areas ecological health may come in a new form. Streams and dolomite prairies, for example, might now be able to flourish in former wetlands now filled with slag.

ACCOMPLISHMENTS TO DATE

The myriad partners dedicated to rehabilitating the Calumet area have already achieved some important goals. They have identified existing and planned land uses. They have identified and partially secured potential funding sources with additional sources being investigated. Places within the Calumet ecological area that could serve as wetland mitigation sites have been identified.

The next challenge is to develop site-specific management plans for the Phase I areas. Once these plans are prepared and reviewed, ecological enhancement work can begin. The U.S. Army Corps of Engineers, and other agencies as appropriate, will be consulted to obtain permits and approval for rehabilitation activities. Work has begun on several sites in 2002 and will continue for years to come.

In the meantime, comments, ideas, and suggestions are welcome. Input from numerous parties has been and will continue to be a cornerstone of the EMS. The new vision for a thriving Calumet area can only be achieved with the ongoing concerted efforts of the people who care deeply for this corner of the world.

Gathering Information

Gathering Information

Data is key to developing a sound EMS for an area as complex as the Calumet region. While a wealth of information already exists, the information had not been consolidated before this planning process began. There is still much to be done, but the partners' efforts to assemble all known information about the area has laid the foundation for planning important future Calumet research.

National Wetlands Inventory

Before the EMS began, other studies were conducted in the Calumet area, including the National Wetlands Inventory (NWI) in the 1980s. According to the study, there were approximately 452 acres of wetland and 1,364 acres of open water at ten wetland sites in the Calumet area during the 20-year period between 1980 and 2000, representing nearly a third of the wetlands in Cook County. Large wetlands and wetland complexes are important to many wildlife species and are especially key for many of the area-sensitive endangered and threatened birds that use the Calumet region (pied-billed grebe, least bittern, black-crowned night heron, king rail, common moorhen). Table 1 lists the National Wetlands Inventory acreages for sites in the Calumet area.

Table 1: National Wetlands Inventory Nesting/Breeding Occurrences in Illinois

Endangered and Threatened Birds in Calumet Area Wetlands 1980-2000

	Lake Calumet	Big Marsh	Cluster Site	Indian Ridge North	Indian Ridge South	Heron Pond	Deadstick Pond
Site acreage	716	310	200	110	35	40	50
Wetlands (acres)	605.7 ow 140.0 ow 12.8 ow 13.3 13.3 12.1 4.2 4.1 3.0 2.2 2.2 2.0 1.3 1.3 1.0	72.0 15.5 10.0 9.9 4.6 4.3 4.2 2.7 1.9 1.1	2.8 2.0	29.1 10.4 7.6 2.5 1.8 1.4 1.1 0.9	26.7 2.8	5.7 5.2 4.4 4.2 0.5	26.9 1.3 0.3 +
Total wetland area (acres)	60.5 758.3 ow	126.1	4.8	54.8	29.5	19.9	2.2 + 26.9 ow
Total IL E&T birds by site	YCNH WP CM	BCNH LBH SE? LB PBG BT CM YHBB YCNH KR		BCNH CM YHBB YCNH LBH PBG LB	BCNH CM YHBB YCNH KR	BCNH CM YHBB LBH KR	CM YCNH LB PBG YHBB
Area sensitive IL E & T birds by site	CM	BCNH LB PBG BT CM KR		BCNH CM LB PBG	BCNH CM KR	BCNH CM KR	CM LB PBG

Notes: ow =open water, BCNH = Black Crowned night-heron; YCNH = Yellow crowned night heron; LBH = Little blue heron; SE = Snowy egret; LB = Least bittern; PBG = Pied billed grebe; KR - King rail; BT = Black Tern; CM = Common Moorhen; WP = Wilson phalarope; YHBB = Yellow-headed blackbird. Sources: National Wetland Inventory GIS Data (Illinois Natural Heritage Database 2000.)

Calumet Research Summit

Organizations have been researching and analyzing the Calumet region for years. The Calumet Research Summit was held in May 2000 to begin to collect and synthesize as much of the existing information as possible. One hundred and thirteen representatives of government agencies, industries, museums, conservation organizations and local community organizations participated. The agenda was cross-disciplinary; ornithologists heard about toxicologists' work and entomologists learned about sociologists' studies. The summit demonstrated the complexity of developing an EMS for the region and fostered a sense of excitement for the stakeholder cooperation needed to make an ecological transformation possible.

The Calumet Research Summit was a good start, but there was clearly a need to collect and combine more information than was possible at the summit. The core planners have taken several additional steps to address this need: drafting a preliminary Ecological Management Strategy to serve as a platform for discussion and critique; conducting focus groups with experts on the Calumet area; and integrating this information across disciplines and topics.

Expert Focus Group Sessions

One of the biggest challenges of developing a management strategy for the Calumet area has been the fact that many people from many disciplines and backgrounds had knowledge of the area, but there was no system in place to collect information from them. Through word of mouth, email and phone calls, those with knowledge of the area were asked to contact CDOE. Once a base list of people was compiled, the working group convened focus groups to gather regional and site-specific information by topic.

Based on the additional information gained by the focus group sessions, the EMS now addresses issues at both species and landscape scales. A focus on individual species allows the plan to directly address basic needs of the species-level targets. At the landscape level, planners can target patch size, distribution, connections, and other landscape features, with the ultimate goal of attaining self-sustaining and resilient populations of native floral and faunal species of interest – for example, black-crowned night heron (*Nycticorax nycticorax*).

The focus groups were arranged by academic discipline or topic area. The topics were:

- Conservation Design Process (a decision-making tool)
- GIS (Geographic Information System - a computer-based spatial analysis system)
- Sediments and Toxicity (2 sessions)
- Hydrology
- Recreation/Access
- Vegetation
- Social Implications
- Economics
- Fish and Fishing
- Birds
- Creatures (other than birds and fish)

A total of 105 people participated in the sessions. They listed known information about each area and identified key data gaps, issues, resources, and action items. Detailed minutes for each session were distributed to participants for review. An additional 68 people who were interested but unable to attend the sessions also reviewed the minutes and provided input. Appendix III contains summaries of each focus group.

A synopsis of each session follows.

BIRDS

The Calumet Area provides vital habitat to dozens of species of resident and migratory birds. State-endangered and threatened species such as the pied-billed grebe (*Podilymbus podiceps*), little blue heron (*Egretta caerulea*), black-crowned night heron (*Nycticorax nycticorax*), least bittern (*Ixobrychus exilis*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*), and common moorhen (*Gallinula chloropus*) make their homes there. Migrant shorebirds, songbirds, and waterfowl rest and feed in local wetlands during their long journeys. The presence of so many different species attests to both the birds' ability to adapt to the region's altered landscapes and to the ecological vitality and vital importance of the remaining Calumet area wetlands. The populations of many species have, however, declined in the last ten years because of habitat degradation and loss. To reverse this trend, ecological rehabilitation activities will need to control fluctuating water levels and decrease contaminant loads in the water and soils. Populations of some bird species – like the mute swan (*Cygnus olor*) and the Canada goose (*Branta canadensis*) – may need to be controlled so that they do not take over habitat from more conservative species or interfere with habitat rehabilitation. See Appendix I for more information about state listed birds.

HYDROLOGY

In the Calumet region, water quality and quantity at different sites pose a number of challenges for ecological managers. In many places, the water table is high, often at or just below the ground surface. Small fluctuations in surface water levels can have a detrimental impact on plant and animals species. In addition, there are multiple sources of underground waste that may introduce toxins into local waters. Installed storm sewers and other human constructions influence all local hydrology and disrupt the natural flow regime.

To improve water quality throughout the Calumet region, the flow of both ground and surface waters through the various water bodies needs to be thoroughly studied. For known information about hydrology, see Exhibit IV. Hydrologic mapping, which attempts to predict the direction and speed of local waters, is often imprecise because groundwater is unseen and underground conditions can be complex. This is particularly true in the Calumet area due to historic filling activities. In the short term, studies of surface water topography across the region will advance understanding of how the different water bodies are connected and where they flow into one another. Both surface water and groundwater hydroperiods need to be understood before construction takes place. Getting surface water depths and groundwater elevations is the way to ensure sustainable wetlands. A hydrologic master plan is crucial.

SEDIMENTS/SOILS/TOXICITY

There is the potential for considerable environmental contamination of sediments, water, and atmosphere due to the historical and current uses of the Calumet area. Potential contaminant sources include slag and other solid industrial byproducts generated in the area; illegal dumping of assorted construction and industrial debris and miscellaneous (and often unidentified) waste material; release of aqueous contaminants in waste and by-product water, or in the form of other solid industrial waste material; potential leaking from landfills; incidental (accidental, drift, or runoff) contamination in the form of

Exhibit IV: Existing Hydrology

chemicals, nutrients, and pesticides as by-products or due to direct application from local uses; and considerable increases in levels of noise, artificial lighting and often malodorous air. The threats to wildlife and human health due to potential toxicological substances should be assessed at all EMS sites in the Calumet area.

The sediments at the bottom of the Calumet area water bodies are of great concern, as is the soil. They may contain a number of different contaminants including industrial chemicals, pesticides, polychlorinated biphenyls (PCBs), petroleum by-products, and heavy metals. These toxins leach from industrial and municipal wastes buried nearby, enter with stormwater from local roads, wash in via precipitation, and are created on site when groundwater reacts with the slag materials or dredge spoils that were used as fill. Different sites (and different parts of the same site) contain varying mixes and concentrations of contaminants, necessitating different management plans. In many places native soil is meters below the sediment surface with various waste or slag in between. Air deposition may also be a source of contaminants. To date, there is no comprehensive study of sediment or soil quality and composition across all of the Calumet area sites. There has been much concern, discussion and debate about the Cluster Site, specifically, because it has buried landfills and a range of waste types and is producing contaminated leachate. More research is necessary as projects move forward.

VEGETATION

The Phase I sites contain a range of native and non-native plant species. Invasive non-native (exotic) and native plant species have considerable negative impacts on individuals or populations of plants in the Calumet area, and on native communities and ecosystems. These non-native species and invasive native species encroach upon dominant natural communities, especially following disturbance. Examples of exotic and invasive plants that threaten native biodiversity and natural community quality in the Calumet area include purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), common buckthorn (*Rhamnus cathartica*), Eurasian watermilfoil (*Myriophyllum spicatum*), and reed canary grass (*Phalaris arundinacea*). These species are aggressive, can establish a monoculture, can deplete plant species composition, and can alter vegetation structure. The resulting vegetation structure is often unsuitable for native fauna. Many of the invasive species seen in Calumet today are able to tolerate a high level of disturbance, thriving in areas with poor soil quality, high salt content, and other adverse conditions.

Milkweed

In addition to invasive species, fluctuating water levels at many sites profoundly impact all plants by either drowning them or drying them out. Contaminated sediments and degraded water quality also present challenges to managing vegetation. The widespread presence of slag creates difficult growing conditions for many native plant species. Plant roots have great difficulty penetrating the hard, dense slag material, which contains few of the nutrients that are essential for plant growth and many metals and compounds that are detrimental to it. Some plant species that are found naturally in dolomite prairie

habitat can live and thrive on slag and it may make sense to foster the growth of these species in some areas that are unsuitable for other rehabilitation efforts. Many species of more conservative native plants, however, are surviving in other places in the region, and may be tapped as a source for native plant seed for rehabilitation efforts. Potential transport of contamination via plants to wildlife will be evaluated.

SOCIAL IMPLICATIONS

As ecological rehabilitation activities are carried out, managers and planners will consider the social implications of the changes they make to the landscape and the restrictions they place on human activities in the region. Those who fly dump at various roadside locations may expect to be able to continue. Nearby residents who fish for subsistence in Calumet area waters may resist efforts to limit this activity unless they understand the potential health threats from contaminated fish. Families or individuals who have long used various sites for fishing, bird watching or other recreational activities may be very attached to those places. Ecological management efforts, as much as possible, need to anticipate social factors and address them.

The natural areas of the Calumet region attract thousands of people each year for a variety of recreational and educational activities. Who are these people and where do they come from? What are they here to do and what are their interests? What do they particularly like or dislike about the area? What suggestions do they have for future improvements? What environmental issues are important to them? As the EMS progresses, researchers will address these questions so that future plans for the Calumet region will be informed by the concerns and interests of recreationists, tourists, students and nearby residents.

FISH/FISHING

A large variety of native and non-native fish species, including northern pike (*Esox lucius*), perch (*Perca fluviatilis*), and smallmouth bass (*Micropterus dolomieu*) live in the water bodies of the Calumet area. Several state-designated endangered or threatened species like the banded killifish (*Fundulus diaphanus*) and Iowa darter (*Etheostoma exile*) can be found there as well. A number of nuisance or invasive fish species are also present. Carp (*Cyprinus carpio*), for example, compete with more desirable species and decrease the water's dissolved oxygen content during their normal foraging and hunting activities.

The biggest current threats to the health of all fish are poor water and sediment quality. Contaminated leachate from buried wastes and stormwater runoff from nearby roads bring metals and toxic chemicals into local waters. Fish take in these pollutants through their gills and through their digestive tracts as they consume plants and animals that have already absorbed toxins. Increasing the water's dissolved oxygen content, decreasing contaminant loads, and adjusting the pH will go a long way towards improving overall fish habitat.

Up-to-date toxicity data is not available for the waters and sediments of most of the Calumet area; this information is key to properly assess fish habitat and fishing opportunities. Existing fish quality data needs to be consolidated from several agencies

and analyzed over time and by geographic area. After this analysis is complete, physical habitat for fish should be evaluated and rehabilitated where appropriate.

CREATURES

The woods, prairies, and wetlands of the Calumet area are home to thousands of mammal, reptile, and invertebrate species. Among these, many species are endangered or threatened including Blanding's turtle (*Emydoidea blandingii*) and Franklin's ground squirrel (*Spermophilus franklinii*). Bats, coyotes, deer, squirrels, raccoons, snakes, and mice are common. The existence of so many animal species in a largely industrial urban area is something of an anomaly; the natural areas of the Calumet region are all the more important because they provide this vital wildlife habitat. All animal species are vulnerable to potential health and reproductive problems because of pollutants in the air, ground and water. Amphibian species, such as frogs, are conspicuously absent from the Calumet area most likely because of degraded soil and water quality and because they require very specific habitat conditions that do not presently exist in the region. Non-native invasive animals are probably less of a threat than non-native invasive plants in the Calumet area, but include the Norway rat (*Rattus norvegicus*) and Japanese beetle (*Popillia japonica*). Also, due to the existence of endangered and threatened species in the area, predators could be of concern. Predators in the Calumet area include raccoon, coyote, opossum, mink and snake.

RECREATION AND ACCESS

Local residents currently use the Calumet area sites for a variety of recreational activities including fishing, hunting, boating, bird watching, golfing, and biking. Harborside Golf Course draws thousands of golfers to the region each year. As ownership of the Phase I sites changes, additional activities that do not conflict with ecological and human safety goals will increase. Signs will identify and promote optimum places for recreational activities to maximize the health and safety of both people and wildlife. This will help recreationists be aware of both the advantages and disadvantages of using different sites for their chosen activities. Special wildlife and educational access areas will help achieve the necessary balance. More information about recreational access in conjunction with wildlife protection can be found in Appendix I.

ECONOMICS

The Calumet region is – and has long been – home to mills and factories that provide thousands of jobs to residents of both Illinois and Indiana. It also draws recreationists and tourists who enjoy the natural areas. All of this will continue as the EMS is implemented. A number of new industrial projects are already planned (see page 136 for Ford Centerpoint project), and interactions between industry and ecological rehabilitation should be facilitated. Likewise, improvements in the health and aesthetic qualities of the natural areas may influence the site planning and manufacturing activities of neighboring industries. Analysis of the economic potential of ecotourism is needed.

GIS/DATA COORDINATION

Geographic Information Systems are the modern tool of choice for organizing and presenting large amounts of data that can be tied to specific points on a map. There is currently no organized, consolidated or comprehensive set of GIS data for the Calumet

area. As the EMS is implemented, data collection for the region will be ongoing through a variety of studies using standardized data collection methods. A GIS specialist working at the Chicago Department of the Environment will collect and synthesize both past and current data. Eventually the public will have access to Calumet Area GIS data. See Appendix IV for GIS Specifications.

Preserve, Improve, Create (PIC)

INTEGRATING THE FINDINGS

After completing the focus groups, the next challenge in developing the EMS was to integrate data gaps, issues, resources and action items across the topics. The initial plan to do this with large, multidisciplinary groups was too unwieldy; a smaller group, therefore, came together to tackle the task. This group included:

- ?? Doug Stotz, Ph.D. - Field Museum of Natural History
- ?? Ders Anderson - Openlands Project
- ?? Michael Miller, Ph.D. - Illinois State Geological Survey
- ?? Lynne Westphal, Ph.D. - USDA Forest Service North Central Research Station
- ?? Suzanne Malec - Chicago Department of Environment
- ?? Nicole Kamins - Chicago Department of Environment
- ?? Tom Slowinski - V3 Consultants

The group identified a framework to determine management priorities on the EMS sites. The key elements of the framework are stated as preserve, improve and create (PIC).

PRESERVE, IMPROVE, CREATE (PIC)

Preserve

Using *preserve, improve,* and *create* as prioritization tools is a useful way to help managers and other stakeholders navigate the myriad decisions necessary to move forward with ecological rehabilitation.

Preserve is defined as providing long-term protection for a specific species, a species assemblage, or habitat, at least in its current level of structure and/or function. Wetland habitat for the black-crowned night heron (*Nycticorax nycticorax*) and other birds, fish, animals, and vegetation need to be preserved in the Calumet area.

Improve

Given the degraded nature of the Phase I sites, any species or habitat targeted in the *preserve* category is also needs improvement. The *improve* category, however, also covers other habitat types that are present but are less common or are not supporting threatened or endangered species. Upland habitat and species often fall in this category. *Improve* is defined as enhancing and rehabilitating habitat structure, function, health, and resilience for species of conservation interest in the Calumet area and expanding those habitat areas where feasible. In rare cases, restoration to original presettlement habitat may be feasible.

Create

After preserving critical species and habitat, and improving them over time as much as possible, there may be opportunities to create something new – creativity will be key in facing the challenges caused by past human activity in the area. *Create* is, therefore, a category that allows for new possibilities, for creating entirely new habitat structure and function that might not reflect original conditions in the Calumet area. There are, for example, vast fields of slag with sparse vegetation on them, even after decades. They share many characteristics in common with alvar, which is also known as dolomite prairie. Alvar has always been rare; it was once present in the Chicago area but is no

more. Can a slag field be made to function as alvar? Perhaps. If this is possible, managers will be able to create a valuable habitat on the vast amounts of fill that are now a serious impediment to ecological rehabilitation in the region and are too costly to remove entirely. In other cases, new soil or soil alternatives will be brought in and placed on top of existing parcels to create a new habitat opportunity. Thus the *create* category seeks opportunities to construct new habitat structures that will fill regionally important gaps and enhance native diversity.

In summary, these categories signal levels of prioritization. *Preserve* indicates the most critical concerns; any actions taken during rehabilitation must not harm or reduce the structure or function of habitats in the *preserve* category. Items in the *preserve* category will have first priority for improvement. Of course, the goal is to *improve* all sites where possible over time. *Create* is the lowest-priority category signifying issues or areas where neither preserving nor improving existing conditions is a viable option – or where the *preserve* and *improve* goals have been reached and potential *create* opportunities will not cause harm.

The PIC categories are defined as follows:

Preserve	*Preserve* existing plant and animal habitats with high biological value
Improve	*Improve* existing habitats that will maximize the potential for native diversity and ecological health
Create	*Create* new habitats, where feasible, that will meet the full range of needs for individual native species and communities
Prioritization	*Preserve* supercedes *improve*; both supercede *create*

Many goals were identified for Phase I of the EMS. Decisions must now be made about where to begin and how to monitor critical logistics and realities (e.g., funding needs, roles of different agencies, potential obstacles, emerging opportunities) while building toward the ecological vision. Focusing on the three decision criteria – **Preserve, Improve and Create —** and on filling in the key information gaps will help keep the process on target and allow a structured selection among different alternatives.

Following are the resource targets identified in focus groups. As the EMS progresses, the PIC priorities will be applied to the individual Phase I sites.

Table 2: Management Guidelines for Phase I Sites

Resource Categories	Resource Targets	P Preserve[3]	I Improve[4]	C Create
Wetland Habitat & Wildlife	Marsh habitat	?		
	?? Black-crowned night heron habitat (excl. Deadstick)	?		
Heron Pond	?? Transitional habitat for birds – includes common reed where it provides critical short-term habitat	?		
Deadstick Pond	?? Other marsh-dependent breeding birds	?		
Big Marsh	?? Native emergent marsh vegetation	?		
Indian Ridge Marsh	?? Amphibian habitat (frogs and mud puppies)			?
	Existing native seed banks	?		
	Other habitat critical to species of concern[5]	?		
	Shorebird habitat		?	
	Submergent species assemblages			?
Upland Habitat & Wildlife	Other habitat critical to species of concern[7]	?		
	Upland habitat		?	
Big Marsh	Vegetation quality (prairie, woodland)		?	
	Grassland habitat		?	?
Indian Ridge Marsh	Diverse upland habitat structure (grasslands, brush, small trees, etc.)			?
	Grassland assemblages of birds and herptiles			?
Aquatic Habitat	Other habitat critical to species of concern[7]	?		
Lake Calumet	Native fish habitat		?	
Water / Hydrology	Current functional hydrologic connections	?		
All Phase I Sites	Other habitat critical to species of concern[7]	?		
	Water levels (control of fluctuations)		?	
	Water quality (control of groundwater and surface water pollutants)		?	
Physical Parameters	Native soils	?		
	Soil quality		?	
All Phase I Sites	Sediment quality		?	
Socioeconomic Parameters	People's attachment to places		?	
	Regional/interstate access to region		?	
All Phase I Sites	Recreational uses that do not conflict with ecological goals or safety concerns	?		?
	Opportunities for learning about local nature and native landscapes		?	

[3] Anything in the "preserve" category will also be "improved."
[4] Improvement methods will include general enhancements, site rehabilitation, and, on rare occasions, restoration to presettlement conditions.
[5] A critical gap is the lack of complete inventories for each site. There may, therefore, be more threatened and endangered or otherwise conservative species on these sites that are not yet known.

Phase I Sites

PHASE I SITES

This section describes the existing conditions and ecological goals for each Phase I site. The main Phase I sites – Heron Pond, Deadstick Pond, Big Marsh, Lake Calumet, and Indian Ridge Marsh – receive the most attention. Adjacent and secondary sites appear briefly. Indian Ridge Marsh will be examined in more detail than the others because it has already been studied in depth and it will likely be the first site to undergo ecological rehabilitation. Other projects will develop as resources and public ownership or cooperation with landowners has been secured.

HERON POND

Size: 50 acres
Owner: Private individuals and City of Chicago

Existing Conditions

Heron Pond Looking North and Slightly East

Heron Pond (Exhibit V) is directly west of Indian Ridge Marsh South and is separated from the marsh by the Norfolk and Southern Railroad. The area has been platted into many parcels for residential development that never occurred; it is therefore owned by several different parties. Sludge drying fields managed owned by the Metropolitan Water Reclamation District border Heron Pond on the west and south, and 122nd Street serves as the site's northern boundary. Heron Pond has 8.5 acres of open water and 30.5 acres of wetlands dominated by common reed (*Phragmites australis*). During high water levels, the wetlands drain to the Calumet River through a ditch along the east side of the property. The ditch is currently filled with debris, including an abandoned weir structure. There is a culvert at the southern end of the ditch that leads to the Calumet River.

A local sportsman's club actively fishes on an open water portion of this site, manages an apiary nearby, and has used parts of the pond for target shooting with clay pigeons. Two shooting stations face the pond near a clubhouse. A fill mound that protrudes into the site's open water body is littered with broken clay pigeons, presumably from gun club activity. Lead shot, discarded shot wads, and possible lead paint on the skeet targets may require clean-up. Most clay shot targets include Polycyclic Aromatic Hydrocarbons (PAHs) which may cause adverse impacts in aquatic organisms.

Between 1980-2000, the site was used at times by the state-endangered black-crowned night heron, and state-endangered yellow-headed blackbird. In 2001 and 2002, the black-crowned night herons established a rookery on this site. It has also been used by the state-threatened common moorhen (Mankowski 2001).

EXHIBIT V: HERON POND OVERVIEW

LEGEND

- PROPERTY BOUNDARY
- COMMON REED (PHRAGMITES AUSTRALIS)
- OPEN WATER
- OVERFLOW
- RUNOFF
- DITCH OR STREAM FLOW

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Heron Pond Next Steps

The goal for Heron Pond will include thriving wetlands and passive recreational activities such as birding. Upland habitat will be improved where it does not conflict with wetland habitat. Potential habitat for black-crowned night herons (*Nycticorax nycticorax*) will be preserved. Limiting the growth of common reed (*Phragmites australis*) and controlling water levels are critical to achieving all other goals. A Phase I and Phase II assessment will be underway in 2003 to move us toward a conceptual plan.

DEADSTICK POND

Size: 50 acres
Owner: Metropolitan Water Reclamation District of Greater Chicago (MWRD)

Existing Conditions

Deadstick Pond is a long, narrow, shallow water body just to the west of the MWRD sludge drying beds, on land owned by the MWRD (Exhibit VI). Stony Island Avenue serves as Deadstick Pond's western boundary, 122nd Street marks its northern limit, and the Calumet River serves as its southern boundary. Part of this area may have been a section of the original eastern shoreline of Lake Calumet before large-scale filling began. The Pond contains 24 acres of open water and 19 acres of wetland dominated by common reed (*Phragmites australis*). Narrow-leaved cattail (*Typha angustifolia*) and dogwood trees (*Cornus spp.*) also grow along its edges. The southern portion of the open water area contains many dead standing tree trunks, for which the water body was named. The tree trunks serve as perches for migrating birds and may also provide nesting or foraging spots for resident birds, including at times the state-threatened common moorhen (Mankowski 2001). In addition, mud flats exposed in the fall provide temporary habitat for 20 to 25 migrating shorebird species. Not surprisingly, Deadstick Pond is widely known as an excellent site for bird watching.

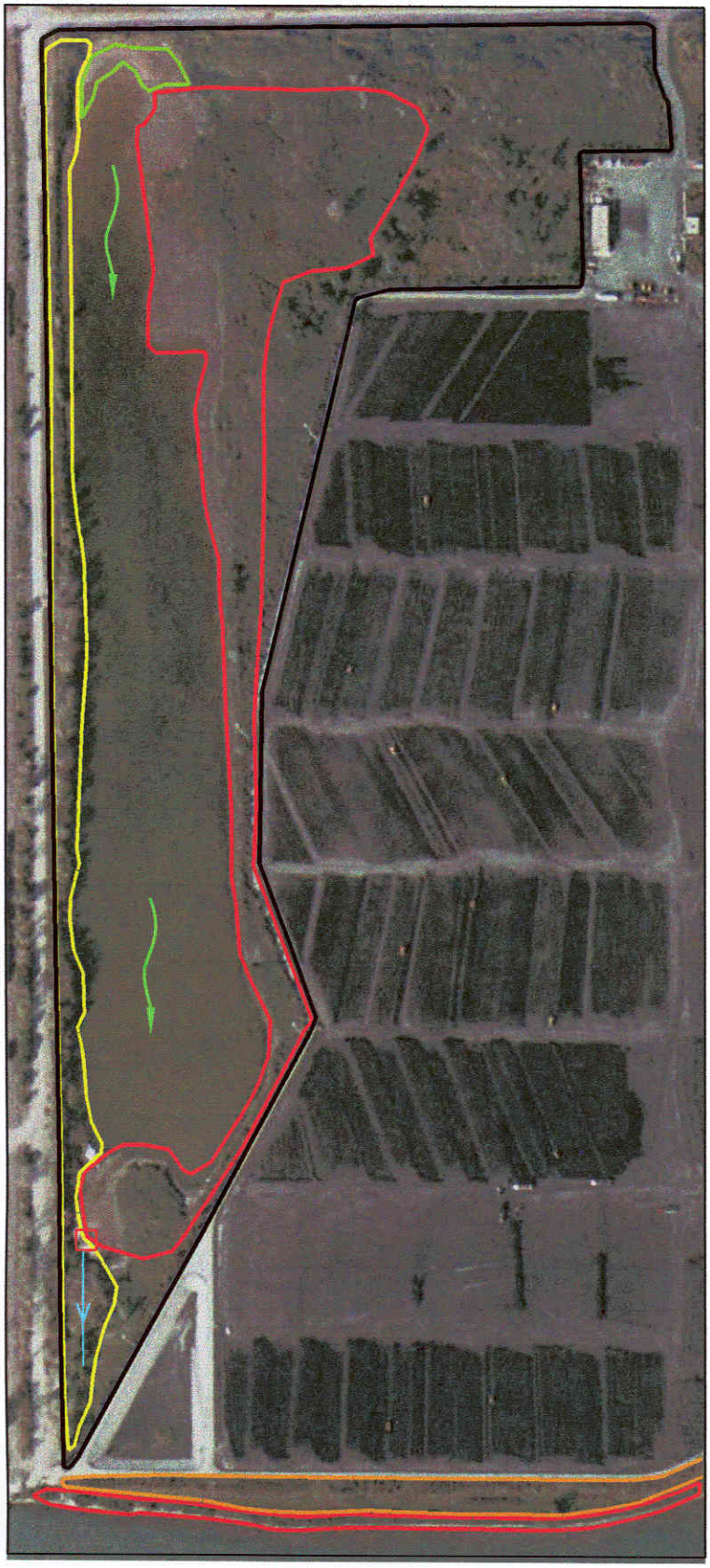
A water control structure, installed in the southern end of the wetland by MWRD, regulates water flowing from Deadstick Pond to the Calumet River. Stormwater runoff from 122nd Street and the Cluster Site, as well as an unknown discharge, enter directly into the pond[6]. This may be the cause of high fish mortality occasionally seen at the site.

Deadstick Pond Next Steps

Ecological management at Deadstick Pond will focus on improving marshland and shorebird habitats and increasing passive recreational opportunities, especially improved access for bird watching. Special attention will need to be paid to fluctuating or extreme water levels. Across the site, specific goals include improving vegetation quality and controlling non-native and invasive plant species such as purple loosestrife (*Lythrum salicaria*) and common reed (*Phragmites australis*). The relationship between runoff from various sources and the connection to the sludge drying beds need to be thoroughly examined.

[6] George Roadcap, Illinois State Water Survey, site meeting 2000.

EXHIBIT VI: DEADSTICK POND OVERVIEW



LEGEND

- PROPERTY BOUNDARY
- COMMON REED (PHRAGMITES AUSTRALIS)
- BROAD-LEAVED CATTAIL (TYPHA LATIFOLIA)
- COMMON REED/ EASTERN COTTONWOOD (POPULUS DELTOIDES)
- TRADITIONAL LANDSCAPING
- DITCH OR STREAM FLOW
- INLET
- CULVERT

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1"=500'

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SCALE FEET

BIG MARSH
Size: 310 acres
Owner: Waste Management, Inc.

Existing Conditions

Big Marsh with ACME Steel in Background

Big Marsh (Exhibit VII) is the largest stand-alone wetland complex in the Calumet area, and contains the largest individual wetland in the area (72 acres). It consists of a mixed marsh/wetland community dominated by common reed (*Phragmites australis*). Big Marsh is owned by Waste Management Inc. The site is bordered by the closed Acme Steel coke plant on the east, the Cluster Site on the south, Stony Island Avenue on the west, and a Norfolk and Southern Railroad property on the north. There are 87 acres of open water, 68 acres of predominantly common reed, and 126 acres of upland fill on the site. Of the five Phase I sites, Big Marsh contains the most upland habitat areas, which were created largely with foundry slag. Even after several decades, these areas have poor soils and support sparse vegetation that consists mainly of low-quality weedy species. A 22-acre parcel of land in the southeast corner of the site is composed of innocuous fill that contains a high percentage of iron. Thirty-nine acres of the southern filled section, bordered by Paxton II landfill, contain impenetrable slag and has been devoid of vegetation for 35 years (Roadcap, 2000.) Only a few eastern cottonwood trees (*Populus deltoides*) and low herbaceous vegetation have managed to establish during this time. Concerns have been stated that this section of slag should not be mined or disturbed because of potential safety concerns associated with the Cluster Site. A thorough contaminant analysis will determine the best course of action.

Big Marsh is less than two feet deep in most areas. Water quality is impacted by high pH levels; in some areas the pH reaches 12.6. Bottom sediments in the marsh are natural muck soil that has not been dredged. The southeastern part of the site is covered with white calcite that leaches out of the slag from adjacent upland fill. When the calcite precipitates out of the water, it takes heavy metals and other pollutants to the bottom of the marsh.

Based on the 1965 USGS map for the area (photorevised 1973, photoinspected 1977), the only inflows to Big Marsh are a ditch on the northern property boundary and surface runoff from the Cluster Site. A drop inlet in the southwest corner of the property drains water into Slip Number 8 of Lake Calumet through a culvert under Stony Island Avenue. The amount of outflow to the lake is controlled by the water level of the lake and the culvert between them. The northeastern portion of Big Marsh is hydrologically isolated from the western portion by a berm. The berm was built as a Resource Conservation and Recovery Act (RCRA) Supplemental Environmental Project (SEP). Waste Management, Inc. was required to develop and implement a water control strategy for the site to serve as the SEP. It appears that water in the north end overflows from the east to the west only

Exhibit VII: Big Marsh Overview

during heavy storm periods. The Hydrologic Master Plan will assess the situation in more detail.

Between 1980 and 2000, Big Marsh was used at times by state endangered black-crowned night heron (13 of 20 years), little blue heron, snowy egret, black tern, common moorhen, and yellow-headed blackbird. In addition, it was used by the state-endangered least bittern and pied-billed grebe (Mankowski 2001).

Big Marsh Next Steps

A major impediment to rehabilitating this site is lack of knowledge about the location and nature of contaminants in the fill material. During dry periods in the marsh, when water levels may drop and expose inundated sediments, some contaminants may be released through oxidation, exposing wildlife and humans using the site to possible health risks. Studying the site and creating a map of possible contaminant locations will, therefore, be important first steps of the management plan. Subsequent ecological rehabilitation activities will need to avoid, cap, remove, or otherwise render inert any harmful contaminants on the site.

The top priorities of long-term ecological management at Big Marsh will be preserving existing marsh habitats – with a special emphasis on protecting potential black-crowned night heron (*Nycticorax nycticorax*) rookery habitats – and improving overall water and vegetation quality. Increased recreational opportunities will be a secondary gain of general improvements in ecological health.

LAKE CALUMET

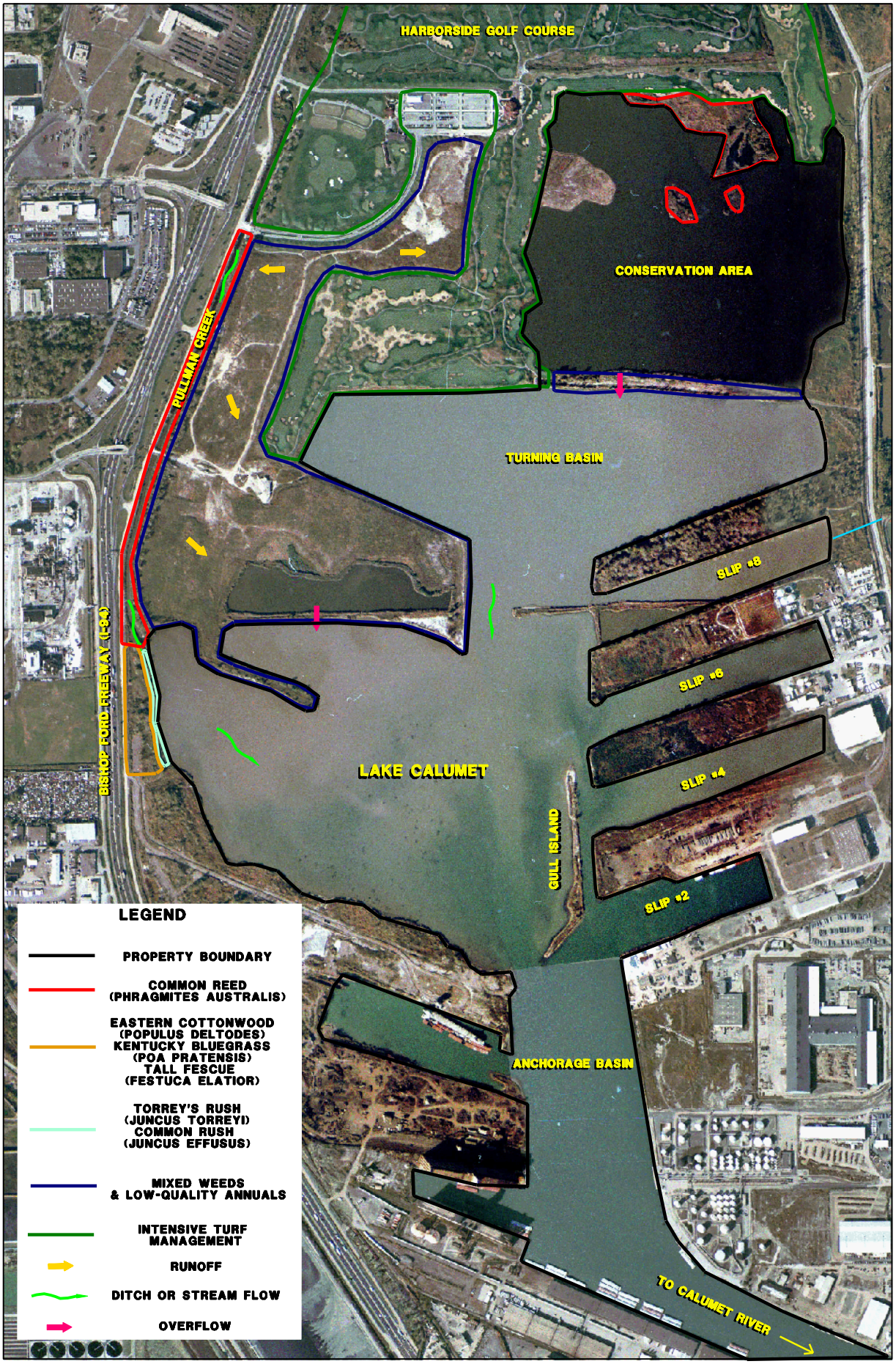
Size: 566 acres; Conservation Area is 150 acres
Owner: Illinois International Port District

Existing Conditions

Lake Calumet Slips

Lake Calumet (Exhibit VIII) contains 442 acres of open water from the North Turning Basin to the beginning of the Anchorage Basin. There are four slips (Numbers 2, 4, 6 and 8) on the eastern portion of the lake. The slips are eight to ten feet above water level and are severely eroded in most places due to a lack of sea wall infrastructure. Barge traffic does not currently utilize the area north of Slip Number 4. Gull Island is located just west of Slip Numbers 2 and 4 and restricts access to Slip Number 4.

EXHIBIT VIII: LAKE CALUMET OVERVIEW



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1000 0 1000 2000
1"=1000' SCALE FEET

The water quality in Lake Calumet is unknown, although anecdotal evidence has suggested it is generally good. There are numerous hydrologic connections to other, more contaminated sites. Stormwater detention methods such as detention ponds have been employed to slow and filter stormwater prior to draining into the lake from Harborside Golf Course. Stormwater also drains directly into the lake from the Cluster Site, several industrial properties and other adjacent vegetated uplands. Pullman Creek connects to the lake at a single point along the west shoreline, and Big Marsh drains into Slip Number 8 on the east side. A water control structure regulates flow from the Conservation Area into the lake through the berm on the northern shoreline. On the east shore, a storm sewer outlet conveys water into the lake from Torrence Avenue, the Norfolk and Southern Railroad yards, the City Auto Pound, and other unidentified areas. Water in Lake Calumet drains from the Anchorage Basin to the Entrance Basin and then out to the Calumet River. And additional runoff enters from an industrial area located west of Interstate 94. The installation of a structure to aerate the incoming water from the west side culvert has been proposed.

The shoreline along the southwestern edge of Lake Calumet remains free of seawall or other infrastructure. This stretch of shore, approximately one mile, extends from the inlet of Pullman Creek to the Anchorage Basin. The soil is extremely gravelly sand, which may impede vegetative growth. In addition, large concrete blocks and large amounts of garbage litter the shore. The nearby upland, a constructed berm, supports non-native grasses and weedy plant species.

The western portion of the Turning Basin has been fully dredged to 10 feet and rip rap has been placed along the shoreline. The dredged material was utilized to cap the old City of Chicago landfill at 103rd Street as part of the closure plan prior to building Harborside Golf Course. In removing the clay material, over 200,000 fish were removed from Lake Calumet, as part of a project, implemented in coordination with the Illinois Department of Natural Resources.

Gull Island, the Conservation Area, West Pullman Creek, Harborside Golf Course, and the roadsides along Doty and Stony Island Avenues are adjacent to or contained within Lake Calumet and are considered in the ecological planning for the lake. Each of these secondary sites is described briefly below. The Illinois International Port District refers to the Harborside Golf Course, Conservation Area, and Turning Basin collectively as the Harborside Complex.

Gull Island

GULL ISLAND

Gull Island (Exhibit VIII) is an 1,800-foot long, 40- to 120-foot wide mound that rises out of the eastern portion of Lake Calumet. It was inadvertently created with displaced dredge spoils from the port area of Lake Calumet. The island is located near slip Numbers 2 and 4 and is separated from the slips by a 150-foot wide channel that is between four and ten feet deep. The 2.3 acres of created land eventually became a nesting site for gulls, for which it was named. The island is

completely dominated by common reed (*Phragmites australis*). Along the shore on all sides is evidence of severe erosion and cutting caused by wave action from passing boats.

THE CONSERVATION AREA

The Conservation Area (Exhibit VIII) is a large lake that was recreated by dredging fill of the original lake. It is bordered by Harborside International Golf Complex on the north and west, and is bounded by Stony Island Avenue on the east. A constructed berm separates the southern edge of the Conservation Area from Lake Calumet, and a water control structure installed in the berm retains the water level in the Conservation Area at 2 to 3 feet higher than the level in the lake. The Conservation Area contains 135 acres of open water and 2.2 miles of shoreline. There also are several wetlands scattered along the eastern and southern shorelines that are mostly dominated by common reed (*Phragmites australis*).

Two wetland mitigation sites are located in the Conservation Area: a 6.5-acre site along the western shore and a 1.5-acre wetland on the northeast shore. The 6.5-acre site was created as a wetland with low-quality fill material, and it consequently has little vegetation. The smaller wetland is dominated entirely by common reed (*Phragmites australis*).

Lake Calumet Conservation Area with Harborside Golf Course in Foreground

Of the 2.2 miles of shoreline in the Conservation Area, 1.4 miles (63%) are directly adjacent to golf course greens, fairways or sand traps (see photo at left). Sheet metal structures were installed to retain the sand in some locations where sand traps are in direct contact with water. soil erosion is an ongoing problem where portions of the golf course meet the water. In some places, the sod is sloughing and crumbling, requiring stabilization.

WEST PULLMAN CREEK

West Pullman Creek (Exhibit VIII) is a wide excavated ditch that runs between Doty Avenue and the western boundary of Lake Calumet for approximately one mile. It enters the Calumet area north of 111th Street through a culvert under I-94 and Doty Avenue and drains into Lake Calumet south of 116th Street. Runoff from Doty Avenue enters the creek directly. Various culvert structures and rip-rap have been installed to manage water flow. Pullman Creek connects to the west side of Lake Calumet at a single point. There is a lift station managed by the State of Illinois at 111th Street. The ditch is the main drain for a portion of the Bishop Ford Expressway. Large amounts of salt used for ice control on the expressway are discharged and leave residuals within the ditch. The Port District

attempted to use Pullman Creek as a fresh water irrigation source for the golf course, but the salt content was too high to support conventional grasses.

The ditch is approximately 40 feet wide and is buffered by common reed (*Phragmites australis*) at the waterline and weedy upland plants in drier areas on steep slopes. Some stretches of bank have virtually no vegetation at all. Water depths are generally less than two feet but vary with rain. A berm composed of a mixture of fill and topsoil separates West Pullman Creek from Lake Calumet along the lake's western shore. Common buckthorn (*Rhamnus cathartica*) and eastern cottonwood trees (*Populus deltoides*) dominate the berm with an irregular mixture of non-native grasses and weedy flowering plants in the understory. The creek bed is exposed during low flows and is lined with trash and debris. Oily material, possibly from the highway, seeps into the creek in several spots, leaving smears along the shoreline and coating stones and exposed mudflats. Pullman Creek appears to be maintained for water flow purposes. As a result, common reed (*Phragmites australis*) is periodically removed.

HARBORSIDE GOLF COURSE

Harborside Golf Course; Source: www.harborsidegolf.com

The Harborside International Golf Complex (Harborside) was constructed on top of a former landfill. The roughly 220-acre complex includes two 18-hole courses, a practice course, a golf academy, two clubhouses, parking and golf cart facilities, and a pro shop. The closed landfill was covered with dredged material from Lake Calumet and biosolids from the Metropolitan Water Reclamation District's drying beds. The golf course was designed as a links-style course intended to replicate natural landforms, using native seed as much as possible. Because of its location in an area where migratory birds congregate for resting and foraging, Harborside has received an Audubon designation of IV for the quality of its bird habitat.

ROADSIDES ALONG DOTY AND STONY ISLAND AVENUES

Many of the roadsides and associated ditches along Doty Avenue and Stony Island Avenue drain into Lake Calumet, often carrying road salt and other contaminants. In large part due to the heavy salt load, these ditches support monocultures of common reed (*Phragmites australis*). Some of the ditches are wet enough to provide small areas of habitat for wildlife. The ditches are frequently used for fly dumping, and the debris and garbage create a management problem.

Lake Calumet and Adjacent Sites Next Steps

Shorelines along Lake Calumet have potential for reconstruction to reduce erosion. Native plants should be planted at the lake edges to assist with this effort and naturalize the lake features. The western shore would be a key area to improve shorebird habitat, since this part of the lake is shallow and has a sandy bottom. Slip 8 (the northeastern slip) provides an opportunity for rehabilitation as an isolated native preserve including wet woods and emergent wetland, provided all environmental contaminants are removed and no further industrial development occurs. This possibility merits further evaluation.

Once a popular birding spot, Lake Calumet's access has been reduced by installation of fencing and razor wire around the site to prevent illegal dumping. An observation platform with public access is recommended for either the northeastern corner (near Slip Number 8 and the Conservation Area) or the western shore. The western portion of the Turning was recently being targeted for a marina by the Port District. Herbicide and fungicide usage on Harborside Golf Course should be analyzed with respect to runoff and impacts on the lake and the Conservation Area.

No action is suggested for Gull Island at this time.

The Conservation Area, which currently contains several wetland mitigation sites, needs soil rehabilitation and planting to be sustained. The shores would also benefit from additional plantings to reduce soil erosion.

Native salt-tolerant vegetation should be established in Pullman Creek to aid in filtering water draining from the Bishop Ford Expressway into Lake Calumet. The ditches along Doty and Stony Island Avenues need further analysis to assess their water quality impacts on Lake Calumet and potential benefits of various ecological rehabilitation techniques. This will be informed further by the Hydrologic Master Plan, as any areas which process stormwater and flush contaminants when they could be filtering and storing stormwater deserve more attention.

Indian Ridge Marsh with Cargill in Background

INDIAN RIDGE MARSH
Size: 145 acres
Owner: Various private owners and City of Chicago

Existing Conditions

Indian Ridge Marsh (Exhibits IX and X) contains a variety of habitat types, including open water, marshes and woodlands that host a number of conservative bird species. The land surrounding the site is mainly devoted to industrial production, but there are a few at the northern edge and northeastern corner of the site. Until recently, Acme Steel operated a coke plant just north of the site. Cargill and Continental Grain own grain silos on the east side of Torrence Avenue. Southeast of the site, the Torrence Avenue Bridge spans the Calumet River. The twin landfills, Paxton II and Land & Lakes, are visible along the western horizon of the site. Norfolk and Southern Railroad operates a rail line along the western boundary. Ironically, the interior of the site seems almost entirely isolated from the nearby industries, although occasional odors and train noise do filter in.

The Indian Ridge Marsh site is a long, narrow rectangle of land. It is divided by 122nd Street into Indian Ridge Marsh North, which covers 110 acres, and Indian Ridge Marsh South, which is roughly square and consists of 35 acres. Overall, there are 98.6 acres of wetland – including 28.3 acres of unvegetated open water – and 50.3 acres of upland on the site. The wetlands have been degraded over the years by an influx of surface and groundwaters that have contained large amounts of road salt, organic nutrients and other industrial materials.

Indian Ridge Marsh was originally an area of mixed wetland and sand prairie lying just beyond the original shoreline of Lake Calumet. A result of the Lake Chicago glacial process, Indian Ridge Marsh is a beach ridge that once stood above the water surface, providing high ground for a Native American trail. After European settlement of the region, Indian Ridge continued to be used for overland transportation between Indiana and Chicago. The routing of a railroad across the site probably also took advantage of the relatively high elevation of the ridge. In the 1860s, Senator Stephen A. Douglass and William Ogden, Chicago's first mayor, owned the site. By 1870, the land was platted for residential development, and most of the more than 1,000 platted lots were sold to land speculators (Weston 1998).

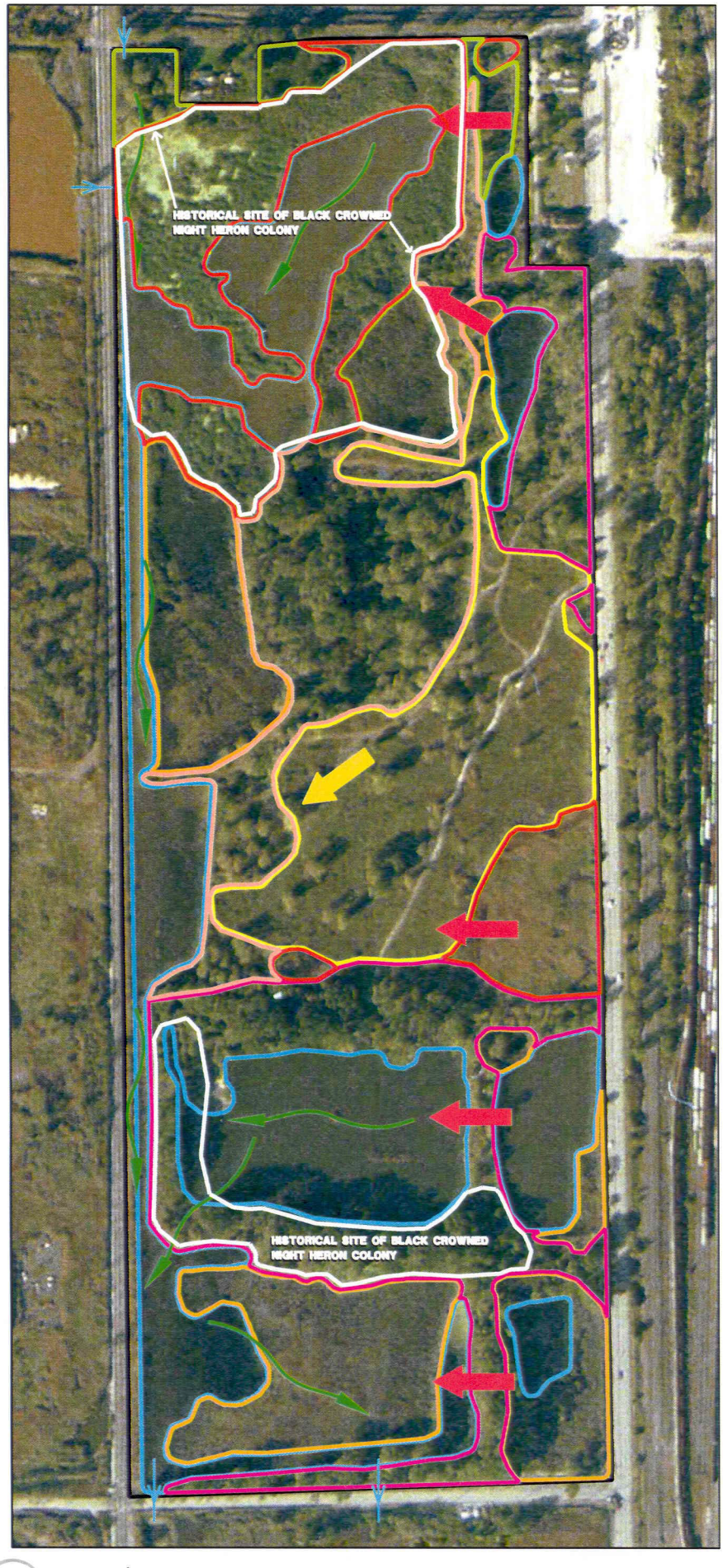
For unknown reasons, the platted street rights-of-way were never constructed at the Indian Ridge Marsh site, and full-scale development never occurred. As previously mentioned, only six houses were ever built on the approximately 1,000 parcels that comprise the site. The number of platted residential units in the subdivision probably discouraged development of Indian Ridge Marsh for the industrial and solid waste uses seen elsewhere in the Lake Calumet region (Weston 1998).

Invasive plants that can tolerate degraded conditions thrive here. Eastern cottonwoods (*Populus deltoides*), Kentucky blue grass (*Poa pratensis*) and tall goldenrod (*Compositae Solidago altissima*) are the most common upland plants; nuisance species like sweet clover (*Melilotus officinalis*), Japanese knotweed (*Polygonum cuspidatum*), garlic mustard (*Alliaria petiolata*), thistles, honeysuckle (Lonicera japonica), wild parsnip (*Pastinaca sativa*) and common buckthorn (*Rhamnus cathartica*) are also present. Wetland areas are dominated by invasives such as common reed (*Phragmites australis*), narrow-leaved cattail (*Typha angustifolia*) and Reed canary grass (*Phalaris arundinacea*). Purple loosestrife (*Lythrum salicaria*), an exotic species, has severely invaded much of the wetland area. Since most of the upland vegetation is located on old fill material, and topsoil on the site is generally shallow, few highly conservative plant species are present. Native plants include red-osier dogwood (*Cornus stolonifera*), Virginia creeper (*Parthenocissus quinquefolia*), jewelweed (*Impatiens capensis*), blue vervain (*Verbena hastata*) pale sedge (*Carex granularis*).

Soils on the northern portion of the site consist of relatively uniform fill that is light gray clay loam to silty clay loam. The soil ranges from 6 to 20 inches deep and overlies fused foundry sand, other industrial waste products, and, in some cases, an impenetrable layer of slag. The soil has low organic content in most areas with essentially no organic material in areas of exposed fill. It is generally firm with moderate to severe compaction. Piles of miscellaneous materials are common on the northern portion of the site. Historical records suggest that some of the site may have been mined for sand. Most filling activities at the site have occurred since 1930 (Colten 1985).

The surface and subsurface waters of Indian Ridge Marsh are poor quality because of stormwater inflow from heavily salted roadways, extensive slag deposition and leachate from municipal waste dumps at the neighboring Cluster Site (Roadcap et al, 1999). Surface and groundwaters throughout the Indian Ridge Marsh site are highly alkaline due to reactions between slag, water and air. Portions of the water also contain high levels of ammonia, heavy metals and low dissolved oxygen.

EXHIBIT IX: INDIAN RIDGE MARSH NORTH OVERVIEW



LEGEND

- PROPERTY BOUNDARY
- OPEN WATER
- MIXED GRASS AND OLD FIELD VEGETATION
- NARROW-LEAVED CATTAIL (TYPHA ANGUSTIFOLIA)
- PURPLE LOOSESTRIFE (LYTHRUM SALICARIA)
- EASTERN COTTONWOOD (POPULUS DELTOIDES)
- EASTERN COTTONWOOD/ COMMON BUCKTHORN (RHAMNUS CATHARTICA)
- COMMON REED (PHRAGMITES AUSTRALIS)
- EASTERN COTTONWOOD/ COMMON REED/ SANDBAR WILLOW (SALIX INTERIOR)
- CULVERT
- OVERFLOW
- RUNOFF
- DITCH OR STREAM FLOW

300 0 300 600

1" = 300

SCALE FEET

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Scientists
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EXHIBIT X: INDIAN RIDGE MARSH SOUTH OVERVIEW

LEGEND

- PROPERTY BOUNDARY
- PURPLE LOOSESTRIFE (LYTHRUM SALICARIA)
- BOX-ELDER (ACER NEGUNDO) ON UPLAND FILL
- COMMON REED (PHRAGMITES AUSTRALIS)
- NARROW-LEAVED CATTAIL (TYPHA ANGUSTIFOLIA)
- OPEN WATER
- CULVERT
- OVERFLOW
- DITCH OR STREAM FLOW

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The water level in Indian Ridge Marsh North is controlled by a small culvert located under 122nd Street near the western boundary of the site. The culvert has often been blocked by debris, preventing drainage of the north section of the marsh and resulting in artificially high water levels. Beavers have also been considered culprits in blocking the culvert at times. A new water control structure installed in spring 2001 is regulating water levels, but it requires modification to handle extreme fluctuations over the long term. Water inflow to Indian Ridge Marsh North comes from three culverts under the railroad tracks on the western property boundary and one culvert under 116th Street on the north. The Illinois State Water Survey (Roadcap et al, 1999) estimates that surface runoff from 13 acres of Cluster Site land and 1 acre of railroad ditch drain into Indian Ridge Marsh North through these four culverts.

Collecting data about newborn black-crowned night herons as part of Illinois Natural History Survey Fledgling Success Study

Water from Indian Ridge Marsh South drains through a ditch along the east side of the railroad and empties into the Calumet River. Currently, there is no flow control structure on the ditch; water levels in Indian Ridge Marsh South are therefore directly related to the water level in the Calumet River and Lake Michigan. This ditch outfall, too, is often cluttered with debris, and therefore may restrict the outflow and affect the water level in the marsh.

Sampling for invertebrates as part of Illinois Natural History Survey's Invertebrates Study

Indian Ridge Marsh has an abundance of wildlife including large numbers of wading birds in wetlands and shallow open water areas. In 2001, high water levels forced the black-crowned night heron to nest at Heron Pond. In 2002, they established a rookery in the northwest portion of Indian Ridge Marsh North in common reed stands and at Heron Pond with roughly 300 pairs occupying the site. They also once nested closer to 122nd in years past. Little blue heron (*Egretta caerulea*), a state-threatened species, nested at the site in 2000 and 2002. The state-endangered yellow-crowned night heron (*Nyctanassa violacea*) and state-threatened least bittern (*Ixobrychus exilis*) have also used this site. The area has also been used over the past 20 years by the state-endangered yellow-headed blackbird and state-threatened common moorhen. (Mankowski 2001). Other bird species of interest that are frequently observed at Indian Ridge Marsh include great egret (*Ardea alba*), American coot (*Fulica americana*), great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), American goldfinch (*Carduelis tristis*), red-tailed hawk (*Buteo jamaicensis*), American woodcock (*Scolopax minor*), tree swallow (*Tachycineta bicolor*), wood duck (*Aix sponsa*), yellow warbler (*Dendroica petechia*), northern flicker (*Colaptes auratus*), barn swallow (*Hirundo rustica*), blue jay (*Cyanocitta cristata*), swamp sparrow (*Melospiza georgiana*) common moorhen (*Gallinula chloropus*), spotted sandpiper (*Actitis*

maculana), blue-winged teal (*Anas discors*), marsh wren (*Cistothorus palustris*), sora (*Porzana carolina*), Caspian tern (*Sterna caspia*), and tree swallow (*Tachycineta bicolor*) (SDI 1999; D. Stotz and W. Marcisz, personal observation).

The Indian Ridge Marsh Model

Indian Ridge Marsh is highlighted in this report as a sample site to outline how future ecological rehabilitation could take place on individual sites. Not all sites, however, will move forward in this exact manner. Sites will advance based on the PIC goals, financial resources and their constraints, priorities of management partners, and other realities. Of course, existing contamination will require attention as well. Indian Ridge Marsh provides an excellent example of the detailed analysis that will be conducted for each site. Below are the results from Phase I and Phase II studies of the property.

PHASE I INVESTIGATION[7]

Mostardi-Platt conducted a Phase I Environmental Site Assessment (ESA) at Indian Ridge Marsh (1999) for CorLands. The object of the ESA was to use American Society for Testing and Materials standards to determine the site's prior uses and possible contamination. The ESA included a review of available records, maps and photographs, as well as a site inspection. It identified 14 solid and hazardous waste management facilities within 0.5 mile of IRM. Contamination had been identified at these facilities.

The report concludes that the site was used for disposal of solid and industrial wastes. It identifies no current disposal activities at the site but notes the presence of piles of slag and other unidentified materials. The report states that elevated concentrations of arsenic, chromium, lead, manganese and PAHs are present in the sediment and surface water at the site (Mostardi-Platt 1999).

PHASE II INVESTIGATIONS

Earth Tech, Inc. (Earth Tech 1999) and Harza (2001) have recently studied Indian Ridge Marsh to determine the nature and extent of contamination that may be present. In addition, there have been several investigations of the Lake Calumet Cluster Site that pertain to Indian Ridge Marsh. This section briefly describes the investigations, summarizes the data collected, and evaluates the potential risks associated with the contamination to on-site biota.

Earth Tech (1999) conducted a Phase II environmental site investigation at Indian Ridge Marsh for USACE, seeking to characterize the material disposed on site. The project consisted of sampling soil, sediment and surface water in both the northern and southern portions of the site. Earth Tech compared the soil and sediment analytical results to Illinois EPA's Tiered Approach to Corrective Action Objectives (TACO) for residential soil remediation. Concentrations of the following soil and sediment constituents exceeded the objectives for:

- PAHs, including benzo(a)pyrene, dibenzo(a,h) benzo (a)anthrancene benzo(k)flouranthene and indeno(1,2,3-cd) pyrene

[7] Phase I and Phase II Investigation sections are taken from Tetra Tech 2001.

- Pesticides, including carbazole and dieldrin
- Heavy metals, including antimony, arsenic, beryllium, cadmium, chromium, iron, lead, manganese, nickel and vanadium

During an investigation of the Lake Calumet Cluster Site (Ecology and Environment 1999), surface water and sediment samples were collected in the channel adjacent to the railroad tracks along the western boundary of the site and a pond on site. The objective was to assess the potential impacts of releases from the Lake Calumet Cluster Site on the sensitive habitat at Indian Ridge Marsh. To evaluate the potential risks to the aquatic community, the concentrations were compared to the Illinois Water Quality Standards.

Only two surface water samples were found to contain constituent concentrations exceeding the Illinois Water Quality Standards. One sample collected in the channel had a lead concentration exceeding the standard, and one sample collected from the pond near 122nd and Torrence contained excessive concentrations of the following metals: cadmium, chromium, copper, lead, mercury, and zinc. The sediment analytical data was also compared to Ontario Ministry of Environment Sediment Quality Guidelines. These guidelines delineate an expected lowest level effect and severe effect for freshwater benthic aquatic invertebrate organisms. Concentrations of the following constituents were found to exceed the lowest level: arsenic, cadmium, chromium, copper lead, manganese, mercury, and zinc. Copper, lead, manganese, and zinc exceeded the severe level. As with the surface water results, the sample with the highest sediment contamination was collected from the pond near 122nd and Torrence.

Harza (2001) generated the most current data on the chemical constituents in media. The objective of Harza's study was to collect soil, groundwater, surface water and sediment data to characterize any contamination at the site. Soil borings collected both soil and groundwater samples. Soil samples provided surface and basal material. The surface samples consisted of the upper portion of the soil column, using visual observation to identify areas with the highest level of potential contamination. To evaluate the potential risk to construction workers and volunteers who could potentially work at Indian Ridge Marsh, researchers compared the soil analytical data to Illinois EPA's TACO soil remediation objectives for industrial facilities. No constituent concentrations in soil exceeded the objectives.

To evaluate the potential risks to the terrestrial ecological community the solid data was compared to USEPA Region 5 Ecological Data Quality Levels (EDQL) (EPA 1997). EDQLs ensure that analytical detection limits are adequate to detect potential ecological impacts. They can also screen for ecological receptors. However, EDQLs are based on the lowest concentrations that may impact an ecological receptor for a specific media and are considered a conservative screening tool. Several metals exceeded the EDQLs. They included arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel and zinc.

Harza's groundwater analytical results were compared to Illinois Water Quality Standards for protecting human health and aquatic life. The groundwater data did not

exceed the standards for human health. Chromium, lead and zinc exceeded the standards for protecting aquatic life.

To further evaluate the potential risks to the aquatic community at Indian Ridge Marsh, Harza's surface water analytical results were compared to Illinois Water Quality Standards for aquatic life. Concentrations of lead and cyanide exceeded these values.

The U.S. Environmental Protection Agency (EPA) and Illinois EPA do not have sediment standards for protecting ecological receptors; however, the Ontario Ministry of Environment has developed Sediment Quality Guidelines based on lowest-effect levels and severe-effect levels (Persaud 1993). Researchers used these guidelines to screen the sediment analytical results to identify potential areas of concern. Concentrations of the following sediment constituents exceeded lowest-effect levels: arsenic, cadmium, chromium, lead, manganese, mercury, nickel and zinc. Concentrations of arsenic, cadmium, chromium, lead, manganese, mercury, nickel and zinc exceeded the severe-effect levels. The sediment samples that were compared to the sediment criteria were located in the channel on the western portion of Indian Ridge Marsh.

In summary, most of the soil samples whose constituent concentrations exceeded benchmarks for protecting human and ecological receptors came from the eastern-central portion of Indian Ridge Marsh or along 122nd Street. The groundwater samples whose constituent concentrations exceeded the benchmarks were collected in the central area of Indian Ridge Marsh North as well as immediately northwest of the intersection of 122nd Street and Torrence Avenue. The surface water analytical data also revealed a localized area of contamination in the northwestern portion of the site, which receives surface water runoff from the Lake Calumet Cluster Site. The sediment samples with constituent concentrations exceeded the lowest effect levels and severe effect levels were collected in the western channel just north and south of 122nd Street and in the marsh area just northwest of the intersection of 122nd Street and Torrence Avenue.

The Chicago Department of Environment, in cooperation with Illinois Department of Natural Resources, is finalizing an Ecological Risk Assessment of the site. It is hoped that this assessment will help serve as a template for ecological risk analysis and decision making for most natural areas in the Calumet region.

Indian Ridge Marsh Next Steps

At the time of this printing (2002) the Indian Ridge Marsh ecological rehabilitation planning is well underway. As there have been dredging spoils deposited on the site as a result of the U.S. Army Corps of Engineers (USACE) dredging of the Calumet River, the site is eligible for up to $5 million from their Section 1135 Funding Program of the Water Resources Development Act. This funding allows for cleanup and rehabilitation of the site. The Chicago Department of Environment is acting as local sponsor, responsible for up to a 25% match for the project and is coordinating closely with USACE to ensure the project achieves the goals set forth in the Ecological Management Strategy. As previously stated, the Illinois Department of Natural Resources is working closely with CDOE to determine what ecological toxicity issues may need to be addressed while cleaning up and enhancing the habitat on the site. Detailed designs will be developed,

working from a range of alternatives. Input will be provided by the Calumet Government Working Group and Calumet community representatives. It is expected that physical work on the site will begin in 2003.

Following is the Preserve, Improve, Create (PIC) chart for Indian Ridge Marsh.

Table 3 : Management Guidelines for Indian Ridge Marsh

NOTE: Shaded areas indicate PIC goals for Phase I sites; asterisks show which are applicable at Indian Ridge Marsh

Resource Categories	Resource Targets	P Preserve[8]	I Improve[9]	C Create
Wetland Habitat & Wildlife	Marsh habitat	?		
	?? Potential black-crowned night heron habitat	?		
	?? Transitional habitat for birds – includes common reed where it provides critical short-term habitat	?		
	?? Other marsh-dependent breeding birds	?		
	?? Native emergent marsh vegetation	?		
	?? Amphibian habitat (frogs and mud puppies)			
	Existing native seed banks	?		
	Other habitat critical to species of concern[10]	?		
	Shorebird habitat			
	Submergent species assemblages			
Upland Habitat & Wildlife	Other habitat critical to species of concern[11]			
	Upland habitat		?	
	Vegetation quality (prairie, woodland)		?	
	Grassland habitat		?	?
	Diverse upland habitat structure (grasslands, brush, small trees, etc.)			?
	Grassland assemblages of birds and herptiles			
Aquatic Habitat	Other habitat critical to species of concern[11]			
	Native fish habitat			
Water / Hydrology	Current functional hydrologic connections	?		
	Other habitat critical to species of concern[11]			
	Water levels (control of fluctuations)		*	
	Water quality (control of groundwater and surface water pollutants)		?	
Physical Parameters	Native soils	?		
	Soil quality		?	
	Sediment quality		?	
Socioeconomic Parameters	People's attachment to places		?	
	Regional/interstate access to region		?	
	Recreational uses that do not conflict with ecological goals or safety concerns	?		?
	Opportunities for learning about local nature and native landscapes		?	

[8] Anything in the "preserve" category will also be "improved."
[9] Improvement methods will include general enhancements, site rehabilitation, and, on rare occasions, restoration to presettlement conditions.
[10] A critical gap is the lack of complete inventories for each site. There may, therefore, be more threatened and endangered or otherwise conservative species on these sites that are not yet known.

OTHER RELATED SITES

Cluster Site with Alburn Incinerator Parcel in Foreground

Cluster Site
Size: 200 acres
Owner: Private

The Cluster Site is a group of former industrial sites and garbage dumps just east of Lake Calumet and west of Indian Ridge Marsh. Historic waste handling activities have included land filling, liquid waste treatment and drum management. The facilities in the Cluster Site are no longer in operation, although the U.S. Environmental Protection Agency and Illinois Environmental Protection Agency are performing on-going corrective action.

Surrounding the Cluster Site are three landfills - Paxton I, Paxton II and Land and Lakes landfills. The Cluster Site consists of four sections called Alburn Incinerator, U.S Drum, Unnamed Parcel and Paxton Lagoons. The Alburn site operated from 1967 through 1977. The area was used for hazardous waste incineration and storage, and surface impoundment for bulk liquid waste. The U.S. Drum site operated from the 1940s until 1979. It was a municipal and industrial waste dump, hazardous waste transfer station, and temporary waste drum storage area. The Unnamed Parcel was also likely used as a landfill between 1940 and 1960. Paxton Lagoons began as an illegal dump site in the 1940s and has been capped.

The City, USEPA, and IEPA are currently working on the site, defining the remaining areas of contamination and developing a remediation plan. During the summer of 2000 the IEPA completed 134 test pits on the Alburn, U.S. Drum and Unnamed parcels. The test pits were dug to between 10 and 30 feet below ground surface. All but one contained industrial/medical waste and/or solid waste. Samples were collected and sent to a USEPA laboratory for analysis. Preliminary results indicate widespread contamination throughout the Cluster Site. CDOE has completed a Comprehensive Site Investigation (CSI) report. IEPA, with input from the Calumet Cluster Site Group, completed a Remedial Options Report.

There are final results from the 2000 investigation that indicate that more than 103 acres of the Cluster Site could be considered an unpermitted landfill. Paxton Lagoons was not included in the 2000 sampling event due to the IEPA completing remedial work and cap installation in 1992. IEPA is currently conducting a $16 million corrective action at Paxton II and plans to perform corrective action at Paxton I. IEPA is actively collecting leachate from Paxton II which will help abate contamination at the Cluster Site.

The site has one very small wetland area on the northeastern edge of the lowland area – sometimes referred to as Grebe Pond. It was used in 10 of the past 20 years by the state-threatened pied-billed grebe (Mankowski 2001).

Based on the CSI and Remedial Options Report, an abatement and control strategy will be developed. Some goals of the strategy are: 1) protect human health in the nearby communities; 2) protect the sensitive ecosystems of neighboring Indian Ridge Marsh, Big Marsh and Deadstick Pond; and 3) provide additional healthy green space using native vegetation.

The downstream impacts of runoff and groundwater from the Cluster Site need to be monitored and managed. The use of greenhouses and/or aquatic plants to filter out ammonia or other pollutants during the winter months is a possibility. The extent of ecological potential on the site is yet unknown.

MWRD SEPA STATION

The Metropolitan Water Reclamation District (MWRD) Sidestream Elevated Pool Aeration (SEPA) Station is a 10-acre property located on the north bank of the Calumet River, at the south end of Indian Ridge Marsh South. At this facility, water is pumped from the river and then cascades back to the river over a series of five artificial waterfalls. The turbulence increases the dissolved oxygen in the water, which improves water quality for both plants and animals. The landscaping is well-maintained and could include more native plants to provide food and shelter for wildlife. A riverbank stabilization project would also reduce erosion. George Roadcap of the Illinois State Water Survey has suggested that pumping SEPA station water into Indian Ridge Marsh South may facilitate water quality improvements. This idea will be evaluated as part of the Hydrologic Master Plan.

MWRD SEPA Station in Foreground at Right; MWRD Biosolids Drying Facility in Background

Ecological Management Techniques

INTRODUCTION[11]

A broad palette of possible ecological management techniques is available for the Calumet sites. Following is a sampling of some of the techniques under consideration; more will be evaluated on a site-by-site basis as projects move forward. Site details and objectives will determine which methods will be appropriate for each EMS property.

WATER

A sandy aquifer underlies much of the Calumet EMS Phase I area. Water yields from this aquifer are low, and contamination may exist. Underlying the aquifer are relatively impermeable glacial deposits, and underlying the glacial deposits is a bedrock aquifer of Silurian age dolomite.

The Silurian dolomite, which is several hundred feet thick, forms a semi-confined aquifer. Some of the outer Chicago suburbs obtain their drinking water from this aquifer. Most small-capacity wells in the Calumet area are completed in this bedrock unit at depths of 300 to 400 feet bgs (below ground surface). Well yields from the dolomite range from 5 to 30 gallons per minute. The Silurian dolomite has a top elevation of approximately 500 ft NGVD (National Geodetic Vertical Datum) at the site.

Groundwater Control

The regional groundwater is controlled by the levels of Lake Michigan, Lake Calumet and the Calumet River. The local groundwater level, gradient, and direction of discharge will be evaluated as part of the Hydrologic Master Plan. Groundwater generally moves from areas of higher gradient to lower gradient. Currently, ammonia is known to be a significant regional contaminant of the groundwater. The concentrations may be high enough to affect the success of rehabilitation efforts, especially for aquatic life. Ammonia is a well-documented toxicant for fish and aquatic invertebrates; its toxicity is both temperature- and pH-dependent (EPA 1999).

Where contamination may be present in groundwater, three possible remediation methods are listed below.

INTERCEPTOR DRAIN

An interceptor drain (or French drain) diverts contaminated groundwater and discharges it to another area. It consists of perforated, high-density polyethylene (HDPE) tubing; filter fabric membrane and a gravel-filled trench. It could be installed either separately or in combination with a cut-off barrier. Interceptor drains require maintenance as well as discharge permitting, monitoring and reporting.

CUT-OFF BARRIER

For a serious groundwater problem, a subsurface cut-off barrier could be installed to restrict or reduce groundwater movement into ecological areas. Barrier types include sheet piling, slurry walls and grout curtains.

[11] Portions of this section originated from USACE and Tetra Tech 2001.

EARTHEN BERM (EMBANKMENT)

Contaminated groundwater can also be treated by creating an embankment planted with species capable of removing or sequestering contaminants in the groundwater (phytoremediation). For example, studies have shown that cottonwood (*Populus spp.*) can sequester over 400 pounds of nitrogen per acre in its stem (Madison and Licht 1994). Studies have shown this uptake can reduce the nitrogen level in groundwater as well (Licht 1990). The tree roots also provide additional uptake and treatment of contaminants such as ammonia by enhancing naturally occurring soil and aquatic microbes within the plant root zone. Soil microbes are a critical component of the nitrogen cycle because they can transform ammonia to nitrate and then to nitrogen gas. The nitrate is readily usable by plants and has reduced toxicity for aquatic life. Other treatment options such as pump and treat, chemical stabilization and air sparging (blowing air through the water) could be considered in the future.

Surface Water Control

Two-foot contour maps were completed in Summer 2001 for the Phase I area, thanks to funding by the USEPA with assistance from the USACE. They will help determine which options for managing surface water should be utilized. Three such options are described below.

WATER CONTROL STRUCTURES

Water level manipulation is often the most cost-effective management tool in managed wetlands. By raising water levels above the normal pool, nuisance species may be more easily controlled or reduced. Periodic wetland drawdowns help to regenerate emergent plants by exposing soil with drowned, but viable seeds. It also is essential to maintain the appropriate hydrology within each site by preventing extreme water levels from persisting. Of course, different water levels support different wetland ecosystems, and thus, different flora and fauna. Three potential types of structures for managing water levels are listed below:

DAM

A barrier to confine or raise water for storage or diversion, or to create a hydraulic head.

WEIR

An obstruction built across an open channel (or in a water control structure) over which water flows, usually through an opening or notch. The opening is normally rectangular, triangular or trapezoidal.

RCB CULVERT

Usually a closed conduit that conveys surface runoff through a road or railroad embankment. RCBC or RCB Culvert stands for Reinforced (with steel bars) Concrete Box (rectangular shape) culvert.

WATER SUPPLY AUGMENTATION

Roadcap and others (1999) have suggested addition of water from the SEPA station south of the site as a possible means to raise average water levels and improve water quality in Indian Ridge Marsh or other EMS sites. It could be diverted from one of the elevated pools at the SEPA station after the water undergoes aeration – this process reduces

turbidity and increases the dissolved oxygen content of the water. Other sites such as the Cluster Site may also have clean stormwater runoff that could be diverted to EMS sites.

Another option is to install water supply wells that tap into the deep aquifer. A single water supply well is unlikely to produce sufficient quantities of water; multiple wells would be preferred. Water supply wells are active systems that require maintenance.

STORMWATER TREATMENT

Any facilities, parking areas or other impermeable surfaces erected on EMS Phase I sites will address stormwater treatment in as natural a manner as possible. The preference is to not divert this flow into sewers but instead to use the wetland resources available. Although no large stormwater diversions are expected for the Phase I sites, if this were to change, the impact on the wetland would need to be assessed. It may be prudent to divert the water through a detention and treatment wetland system prior to its entering the primary wetland rehabilitation area. This could be designed as a passive, low-maintenance system consisting of wet meadow swales or emergent marshes. This method of stormwater filtering is considered an important best management practice for treating urban runoff. It could also provide interpretive benefits. Efforts should be made to prevent migratory birds from exposure to oils and other pollutants that would accumulate in these treatment wetlands.

SOIL AND OTHER SURFACE ISSUES

Surface and subsurface investigations will be necessary on each site to determine the composition of contaminants in the soil and fill areas. Soil amendments/additions or fill removal may be necessary depending on conditions at each site.

Slope Contouring

Steep slopes near some water bodies can be pulled back to create shallower slopes and variable water depths that are suitable for a variety of wetland plants, thereby increasing waterfowl foraging habitat and creating more attractive shorelines for human visitors. In some locations, this may require importation of soils to support the introduced plant life. The removal of fill or waste mounds could open portions of the area for re-vegetation with suitable plants, either from a buried but viable seed bank, or by planting. It could also expose native soils. Environmentally benign fill mounds can also be covered with suitable topsoil and planted to create some visual topographic relief using appropriate plant species.

Excavating and Grading Existing Site Soil (Transpositioning)

The excavation and grading option involves stripping the fill material from certain areas where the overburden is at its thinnest to allow recovery of native underlying soils. This option could restore a soil profile reasonably similar to predisturbance conditions. Perhaps the most important aspect of this option is that the buried organic soils may have a native seed bank that would be released upon the soils' placement at the surface. Presumably, this native seed bank is appropriate for the site and would greatly enhance and supplement the planned seedings. The viability, density and gross composition of the seed bank could be tested in a germination study.

Another important aspect of this option is that it would provide a much better medium for absorbing and controlling stormwater. A highly permeable sandy soil would efficiently convert precipitation into groundwater, eliminating erosion and sedimentation from uplands into water bodies and thereby reducing the movement of contaminants. Therefore, this option could greatly improve surface water quality on site.

Amending Existing Fill / Soil

Five options exist for amending existing fill material for use as a planting medium. Each option involves improving the fill by adding organic material. There are limitations to this approach, however. The texture would not closely match predisturbance conditions, so composition and diversity would be lower quality than native soil. The clay content of the soil may still be fairly high, so the soil would not accommodate stormwater as well. Lastly, the native seed bank would be absent. Given these limitations, following is a list of potential organic additions.

BIOSOLIDS

Large quantities of processed sludge from the sewage treatment plant operated by the MWRDGC are available in sludge drying beds immediately adjacent to the area. Use of this organic material to improve the tilth of the fill has been evaluated in a germination study. It is estimated that a mixture of 15 percent of the biosolids could be added to the fill with heavy cultivating equipment to a depth of 2 feet. Caution should be used when considering the use of biosolids as their high nitrogen content may favor weeds over native species.

PEORIA SEDIMENTS

Dredged sediment from a project at Lake Peoria, Illinois, is another potential amendment source. There is significant interest in evaluating this option as data becomes available. As with biosolids, analysis of chemical properties, which might be harmful to human or wildlife health, is necessary.

SAND

Some of the Phase I area was formerly sand prairie. Sand is readily available in the region, and it could be trucked to the site, brought in by rail, or barged to a nearby terminal and then transferred to trucks or railcars. The advantages of this option include improvement of site surface soil to support upland seedings and plantings, stormwater management benefits, and discouragement of weedy invasive species.

MULCHING OF FILL MATERIAL

Clean straw can be used as mulch to improve the organic content and tilth of fill material. Enough straw to achieve a 15 percent organic admixture would be tilled to a 2-foot depth. Existing vegetation cleared during site preparation could be composted and worked back into the soil with the straw mulch. This option would be tested in the proposed germination study. Attention should be paid so invasive species are not incorporated into this mulch.

ADDITION OF TOPSOIL

Some sites or portions of sites have very shallow, low-quality soils or have soil beneath fill material, making the survival of any plantings dubious. It may be desirable to

overexcavate some areas and fill them with topsoil to obtain good soil and maintain appropriate water table elevations, cover fill areas with topsoil, or mix fill with topsoil. Suitable topsoil has a relatively high organic content and low clay content, while also being free of large non-degradable debris, stones or noxious weed seeds. This soil is difficult to obtain in the Chicago area and can be cost prohibitive.

VEGETATION

The Phase I area is dominated in many places by invasive, low-quality plant species. Rehabilitation efforts will focus on controlling invasives and improving soil and hydrologic conditions so more conservative native species can be planted. Several vegetation management tools and methods are listed below.

Controlling Non-Native and Invasive Native Plant Species

Threats posed by non-native and invasive plant species need to be evaluated on a site-specific basis and addressed in management plans. An integrated approach to management could include activities such as water level manipulation; prescribed burning; biological, chemical, and mechanical control of undesirable plants; and exclusion techniques. Due to the highly disturbed nature of the Calumet area and the likely continued introduction of exotic and invasive species, complete eradication or control of these species is probably not feasible.

Woody Vegetation Control

Clearing of non-native woody species, mainly buckthorn and European honeysuckle, can be conducted for open areas shaded at ground level. In the absence of fire, these exotic shrubs frequently invade natural woodlands at the expense of native vegetation, particularly herbaceous species. The dense shade caused by invasive shrubs prevents most native woodland herbaceous plants from successfully emerging, resulting in low-quality flora.

Effective control includes cutting the stems near the ground surface and removing the entire aboveground portion of the plants. To prevent stump resprouting, a very common occurrence with buckthorn and honeysuckle, an appropriate herbicide is applied to the cut stump. To reduce detrimental effects to the soils and native flora in the area, this type of woody control activity can be done when native plants are dormant, preferably during winter.

Removal by mechanical and other means reduces shading, allowing the ground layer to regenerate and increase floral diversity on the site. Supplemental seeding can also increase the local species diversity when a suitable seedbank is not present. Woody species control also can provide an opportunity for experimental treatments to determine the most effective techniques, further raising the possibility of ecological rehabilitation workshops and or similar activities. These treatments can take place in conjunction with local academic institutions, thereby benefiting both.

Purple Loosestrife (*Lythrum salicaria*) Control

This species reduces diversity in native plant communities by displacing other species. Conventional control methods (e.g., herbicide application and mechanical removal) may be too costly and labor prohibitive, given the current level of infestation. Biocontrol using *Galerucella* beetles is a promising cost-effective approach. These beetles are an introduced species that feeds exclusively on purple loosestrife, damaging the plants sufficiently to prevent flowering, and eventually killing them. Biocontrol also could be an opportunity for experimental treatments, further raising the possibility of ecological rehabilitation workshops, affiliations with academic institutions or similar activities. The Illinois Natural History Survey has developed a comprehensive program for purple loosestrife biocontrol and has released beetles in numerous areas within the Calumet region.

Purple Loosestrife Infestation; Source: INHS Website

Selected areas of moderate infestation could be treated using conventional means (mechanical removal or herbicide) using volunteer labor. Even after clearing, some control effort may be necessary to prevent seedbank recovery of purple loosestrife. Adult plants can produce roughly 1 million seeds, and the seeds remain viable in the seed bank for years even if submerged. Therefore, planting of appropriate native species tolerant of existing soils, sediment and water quality conditions, followed by regular monitoring, will need to closely follow removal in order to hinder reinfestation.

Common Reed (*Phragmites australis*) Control

This species is abundant throughout the Calumet region. It reproduces vegetatively by long surface runners (stolons) that root and sprout at intervals of 8 to 12 inches. Thus, a small stand can rapidly overcome nearby areas, reducing local vegetation quality. Control is difficult, no truly cost-effective control method is known, and the existing seedbank will allow the species to re-colonize rapidly, requiring continuous effort. Herbicide application is one means of large-scale control, but wildlife may be adversely affected, either directly by the herbicide or by loss of habitat until new plants grow to replace those removed. A better means of controlling the species may be to deeply flood the infested portions of the site periodically during the early growing season, while mowing drier areas frequently to reduce the nutrient reserves in the roots.

Common Reed (*Phragmites australis*)

The black-crowned night heron (state-endangered) rookery has been located in years past in stands of common reed. In order to maintain short-term habitat, complete control of common reed in all locations may be undesirable. Instead, a phased approach of removal and replacement will be required in the rookery areas.

Containing Common Reed in selected areas is possible by excavating portions of the perimeters, thus creating deep water-areas that the species will not inhabit. This has the added benefit of creating permanent open waters that will be attractive to migratory waterfowl and fish. The need for eradication of Common Reed should be evaluated on a site-specific basis.

Vegetation Management Techniques

Herbicide Application

Selective application of Glyphosate-based herbicides (marketed as Roundup® or Rodeo®) to aggressive weeds can reduce the abundance of nuisance species, primarily in wetland areas. Glyphosate herbicide, a non-selective chemical that is rapidly broken down by microorganisms in the soil, is lightly sprayed or wick-applied to the leaves or stumps of target species. The chemical is absorbed through the tissues and translocated to the roots, where it disrupts plant metabolism, thereby killing the plant. Using this and other types (Garlon®, Post®) of environmentally-safe herbicides can be effective in controlling certain persistent weeds, without causing undue stress to desirable plants. This method is, however, labor-intensive and may be too costly if large areas are to be treated.

Because herbicide application is a state-regulated activity, certified operators must be used. Herbicides should only be used when other means of control are not effective.

Prescribed Burn Management

Periodic burn management can improve the populations and cover of native flora, while reducing the influence of most non-natives. Under the direction of a skilled and experienced burn crew, prescribed burning can be a safe and effective management tool for reducing populations of nuisance plant species that invade natural areas and displace native vegetation. The timing, frequency, and intensity of prescribed fire, or the "fire prescription," is based on the overall ecological conditions of a particular site and management objectives. The first objective of any burn prescription is the safety of the burn crew and property on or near the burn site. Many Midwestern native species, particularly those characteristic of prairie and savanna habitats, will not persist without fire.

Controlled burns also present an educational opportunity for the visiting public by demonstrating the role of fire in native ecosystems. Some portions could be burned annually, while other areas may be burned less frequently, thereby creating areas in different successional stages and increasing attractiveness to wildlife.

Prescribed burns normally are conducted by trained and experienced professionals. However, a volunteer network based at the proposed Calumet Environmental Center could include burn crews led by professionals, lowering the overall costs involved, and increasing the number of burn sites in a given period.

Controlled burns must be coordinated with utility companies that have on-site facilities or pipelines, such as at Indian Ridge Marsh. While this extra coordination is necessary, prairie preserves situated over natural gas pipelines have been burned safely. The Amoco Refinery in Joliet routinely performs prairie burns in proximity to the plant. Burning on Phase I sites would require permits from the city and state and sometimes the county, as well as notification of the Chicago Police Department and Chicago Fire Department. In addition, nearby communities, industries and those conducting research projects on the site must be notified before conducting prescribed burns. Some restrictions may apply for sites near industrial facilities. Such companies would need to be consulted.

Seeding vs. Planting Live Plants in Emergent Zones

Planting live plants in the emergent zone is a common approach to vegetation management because they tolerate some water level fluctuation. As long as the plants do not become submerged, they should survive and consolidate. This option is costly, however. Individual live plants, either as bare roots or plugs, are expensive and labor-intensive to plant. Seeding is a lower-cost approach to consider for the emergent zone. Under this option, the site may have to be dewatered so the emergent planting zones are exposed for several months from the time of seeding until germination. This would pose an added cost compared to the use of live plants, which would be planted in standing water. A site-by-site analysis will be conducted to choose the most viable option.

Seed Mixes

Seed mixes may be collected from high-quality natural areas in the Calumet region or purchased from native plant vendors. These custom mixes would be much more expensive than standard, generic native seed mixes. The generic mixes would still achieve the goals of stabilizing the site; replacing exotic and weedy species with more conservative, native species; improving site aesthetics; and improving habitat diversity.

Growing Season Inspections

Periodic floristic inventories throughout each growing season are important for providing detailed information on the success of ecological rehabilitation, including supplemental planting and woody/invasive species control. This data can document the vegetative conditions of the preserves, as well as help develop an accurate comparison of current and historic site conditions. Soils and wildlife data can also be collected during the inspections. As site conditions change, inspections would signal the need for adjustments to the management plan.

Water Level Control/Management

Water levels heavily impact vegetation. Vegetation is adapted to certain types of water levels and lengths of inundation (hydroperiod). In some wetlands, flood pulses occur. In others, water levels change slowly. The Hydrologic Master Plan will provide the baseline hydrologic data for Phase I sites and inform decisions about water levels, hydroperiod, flood pulsing and more.

REGULATORY PROCESS FOR ENDANGERED AND THREATENED SPECIES

Any activity that involves altering or disturbing habitat of endangered or threatened species, or wetlands in Illinois, requires formal consultation with the Illinois Department of Natural Resources pursuant to the Illinois Endangered Species Act and the Interagency Wetland Policy Act. Compliance with these regulations is mandatory and consultation should take place at all stages of design planning and implementation.

CONTAMINATION

As mentioned in previous sections, potential contamination in the groundwater, surface water, soil and sediments at the EMS Phase I sites could significantly affect the long-term success of ecological rehabilitation. Where appropriate, soil, surface water, groundwater, and sediment will be characterized for potential environmental contamination, with possible impacts on the local ecology assessed. A review of human and ecological health risks will be conducted prior to beginning work on any Calumet area site, and all appropriate regulatory processes will be upheld.

PREDATOR CONTROL

Due to the existence of endangered and threatened bird species in the Calumet area, predators could be of concern. Predators can reduce nest success by destroying nests and/or young. Predators in the Calumet area include raccoon, opossum, mink and snakes. Edge habitat, such as hedgerows or fencerows and trails, serves as travel corridors for predators. Preserve design should reduce or prevent predator movement from local sources (i.e. landfills) and between and within sites. Predator movement can be reduced by careful placement of corridors and controlling water levels to provide adequate interspersion of open water and vegetation. Wetland size and wetland complex size can minimize predation: larger sites offer more opportunity for use of remote areas for nesting, foraging and resting activities.

PUBLIC ACCESS, ENVIRONMENTAL EDUCATION AND RECREATION

Public access to the various ecological management sites of the Calumet area could promote ecological awareness, enhance the interpretive opportunities of the new Calumet Environmental Center and provide recreational opportunities that are not in conflict with ecological goals. A range of options are possible and will be considered for each site:

?? Designated entrance gate
?? Trails or bike paths connecting sites
?? Small parking area
?? Interpretive signage and kiosks
?? Pedestrian amenities (such as shade and seating)
?? Boardwalks and observation platforms
?? Bollards or other impediments to entry for security against unauthorized vehicles

OTHER TOOLS

GIS

Geographic Information Systems (GIS) are the best tool for managing and warehousing spatial EMS data over the life of the project. Many management decisions will be based on the modeling and spatial information GIS provides.

The creation and maintenance of the Calumet Area GIS project will be organized by Chicago Department of Environment. Representatives from cooperating agencies and partners will provide information, historical data, research, funding and various other types of assistance. Roles will be defined as the EMS evolves.

The Chicago Business and Information Services (BIS) GIS Division has guidelines and standards for data gathered as part of GIS projects. (See Appendix IV.) These standards outline how data is to be formatted. For example, data must be in the State Plane >83 (feet), Illinois East coordinate system and should be in the ArcInfo coverage or ArcView shapefile format. All data layers will be accompanied by appropriate metadata as specified by the Federal Geographic Data Committee. In order to make this tool as powerful as possible, all researchers collecting spatial data for the EMS Phase I or Phase II areas are asked to adhere to the City's GIS standards.

A survey of existing Calumet area data is currently underway and, when possible, this data will be integrated into the GIS system. As the project progresses to the point at which agencies share data, a framework for warehousing and disseminating information will be developed. Data dissemination will occur in a controlled fashion and may include a web-enabled solution.

GPS

The City requests that all Global Positioning System (GPS) survey points collected be accurate to within 5 feet. The Department of Environment has a GPS unit of this accuracy that is available for projects in the EMS area.

Current Data/Information Gaps

OVERVIEW OF CURRENT DATA

Current data is necessary to effectively evaluate opportunities and constraints for habitat protection and enhancement, hydrological management, and recreational development. The focus group sessions yielded a wealth of data but also uncovered many data gaps. Some of these data gaps are critical and require immediate attention. Others are longer range planning tools that will be addressed as the opportunity becomes available.
Following is some of the work in process:

Hydrologic Master Plan

Inventorying existing water control structures, flows, water quality, and using hydrologic modeling to help with regional water decisions. Began mid 2001. Led by CDOE with active involvement by the Illinois State Water Survey and Illinois State Geological Survey. Funded by IDNR's C2000 Program and CDOE.

Topographic Mapping

Production of two-foot contour maps using LIDAR technology. One-foot data is also available as necessary for projects but would require more funding. Completed June 2001. Funded by USEPA. Facilitated by USACE.

Vegetation Mapping

Mapping of large areas of vegetation. Completed in 2001. Conducted by V3Consultants, Tetra Tech EM, Inc., and other parties from on-the-ground site visits.

Invertebrate Baseline Study

Began in 2001. Led by INHS with CDOE as partner. Funding from Chicago Wilderness and IDNR's Waste Management and Research Center.

Black-Crowned Night Heron Fledgling Success Study

Conducted in 2002-2003 by INHS with funding from IDNR and other sources.

Phytoremediation Study

On-going tests of the suitability and effectiveness of using cottonwood and willow trees for phytoremediation of contaminated soil and groundwater are being conducted at the Cluster Site. Led by USDA Forest Service, CDOE, and Waste Management and Research Center. Funded by USDA Forest Service and BP through Chicago's Environmental Fund.

Site-Specific Indian Ridge Marsh Research

Determining establishment of plants in fill material, biosolids, straw mulch, native sand and native organic topsoil in wet and moist regimes. Conducted by Tetra Tech EM, Inc., with INHS greenhouse space. Funded by USACE.

Stewardship Plan for Calumet Region

Developing a stewardship and monitoring protocol and implementation plan for the region, using the Conservation Design process and citizen scientists. The plan will tie in with existing stewardship organizations and efforts. Conducted by the Field Museum of Natural History, CDOE, Chicago Park District, IDNR, INHS, and Forest Preserve

District of Cook County. The intent is to expand this initiative to involve numerous additional organizations. Funded by Chicago Wilderness.

Calumet Website

Providing centralized information on key projects in the region. Led by CDOE.

OVERVIEW OF INFORMATION GAPS

While much information has been gathered, and much gathering is in process, some critical gaps remain. They include:

?? Baseline inventories of flora and fauna for several sites
?? An understanding of ecotoxicity on sites - the connection between contamination and its impacts on floral and faunal health
?? Contamination information for several sites

Below is the complete list of outstanding data-collection activities compiled from the twelve focus groups. Each activity should be conducted on all sites. Partners will be critical in filling these gaps. As mentioned previously, some of these gaps are being filled.

Birds/Fish/Critters

Map current habitat structure
Conduct invertebrate inventory at key sites -- aquatic and non-aquatic
Begin butterfly monitoring
Expand monitoring for marsh breeding birds
Conduct black-crowned night heron fledgling success study
Inventory fish population over time (compile and analyze fish data from various agencies)
Outline current fish habitat
Conduct ecotoxicology study (field mice, prey fish, insects, birds)
Research wildlife disturbance distances

Vegetation

Map habitat structure
Outline areas of existing and potential flora
Outline areas of existing and potential fauna
Identify key areas to preserve, improve, and create
Map locations, and current and potential invasion routes of exotics/invasives
Research how vegetation uptakes pollutants
Research which plants can grow on various media
Inventory plant composition and abundance by habitat
Evaluate strategy of using seeds from existing seed banks

Hydrology

Map land cover – pervious/impervious
Create a hydrologic/hydraulic master plan

Survey flows and culverts
Research flood routing
Create a hydrologic model that incorporates and addresses toxicity information, water and sediment quality and movement, and surrounding toxics that may leach into the water
Conduct hydraulic mapping/interface on a regional level
Research surface water and groundwater quality
Establish surface water and groundwater sampling stations, and map on GIS
Establish sampling protocols and network

Sediments/Soils/Toxicity

Identify surface runoff
Inventory and isolate waste deposits
Assess past research in sediment/soil/water contamination, and identify gaps
Map point and nonpoint sources of contaminants and the nature of their inflows/outflows
Gather 3-D geologic information or characterization of subsurface materials[12]
Establish sampling protocols for sediment and soil

Stewardship

Establish contacts and coordination with organizations already working in the area
Establish inventory network to collect baseline information – coordinate with existing programs
Establish monitoring network tied to adaptive management – coordinate with existing programs
Begin/expand environmental education – coordinate with existing programs

GIS

Identify existing and future data - format and metadata
Prioritize existing and future data
Establish metadata protocol to determine whether information is fit for inclusion
Obtain staff person for full-time GIS coordination
Obtain topographic maps - 2' overall; 1' individual sites (see what already exists)

Economics

Assess use values via comparative travel cost study of North Park Village Nature Center contingent valuation for non-use/natural areas - build in volunteers, fish/fishing, etc.
Find means other than willingness to pay to assess non-use values
Study ecological impacts of marinas and other recreational uses
Map railroad and industrial property access points
Evaluate possible liability issues
Establish baseline economic data (jobs/tourism)
Estimate economic impact of ecological rehabilitation
Identify synergy between industrial and ecological rehabilitation using case studies

[12] Three-dimensional (3-D) geologic mapping of the Lake Calumet 7.5-minute USGS quadrangle allows planners, engineers and scientists to assess the thickness and geographic extent of natural (including aquifers beneath the surface) and man-made materials of the area.

Recreation/Access

Identify extent of hunting
Identify desired and safe recreation use, access, needs and impact on natural communities

Social Implications

Map assets
Social networks
Environmental organizations
Stewardship programs
Map land about to change and common names for places
Research site users
Research current uses and interests in the area

Conservation Design Process

Set guidelines for scientific integrity and validity
Establish clear communication network for management and decision-making
Conduct test run using non-species target

Next Steps

MOVING FORWARD

The EMS is a fluid document that will change as more data is collected over the years. The strategy will unfold in phases – this first phase centers around Lake Calumet and the adjacent wetland properties. The Phase I EMS will be a template for ecological priorities in the region. Work will expand to other sites in the region over time.

The Phase II EMS sites are expected to include Van Vlissingen Prairie, Hegewisch Marsh, Wolf Lake, Eggers Grove, Powderhorn Marsh, Indian Creek and the Hyde Lake Wetlands (Exhibit XI). These sites will be added to the EMS as the Calumet Open Space Reserve develops.

This Phase I EMS document has been reviewed by the parties noted in the beginning of this document and the priorities have been introduced at a series of public meetings. Designs and specifications for each site will move forward based on the PIC goals, financial resources, priorities of management partners, and other realities.

INTER-GOVERNMENTAL AGREEMENT

The City of Chicago Departments of Environment and Planning and Development, the Illinois Department of Natural Resources, the Illinois Environmental Protection Agency and the Illinois Department of Commerce and Community Affairs have executed an Inter-Governmental Agreement (IGA) for collaborative work in the Calumet area. It outlines goals and responsibilities for each agency, including land acquisition, cleanup, and ecological rehabilitation of specific sites. The IGA will serve as a template for collaboration on City/State projects in the Calumet region.

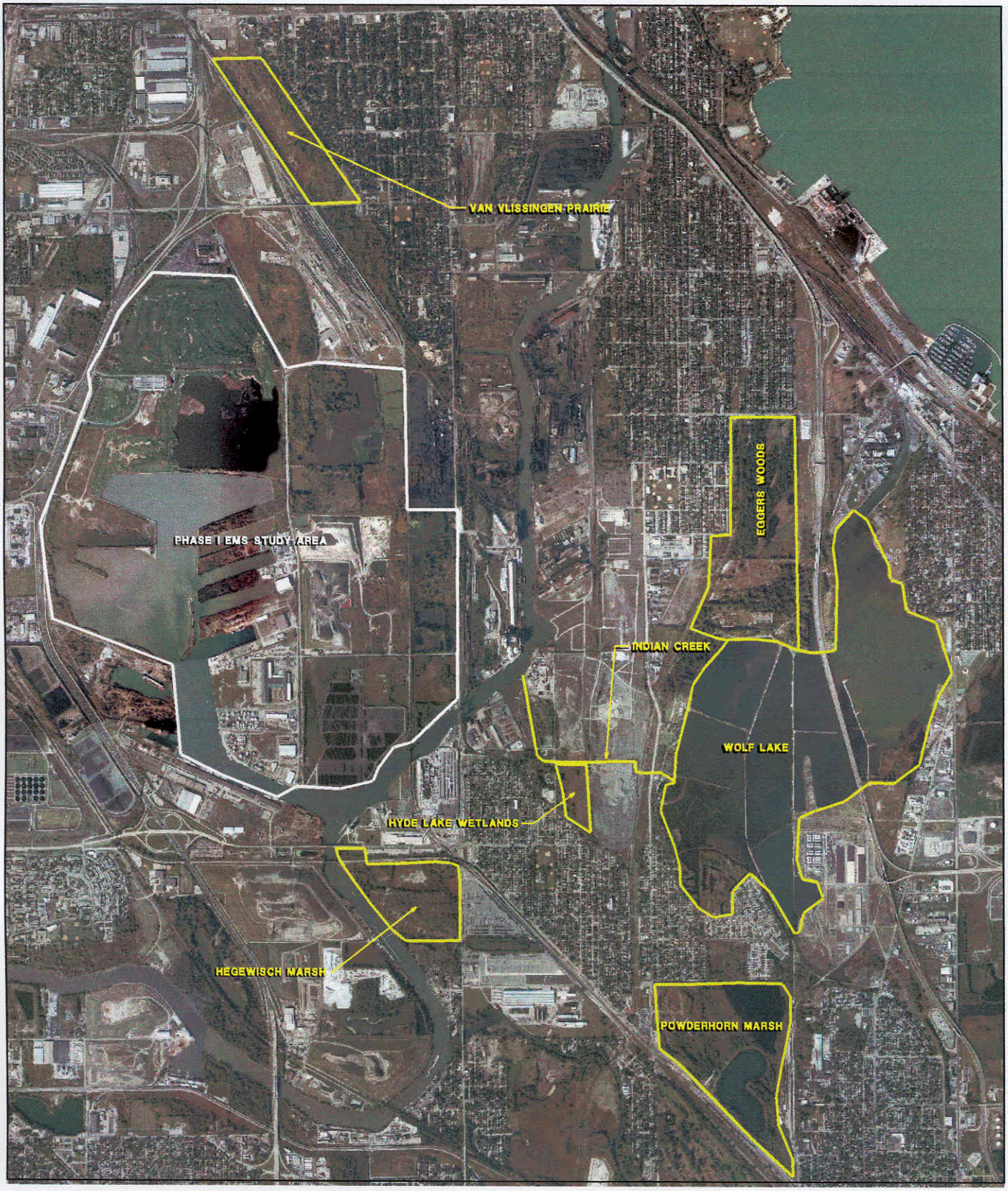
HYDROLOGIC MASTER PLAN

The Hydrologic Master Plan, underway in 2002, will provide the data necessary to determine water level control and management on the EMS Phase I sites. The goal is to gain an understanding of the hydrology, hydraulics and water quality of the Calumet area, and develop a plan for comprehensive hydrologic management. It will involve establishing local benchmarks, assessing the function of current hydraulic infrastructure, finalizing a topographic map, conducting bathymetric surveys, installing staff gauges, measuring flows to develop stage-discharge relationships, identifying seeps and springs and assessing their flow rates, and developing a monitoring protocol for water quality. Information will help inform decisions about water levels, hydroperiod, flood pulsing, and more. The Hydrologic Master Plan is being carried out by Chicago Department of Environment with guidance from George Roadcap of the Illinois State Water Survey, and Michael Miller of the Illinois State Geological Survey. It will continue through 2003.

STEWARDSHIP IN THE CALUMET REGION

The success of rehabilitation efforts in the Calumet region will rely on countless hours of community collaboration and volunteer assistance. A stewardship network and a comprehensive education and outreach strategy must form to sustain the ecological

EXHIBIT XI: EMS PHASE II STUDY AREA SITES



NOTE: PHASE I OF EMS IS IN WHITE, PHASE II SITES ARE IN YELLOW.

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revitalization that will occur in the coming decades. There are already extensive networks of hard-working and dedicated volunteers who have made ecological improvements to the region. Following their example, more volunteers will assist with major ecological rehabilitation projects and help educate others about the region's natural areas.

Chicago Wilderness has provided funding to help coordinate the development of a stewardship network for the Calumet region. These funds are being used to synthesize information about existing stewardship activities and to obtain partner and community input on ecological rehabilitation plans. Information about stewardship opportunities will be made available to schools and community organizations. A web site will deliver information on the progress of Calumet's revitalization and stewardship opportunities for people of all ages.

Stewardship in the Region - Working on a Purple Loosestrife Control Strategy with Illinois Natural History Survey and Greencorps Chicago

Stewardship activities will tie into existing programs whenever possible. For example, Neighborhood Naturalists, Urban Watch, Junior Earth Team, and the BP Community Service Program will be implemented region-wide by a broad range of stakeholders, including the Field Museum, Chicago Department of Environment, the Chicago Park District and others. Information about long-term monitoring plans will be available to students and citizen scientists through programs like Project Wild, Mighty Acorns, and WOW! (Wonders of Wetlands). The new Calumet Environmental Center will be the base for the region's volunteer stewardship programs and for Calumet-area research, education and passive recreation. A grant from the Urban Resources Partnership will also support the development of environmental education programs offered at the Calumet Environmental Center. The Lake Calumet Ecosystem Partnership (LCEP) will also be tapped for stewardship involvement and community outreach.

Stewardship will be one of the driving forces of ecological rehabilitation in the Calumet area. A strong partnership between citizen stewards, government agencies, and educational, cultural and community institutions will sustain environmental health in the Calumet region for generations to come.

CALUMET SUSTAINABLE GROWTH ADVISORY COMMITTEE

The purpose of the Calumet Sustainable Growth Advisory Committee is to review progress on natural areas conservation and rehabilitation, industrial development and retention, and environmental cleanup.

The Committee will focus on the following issues:

- ?? Industrial retention and incentives
- ?? Public infrastructure and heavy truck route connections
- ?? Park development and wetland and natural areas preservation
- ?? Natural areas management and programming
- ?? Environmental remediation, ecological rehabilitation and reuse of brownfield sites
- ?? Tourism opportunities
- ?? Marketing
- ?? Green energy opportunities
- ?? Fundraising

Co-chairs:

?? John McCarter - President, Field Museum
?? Robert Darnall - CEO, retired, Inland Steel
?? Bill Kurtis - Journalist, Kurtis Productions
?? Sheli Rosenberg - Vice Chair, Equity Group Investment, L.L.C.

Committee Members:

?? N. Marcia Jimenez – Chicago Department of Environment
?? Jerry Adelmann - Openlands Project
?? Mary Sue Barrett - Metropolitan Planning Council
?? Tim Berens - Stolthaven
?? The Honorable Anthony Beale - City Council 9th Ward
?? The Honorable William Beavers - City Council 7th Ward
?? Alicia Berg - City of Chicago Department of Planning and Development
?? Marian Byrnes - Southeast Environmental Task Force
?? Anthony Cappello - Diamond Coring Company, Inc.
?? Nancy Christien-Zidek - ADE, Inc.
?? Renee Cipriano - Illinois Environmental Protection Agency
?? Jack Darin - Sierra Club, Illinois Chapter
?? David Dillon - Dillon and Nash
?? David Doig - Chicago Park District
?? The Honorable Zenovia Evans - Mayor of Village of Riverdale; South Suburban Mayors and Managers Association
?? Jim Garner - Illinois Department of Natural Resources
?? The Honorable Debbie Halvorson - Illinois State Senator (D-40)
?? The Honorable Willis Harris – Illinois State Representative (D-29)
?? The Honorable Constance Howard - Illinois State Representative (D-32)

?? William Humphrey - Conservation Fund
?? Anthony Ianello - Illinois International Port District Authority
?? The Honorable Jesse Jackson Jr. – US Representative (Illinois D-2)
?? Mary Laraia - LaSalle Bank
?? Howard Learner - Environmental Law & Policy Center
?? Brent Manning - Illinois Department of Natural Resources
?? Pam McDonough - Illinois Department of Commerce and Community Affairs
?? Carolyn Merritt - Chicago's Environmental Fund
?? The Honorable David Miller - Illinois State Representative (D-29)
?? The Honorable Harold Murphy - Illinois State Representative (D-30)
?? Ed Paesel - South Suburban Mayors and Managers Association
?? Jorge Perez - Calumet Area Industrial Commission
?? The Honorable John Pope – City Council 10th Ward
?? George Ranney - Metropolis 2020
?? Tony Reinhart - Ford Motor Company
?? John Rogner – United States Fish and Wildlife Service; Chicago Wilderness
?? Robert Ryan – Illinois State Representative (D-79)
?? John Schmitt - Illinois Conservation Foundation
?? The Honorable William Shaw – Illinois State Senator (D-15)
?? Tom Skinner – US Environmental Protection Agency Region V
?? Judith Stockdale – Gaylord and Dorothy Donnelley Foundation
?? John Stroger - Cook County Board
?? Todd Stroger - City Council 8th Ward
?? Ron Thomas - Northeastern Illinois Planning Commission
?? Hal Tolin - Reserve Marine Terminals
?? The Honorable Donne Trotter – Illinois State Senator (D-16)
?? John Turner - Conservation Fund
?? The Honorable Peter Visclosky – US Representative (Indiana D-1)
?? The Honorable Jerry Weller – US Representative (Illinois D-11)
?? Lynne Westphal - USDA Forest Service North Central Research Station

The Committee will be regularly briefed on development of the Calumet Area Ecological Management Strategy and progress toward its implementation.

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GLOSSARY OF TERMS

Active recreation – Recreation on designated areas or parks with facilities designed for active or organized activities, i.e. ball fields, playgrounds, soccer fields, etc.

Assemblage – A collection of species, habitats, etc. in a defined area at a particular time. Similar to an ecological community.

Biocontrol (also called biological control) – The use of a non-invasive pathogen or organism to control an invasive organism. Biocontrol does not result in eradication of the invasive species, but significantly reduces its population, allowing other species populations to rise. Biocontrol attempts to replace limits on an invasive species lost when that species was removed to another location without the normal checks on population growth.

Biodiversity – A complex system of all living organisms coexisting and functioning together. Can be examined or discussed at local, regional, continental and global scales.

Biosolids – Treated excrement that contains organic matter, which can be processed and used to fertilize agricultural turf, ecological rehabilitation areas, and other places where soils lack sufficient organic content or friability to support good plant growth.

Brownfield – An abandoned or underused property that has actual or perceived contamination, thus creating a stigma related to its sale or use. Sites can range from corner gas stations to large-scale industrial properties.

CDOE – Chicago Department of Environment

CDPD -- Chicago Department of Planning and Development

CID – A Waste Management Landfill along the Calumet River

Conservative species – A species with relatively specific and narrow habitat requirements; usually considered disturbance-intolerant. Habitats with many conservative species are thought to be relatively undisturbed.

Creation – The process of design and establishment of an ecosystem in an area with a different ecological setting. For example, an emergent wetland created in dry grassland.

DEQ – Indiana Department of Environmental Quality

DNR – Illinois Department of Natural Resources

Ecological function – The specific goods or services that an individual organism, a group of organisms or a process plays in an ecosystem.

Ecological integrity – The ability for an ecosystem to function and be self-sustaining for an extended period with only minimal to no outside influence.

Ecological Management Strategy – The careful prioritization of ecological management activities. This process includes data collection, site investigations and specific recommendations, as well as input from a variety of stakeholders and other interested parties.

EMS – Calumet Area Ecological Management Strategy

Enhancement – The process of increasing desirable aspects of an ecosystem or habitats while decreasing undesirable aspects.

Floristic quality – Evaluation of plant communities, in which some measure of quality (such as weediness, habitat specialization or sensitivity to disturbance) is used to assess the community condition.

GIS – Geographic Information Systems, a computerized set of maps and mapping tools that connect data to geographic locations. Used to manage and display data and its spatial correlation.

Herptiles – Amphibians and reptiles

IEPA – Illinois Environmental Protection Agency

IDNR – Illinois Department of Natural Resources

Improvement – The process of augmenting the quality or condition of existing ecosystems.

INAI – Illinois Natural Areas Inventory

Invasive Plant Species – Any plant either native or non-native that has the predisposition to form a monoculture. Typically, these species have aggressive growth forms and high reproductive capacity. They actively compete with other species and exclude them. These species are only invasive when they are removed from their native habitats without concurrent transport of predators and parasites.

INHS – Illinois Natural History Survey

IRM – Indian Ridge Marsh

ISGS – Illinois State Geological Survey

ISWS – Illinois State Water Survey

Leachate – Contaminated liquid that seeps out of a landfill.

Monoculture – A single species population living in an area at the expense of all other plant species. Crops, by virtue of human intervention, are monocultures. Invasive plant species also often grow monocultures.

MWRD – Metropolitan Water Reclamation District

NIPC – Northeastern Illinois Planning Commission

Passive recreation – Recreation with little or no defined activities or facilities (except for trails or interpretive kiosks). Bird watching, hiking and nature study are examples.

Phytoremediation – General term for various strategies utilizing plants to contain or remove contaminants from soil and water or to improve hydrologic conditions on a site.

Rehabilitation – The process of returning an existing but degraded ecosystem to a healthier condition. The objective may be similar to or distinct from restoration. Rehabilitation usually is intended to improve a degraded and non-functional condition, without the expectation that full function will be restored.

Restoration – Reestablishment of specific lost components and their function to an ecosystem or habitats within an ecosystem.

SAMP – Special Areas Management Program. Administered by the U.S. Army Corps of Engineers.

Seed Bank – Remnant mixtures of viable seed that have survived under fill or other soil disturbances.

SEPA – Sidestream Elevated Pool Aeration Station. Managed by the Metropolitan Water Reclamation District of Greater Chicago

Structure – The arrangement of parts of a habitat or ecosystem relative to use by various kinds of wildlife.

Sustainable Development – A development project that uses many disciplines to initiate a design that will be low-maintenance and self-sustaining in terms of economic, social and physical parameters.

USACE – United States Army Corps of Engineers. The federal planning agency for waterways. USACE reviews plans and issues permits for all proposed discharges into waterways.

USDA – United States Department of Agriculture. The US Forest Service is a division of the USDA.

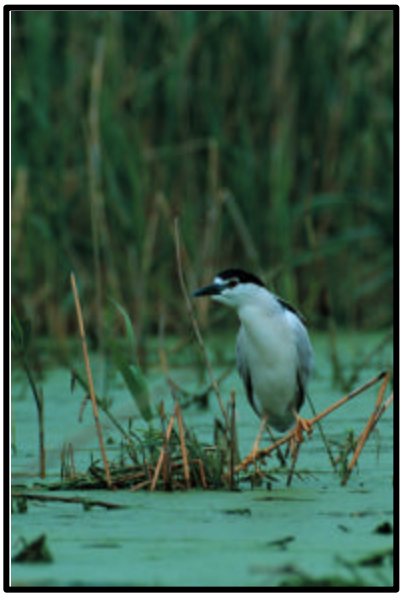
USEPA – United States Environmental Protection Agency.

USFWS – United States Fish and Wildlife Service

USGS – United States Geological Survey

Illinois Endangered and Threatened Birds of the Calumet Region

STATUS AND DISTRIBUTION[13]



Illinois Endangered Black-crowned Night Heron at Heron Pond, 2001. Photo courtesy of Dr. Michael Jeffords, Illinois Natural History Survey.

The Calumet area is known for the presence of 11 breeding species of Illinois endangered or threatened wetland birds: black-crowned night heron, yellow-crowned night heron, little blue heron, snowy egret, least bittern, pied-billed grebe, king rail, black tern, common moorhen, Wilson's phalarope, and yellow-headed blackbird. Additionally, two endangered species, black rail and piping plover, once bred in the region, but are now extirpated. While some species have occurred in only limited years (little blue heron, Wilson's phalarope, black tern, and snowy egret), the Calumet area is considered one of the most important complexes for wetland endangered and threatened bird occurrences in Illinois, based on the presence of so many species for multiple years (Illinois Natural Heritage Database 2000). The area has provided important nesting habitat for these species for decades and several species found here are known from to breed only in a few locations in the state (Wilson's phalarope, snowy egret, little blue heron, yellow-crowned night heron.) Other species, such as the black-crowned night heron, occur at multiple locations in the state and region, but the Calumet area wetlands support one of the largest breeding populations in the state.

Some species, such as Wilson's phalarope or snowy egret, only breed occasionally in the Calumet area because they are typically rare in the region or state. For many species, local nesting activity may vary over years because of year-to-year fluctuations at a specific site. Site-fidelity (breeding site or nesting location) is a factor for other species, such as black-crowned night heron (Davis 1986), and their presence in the Calumet area is much more regular. Depending on environmental conditions in a given year, the wetland complex of the Calumet area may provide considerable area for potential nesting sites for many species. The area also offers foraging and resting habitat for birds dispersing from other nesting locations as well as for a number of other migrating wetland birds.

Species accounts for the state threatened and endangered birds in the Calumet area are provided. The data summarized in Table 5 addresses the current status and prospects for each of these species in the area.

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[13] Most of this section is derived directly from: Mankowski, Anne. August 2001. "Ecological Management Strategy Recommendations and Requirements for Illinois Endangered and Threatened Wetland Birds of the Lake Calumet Area." Illinois Department of Natural Resources, Midewin National Tallgrass Prairie. Wilmington, Illinois; with additional data and interpretation from Walter Marcisz, Alan Anderson, and Douglas Stotz.

Black-crowned Night-Heron

The Calumet area contains heron colonies dominated by this state-threatened species. Over the last twenty years there have been multiple colonies in a year, but since 1997 they have nested in only one site each year, with the exception of 2002. The Calumet population is one of the largest in the state with the numbers of birds varying annually, but numbers in the hundreds of breeding pairs. The location of the colonies have varied across years, but in recent years, Big Marsh or Indian Ridge North have been the usual locations for the colony (although Heron Pond was used in 2001). The herons have over the last decade nested in the *Phragmites* in these marshes, rather than in woody vegetation used more typically elsewhere in its range. Although the night-herons nest at this site they spread widely across the Chicago area to forage. The wide foraging range and the variable location of the breeding colonies present additional challenges in maintaining a viable breeding population at Lake Calumet for this species and for the other herons that are part of the mixed species colony (includes Little Blue Heron and perhaps Snowy Egret).

Yellow-crowned Night-Heron

There are no specific records of this species breeding within the immediate Calumet area. However there are at least three confirmed nesting records from two locations within a mile of the southern edge of the region. Adults are seen regularly with in the Lake Calumet area during the breeding season. Because this species, when found breeding in the broader Calumet region has not been part of the mixed heron colony, we consider it likely that at least some of these records refer to birds breeding locally, and so are treated as possible nesting records in Table 4. Yellow-crowned Night-Herons nest in trees near water.

Little Blue Heron

One or two pairs of Little Blue Herons have been confirmed nesting in mixed heron colonies in the Calumet area from 1999 to 2002, and a pair probably nested in the colony in Big Marsh in 1996 and at Indian Ridge North in 1998. The presence of multiple adults during the breeding season through much of the 1990s suggests that small numbers probably breed in the heron colony annually.

Snowy Egret

This species is not known to have bred in the Calumet area ever. It occurs regularly in the summer, and could eventually be found breeding in the mixed heron colony, but to this point has never shown any indication of breeding.

Least Bittern

Least bitterns are difficult to detect, and so are certainly underrepresented in the data in Table 5 as breeders in the Calumet area. They likely breed in small numbers annually within the area. The specific sites used will vary across years depending on the specifics of habitat conditions at different sites.

Pied-billed Grebe

Pied-billed Grebes are regular, successful breeders in several of the wetlands of the Calumet area. They may be annual breeders in Indian Ridge Marsh, Heron Pond and Deadstick Pond. Recently Big Marsh apparently has not harbored breeding pairs.

King Rail

King Rails have been confirmed as nesters in the Calumet area in only a few years. Like the Least Bittern, the records almost certainly understate this species' use of the region. However, it appears to be significantly less common than that species in the Lake Calumet area. It could breed annually if conditions in the various wetlands at the site were maintained in an appropriate manner for this species. This species has declined substantially in northern Illinois over the last several decades.

Black Tern

Black Terns have vanished as a breeding species in the Calumet area. The 1986 nesting at Big Marsh was the last breeding record in the area. The nearest current breeding sites are in Lake and McHenry Counties. The loss of this species from the Calumet area is part of a general decline in the southern part of its range, however, loss of cattail-dominated hemi-marsh and uncontrolled water levels may have contributed to its local extirpation. Because of the overall decline this species is suffering, it seems unlikely that this species would return, even with the creation of appropriate habitat.

Common Moorhen

Moorhens are regular, successful breeders in several of the wetlands of the Calumet area. The breeding population appears to be stable. They may be annual breeders in Indian Ridge Marsh, Heron Pond and Deadstick Pond. Recently, Big Marsh has not harbored breeding pairs.

Wilson's Phalarope

Wilson's Phalarope seems to always have been an irregular breeder in the Calumet area, but habitat degradation and change in the region since the last nesting record in 1981 make it unlikely that this species will nest again in the area, absent significant rehabilitation of the wetlands.

Yellow-headed Blackbird

At one time, the immediate area near Lake Calumet housed multiple colonies of Yellow-headed Blackbirds. They no longer breed in the area, presumably because the almost total replacement of cattails by *Phragmites* has essentially eliminated appropriate breeding habitat for the species (note that the species did nest successfully in *Phragmites* at Heron Pond) and a general decline in the population here near its southeastern limit. Two populations remain in less degraded marshes with extensive cattails (Eggers Woods and Hegewisch Marsh) in the broader Calumet region, and the species could be expected to reestablish itself in the Calumet area if the cattail habitat can be restored to some of the wetlands.

Black Rail

Black rails nested in the Calumet area in the 1800s, but have not been encountered recently. This species is extremely difficult to detect, so its current status cannot be stated with complete certainty. There are scattered recent records of the species on migration in the Chicago area and the possibility of a remnant population in the Calumet area cannot be discounted. However, the sedge-dominated marsh habitat that this species prefers has largely disappeared from the area, so without considerable rehabilitation of wetlands, it seems unlikely that the area can harbor a viable population.

Piping Plover

This federally-threatened species was once bred regularly in the Calumet region, near the shores of Lake Calumet and Wolf Lake. By the 1950s, industrial development and alteration of these lakes had caused the extirpation of the plovers as a breeding species in the Calumet area. The tremendous decline in the Great Lakes population of Piping Plover and the difficulty in recreating suitable habitat make in unlikely that this species will ever return to the Calumet avifauna. It has been lost for good.

Snowy Plover

This federally-endangered species used to be a common breeder in the area. Like the piping plover, it has not been seen since the mid-1950s and has been lost for good.

Table 4 : Illinois Endangered and Threatened Wetland Bird Species Nesting/Breeding Occurrences by Site in the Calumet Area 1980-2000

Species	Lake Calumet	Big Marsh	Cluster Site	Indian Ridge North	Indian Ridge South	Heron Pond	Deadstick Pond
Black-crowned night-heron		1998 1997 1996 1995 1994 1993 1992 1991 1990? 1989 1988 1987 1986 1985 1984		2000 1999 1996 1995 1994 1993 1992 1991 (1990)	1989 1988 1987? 1985 1984 1983 1982 1981	1996 2001	
Yellow-crowned night-heron	(1998)	(2001) (1998) (1996) (1988) (1987)		(2000) (1999)	(2001)		(2001)
Little blue heron		(1996)		2000 1999 (1998)		2001	
Snowy egret		?				?	
Least Bittern		(1997) (1990) (1986) 1983 1982 (1981)		(2000) 1999 (1988)			(2000) (1999) (1988)
Pied-billed grebe		1997 1996 1995 1994 1993 1992 1991 1988 1987 1983 1982 1981 1980		2000 1999 1995 1994 1990 1989	?		2001 2000 1999 1998 1995 1994
King rail		1994			(1987)	1986	
Black tern		1986					
Common moorhen	1993	1996 1995 1994 1992 1991 1990 1989 1988 1987 1986		2000 1999 1996 1995 1994 1993 1992 1991 1990 1989 1988 1987 1986 1985	1995 1994 1993 1992 1991 1989 1987 1985	1999 1998	2001 2000 1999 1998 1997 1996 1995 1994 1992 1991 1990 1989 1988 1987 1986 1981

Wilson's phalarope	*Pre-1968*					(1981)	(1981)
Yellow-headed blackbird		1992 1991 1990 1989 1987 1986 1981		1995 1994 1993 1992 1991 1990 1989 1987 1986 1985	1991 1990 1989 1988 1987 1986 1985	1993 1992 1991 1990 1989 1988 1987 1986	1993 1991

? signifies that the data is not definite or is missing. A year enclosed in parentheses under a particular site indicates that the species possibly bred at that site during that year.
Sources: Illinois Natural Heritage Database 2000; D. Stotz and W. Marcisz (pers. obs.)

HABITAT FEATURES FOR ILLINOIS ENDANGERED AND THREATENED WETLAND BIRDS IN THE CALUMET REGION: AN OVERVIEW

Providing suitable habitat is the key factor in maintaining wetland bird populations. Management for a particular species or group of wetland birds involves the habitat types preferred and used by the species. A number of wetland types must be maintained to manage for the largest group of wetland birds in a landscape, and for successional changes through time and episodic weather conditions (Heidorn et al. 1991). It is especially important to manage suitable habitat at historic and immediately adjacent sites for species with strong site-fidelity, such as black-crowned night heron. Bird species (individuals or colonies) lost from a site for several breeding seasons because habitat becomes unsuitable are increasingly unlikely to return, even if habitat or hydrologic conditions are restored. Managing the region as a complex of habitats will provide bird populations some resilience against weather or precipitation extremes, and catastrophic or random events. Deeper water sites will provide important wetland habitat in dry years and the more shallow wetlands will receive use in wetter years.

Hydrologic fluctuations determine the structure and horizontal stratification of wetland vegetation. Semipermanent and seasonal wetlands provide especially important habitat for many wetland birds of the Calumet area. Semipermanent wetlands have surface water throughout the growing season in most years. When surface water is absent, the water table is at or near the surface. Seasonal wetlands have surface water present for extended periods, especially early in the growing season, but water is absent by the end of the season. In the absence of natural hydrologic fluctuations that maintain suitable habitat conditions, water level control can be used to manage habitat structure for individual bird species or guilds of species, such as the hemi-marsh species mentioned above.

Water level control is the most important aspect of wetland management for wildlife. Effective water level management provides suitable nesting and foraging habitat. Lower water levels in late summer emulate natural drawdown conditions, and plants respond favorably and maintain habitat structure for longer periods. Conversely, ill-timed lower levels can allow predators access to nesting sites. Prolonged drawdowns can aggravate disease problems, such as avian botulism. Sudden rises in water levels may flood nests, and nutrient input may increase eutrophication and spread of tall emergent plants. Loss of shallow-water foraging habitat for species such as herons results.

Additional wildlife habitat management concerns include water and sediment quality (introduction or presence of contaminants), vegetation composition and structure, and the impact of invasive and non-native species. Species and site-specific management plans should be developed to address all habitat management concerns. Priorities should be based on the life history and habitat requirements of Illinois endangered and threatened species.

HABITAT STRUCTURE

Appropriate physical structure is one of the most important features of wildlife habitat. The interface between water and vegetation (edge) is very important for nesting wetland birds (Burger 1985). Individual species have different requirements or preferences for nesting habitat structure. A review of species-site associations in Tables 1, 2 and 3 indicates the sites which have had or maintained hemi-marsh conditions (interspersed open water and vegetation), for example Big Marsh, Indian Ridge Marsh North, and Indian Ridge Marsh South have consistently provided suitable habitat for many endangered and threatened bird species. When bird species are known from a single site, or only a few sites, it is important that those sites be protected and managed for the rare species every year. Some sites have supported multiple species during a single year. This indicates 1) the importance of hemi-marsh habitat and Calumet area sites for endangered and threatened bird species, and 2) the importance of preserving and managing multiple sites for hemi-marsh conditions every year. Hemi-marshes could be a focus of habitat/ecosystem management to achieve multiple resource needs of many endangered and threatened bird species.

WETLAND SIZE AND ISOLATION

Large wetlands and complexes are especially important for many of the area-sensitive endangered and threatened birds that use the Calumet area (pied-billed grebe, least bittern, black tern, black-crowned night heron, king rail, common moorhen). Marshes in wetland complexes contain more bird species than larger isolated marshes (Brown and Dinsmore 1986). Many other wildlife species benefit because larger habitat areas usually support more species and more individuals per species than smaller areas of habitat. Large sites provide more habitat for birds to disperse and nest, and decrease the potential for nest loss to predation. Larger areas and habitat complexes provide more buffer from surrounding land uses for habitat and wildlife. Smaller and isolated habitats are more susceptible to impacts from random events such as extreme weather conditions. Where smaller wetlands are within a wetland complex, several area-sensitive birds and area dependent birds have been known to occur (Brown and Dinsmore 1986).

Six area-sensitive endangered and threatened wetlands birds are known to be in the Calumet area. The area requirements of these birds are based on Brown and Dinsmore 1986.

Black-crowned night heron > 20 hectares (50 acres)
Least bittern > 5 hectares (13 acres)
Pied-billed grebe > 5 hectares (13 acres)

King Rail most frequently > 20 hectares (50 acres)
Black Tern > 5 ha (13 acres), most frequently > 20 hectares (50 acres)
Common moorhen - similar to pied-billed grebe > 5 hectares (13 acres)

The importance of large wetlands and complexes for many of the endangered and threatened wetland bird species of the Calumet area becomes evident in a comparison of wetlands (1980s data) and nesting occurrences by site (Table 2). Wetlands in the early 1980s are illustrated and classed by size according to the same classification used by Brown and Dinsmore (1986). The most area-sensitive species (generally requiring > 20 ha (49.4 acres) such as black-crowned night heron and black tern, have used locations with the largest individual wetlands or large complexes on site or within immediate proximity (Big Marsh, Indian Ridge Marsh North, and Indian Ridge Marsh South, and Heron Pond). Other area-sensitive species (generally requiring > 5 ha (12.4 acres), such as least bittern, pied-billed grebe, and common moorhen, used all of the aforementioned sites, and use smaller wetlands and other complexes (Cluster Site) as well. The regional wetland complex created by the relative proximity of Big Marsh, Cluster Site, Indian Ridge Marsh North, Indian Ridge Marsh South, Heron Pond, and Deadstick Pond allows for dispersal between sites and alternate nesting habitat. Small and extremely small individual sites, such as Heron Pond and Cluster Site, are more suitable for area-sensitive species because of adjacent wetlands at Indian Ridge Marsh North and Indian Ridge Marsh South. It is important to preserve large wetlands and large wetland complexes when managing multiple sites for area-sensitive species, and to expand and create additional wetlands where possible and appropriate.

VISITOR DISTURBANCE OF WILDLIFE

Recreational use of wetlands by humans can affect wildlife by disrupting foraging and social behavior, parent-offspring and pair bonds, increasing the probability of egg or nestling mortality due to exposure, and increasing nest predation by attracting predators to nest sites or young (Vos et al. 1985, Klein 1993). Increased use of natural areas can decrease wildlife densities and the length of foraging sessions. Different types of activities can be more disruptive to wildlife. Visitor approach on foot is among the most disruptive disturbances (Klein 1993). Wetland size, wetland complex size and habitat structure have a bearing on visitor disturbances and predation impacts. Larger sites offer more remote habitat for undisturbed nesting, foraging and loafing activities.

Disturbances can negatively affect birds at all times, particularly impacting nesting success during the breeding season. Based on data collected, a sensitive period in the Calumet region is March 15 through August 15 (See Mankowski 2001 for more details). Construction should be minimal and least disruptive during this period. Any construction activities in sensitive habitat of species of concern should be coordinated so that suitable habitat is re-established by the next nesting season, or other suitable habitat is present and managed in the immediate area.

Recreational access will only be developed where acceptable, minimizing visitor disturbances to wildlife, especially Illinois endangered and threatened species. An additional 100 meters of buffer should be established during the early part of the season

(egg-laying, incubation, hatching and fledgling) although permanent buffers are best. During sensitive periods, some buffers will decrease and others will increase. Visitor-disturbance buffers should be posted and compliance enforced. General recreational development of Calumet area sites should limit visitor access to areas outside established buffers.

PRIORITIZATION

Priority conflicts will certainly arise in managing for different species. One factor to bear in mind is that the EMS does not necessarily assign endangered species the top management priority. Rather, its focus is on community management – as a means for increasing, maintaining and enhancing endangered species. Thus, for example, the EMS will not manage for an endangered bird species that moves into an area it had not been in before if it is consuming invasive plant species that prevent native plants from thriving.

Other Projects in the Calumet Region

Calumet Area Land Use Plan[14]

Good environmental management is good for business, and good business development can also benefit the environment. Nowhere is this more true than for the Calumet region on Chicago's southeast side. For over a century, the Calumet region has contributed to the prosperity of Chicago. It manufactures and processes products essential for industry and in the everyday lives of citizens. It serves as North America's busiest hub for intermodal transportation.

Today, opportunities are ripe for revitalizing the Calumet area. In a city where large tracts of open land are needed but scarce, the Calumet area retains well over 1,000 acres suitable for manufacturing and other businesses. Almost 60 percent of land in Chicago that is available for industry can be found here. This industrial land exists side-by-side with Chicago's most important wetlands. Approximately 4,000 acres of important open space are to be managed by the Calumet Open Space Reserve.

Prompted by enormous opportunities for both industrial revitalization and for protection of important open space, the Department of Planning and Development (CDPD) initiated the creation of the *Calumet Area Land Use Plan*, to determine appropriate land uses. CDPD partnered with the City's Department of Environment and three non-government organizations, the Southeast Chicago Development Commission, Openlands Project, and the Calumet Area Industrial Commission. A USEPA sustainable development challenge grant and a grant from the U.S. Department of Agriculture's Forest Service helped fund the plan's development.

Simultaneously, CDPD is implementing an industrial Tax-Increment Financing (TIF) district for the region. The TIF will help provide financial incentives for industry to locate in the Calumet area, and is the key to the implementation of the land use plan. Over one-third of the 3,000 acres of industrial land will be available for redevelopment, which could potentially create close to 7 million square feet of new industrial space.

Today the era of decline is ending and it's possible to see what a new era will look like. Chicagoans will regain access to wild lands and restored landscapes that were unavailable for public use for half a century. New industries will spring up in the Calumet area bringing new jobs and tax revenue. With careful planning and management, we can bring back Calumet's natural beauty and industrial strength.

Guiding Goals for the Plan:

- ?? Improve quality of life in the Calumet area and the surrounding communities by creating greater economic opportunity and enhanced environmental quality.
- ?? Retain and enhance existing businesses and industries within the Calumet area.
- ?? Attract new industrial and business development, and create new job

[14] Excerpted from City of Chicago Department of Planning and Development's *Calumet Area Land Use Plan.*

opportunities.

?? Protect and enhance wetland and natural areas within the Calumet area, and improve habitat for rare and endangered species.

Action Objectives for the Plan:

?? Visualize and enact a plan where large, viable tracts of land with excellent access to transportation can be assembled for industrial development.

?? Create a Calumet Open Space Reserve, with connected green spaces.

?? Develop effective design guidelines that encourage visually attractive buildings, industrial entrances, rights-of-way, and open spaces. Include river-edge and lakeside enhancements where possible, and emphasize natural landscaping and stormwater management to enhance habitat for native plants and animals. Promote energy efficient and environmentally sustainable design and construction techniques.

The Calumet Area Ecological Management Strategy addresses rehabilitation efforts within the Calumet Open Space Reserve, and broadens those boundaries by securing connections with open spaces in Indiana and the south suburbs of Chicago.

Calumet Open Space Reserve (OSR)[15]

The Calumet Open Space Reserve (OSR) outlines strategies for open spaces that are part of the Calumet Land Use Plan. The OSR's potential as a boon to tourism and for protection of wildlife is tremendous. 4,877 acres of the Calumet area are slated to become part of the preserve, a matrix of open lands to be used for nature preservation and in many cases, recreation. Of these, 4,186 acres are in Chicago, and 691 are in the near south suburbs. These lands are rich with large numbers of herons, egrets and other water birds. The acres slated to become part of the OSR will be assured permanent protection by a coalition of state and local agencies.

The anticipated owner for the majority of open land is the Illinois Department of Natural Resources (IDNR). IDNR is an appropriate owner, as its mission includes the protection and management of Illinois' natural resources. The agency already owns the land around Wolf Lake, at the William Powers Conservation Area, and IDNR's Illinois Natural Areas Inventory (INAI) designated many of Lake Calumet's wetlands as being land of statewide significance. The plan recommends that IDNR acquire an additional 1,300 acres, most of it within the Calumet Wetlands and the Calumet Prairies Management Units.

[15] Most of this section excerpted from City of Chicago Department of Planning and Development's *Calumet Open Space Reserve,* Final Draft, 02/01/02.

The Forest Preserve District of Cook County manages the most existing open space in the reserve, with approximately 865 acres in three separate forest preserves. The plan recommends that the Forest Preserve District acquire an additional 440 acres.
The Illinois International Port Authority District owns and operates the Harborside International Golf Center, a 36-hole championship golf course. This 435-acre, award-winning development designed to emulate the Scottish landscape contributes to the open space of the region.

Calumet Environmental Center

In 1997, the Chicago Department of Environment conducted the *Nature Center/Nature Preserve Network Feasibility Study*, which evaluated the establishment of a nature center at four sites throughout the City of Chicago. The study narrowed the site search to the Calumet area. In April 1999, the CDOE identified three candidate sites in the Calumet area for concurrent brownfield redevelopment and ecological rehabilitation, as part of *The Lake Calumet Southern Lake Michigan Economic Ecosystem Initiative*, funded by the Illinois-Indiana Sea Grant. As the result of an environmental center feasibility study published in July 1999, CDOE is finalizing a site for the environmental center.

The final candidates are Van Vlissingen Prairie, near 103rd and Torrence; Indian Ridge Marsh, at 122nd and Torrence; and Hegewisch Marsh, at 130th and Torrence, near the Ford Chicago facility. All three sites will be preserved for habitat and open space, regardless of the final site selection.

The center will serve as the core of the Calumet initiative's educational mission. The building will include classrooms, research and conference facilities, and observation decks. It will also feature permanent interactive exhibits and seasonal exhibits highlighting annual changes in plants and wildlife, along with environmental activities in the area. Exhibits will focus on topics including the importance and mechanics of wetlands. Programs will explore the environmental, industrial and cultural history of the area, particularly highlighting the positive intersection of habitat and industry in Calumet.

Like the City's two other environmental centers, North Park Village Nature Center on the north side and Chicago Center for Green Technology on the west side, the Calumet Environmental Center will be free to the public. Ford Motor Company donated $6 million for the development of the Calumet Environmental Center.

The building will be a model of environmentally sound design – maximizing energy efficiency, water conservation and resource conservation. Building materials will both look natural and reflect the area's industrial heritage. The building's architect will be selected through a design competition, with the Illinois Institute of Technology College of Architecture serving as the competition advisor.

Creating the Calumet Environmental Center will also involve rehabilitating roughly 130 acres of natural habitat. Shoreline-reshaping and stabilizing, biological controls, phytoremediation and extensive native plantings will be among the methods used. The rehabilitation will take years, providing educational opportunities for visitors as the site evolves. Viewing stations, platforms, floating boardwalks and other structures throughout

the site will offer views of open water, wetland marshes, prairies, savannas and neighboring industry.

Ford Centerpoint Development and Indian Creek Rehabilitation

Ford Motor Company operates a plant that manufactures the Ford Taurus and Mercury Sable in the Calumet area. Ford/Centerpoint has begun building a supplier park adjacent to Ford's existing facility. This development, eventually consisting of 1.7 million square feet on 150 acres of land, has the potential to exemplify how industry and environment can work together. The purpose of the development is to reduce transportation costs and pollution from long ground delivery distances, and provide a just-in-time manufacturing source of materials for the plant.

Existing Ford Facility at 130th and Torrence

A channelized former wetland, called Indian Creek, runs through the western side of the supplier park and along the southern property line, and through a wetland called Hyde Lake wetland. Indian Creek serves as an important hydrologic connection between Wolf Lake on the east and the Calumet River on the west. Ford will be mitigating (replacing acreage) on-site for filling several acres of low-quality wetland. This will be accomplished through improvements to Indian Creek.

On the Ford site, a range of innovative conservation-minded options will be implemented to improve water quality, decrease heavy runoff to the creek, and identify opportunities for pollution prevention. Stormwater runoff routes will be designed for sheetflow into vegetated swales wherever possible. Swales will contain native vegetation, filtering the water and cleaning it as it moves through. Swales will empty into detention basins (also vegetated), and then into Indian Creek. This design will slow the pace of movement of water into the creek, decreasing the erosion often caused by major storm events. The entire campus will be planted with shortgrass prairie, tallgrass prairie and native trees.

The City of Chicago Department of Environment, along with other agencies reviewing a Section 404 permit (USEPA, IEPA, USACE, USFWS, IDNR, and other federal and state agencies), USDA Forest Service, Chicago Department of Planning and Development, Northeastern Illinois Planning Commission, Openlands Project, residents, and environmental organizations, worked with the developer to make this a model project for industry and environment. The project will demonstrate the potential of conservation buffers in industrial areas. Ford sees this project as potentially serving as a model of its environmental work, similar to their improvements at River Rouge in Michigan. Its project in Calumet will convey a message of sustainability through green architecture, on-site mitigation, environmentally sound stormwater management practices, and natural landscaping.

It has been suggested by the U.S. Army Corps of Engineers that a small percentage of wetland mitigation projects are successful nationally, often because they are small-scale projects which have little to no relationship with potentially large-scale ecosystems. In light of this, the City and the agencies mentioned above are working on a rehabilitation plan for the entire creek and adjacent wetlands, integrating Ford's mitigation project into the macro site.

Ford / Centerpoint Supplier Park Illustration

The goal of the creek rehabilitation is to create a natural flow, stabilize the shoreline, reduce the precipitation of calcium carbonate and other slag byproducts in the water, improve water quality, and create habitat for native creatures. The USDA Forest Service is conducting research that will help design the future hydrologic functions of the creek. This work will successfully incorporate Ford's work into the larger scale project.

Staff of IDNR's Waste Management and Research Center are addressing pollution prevention opportunities within the buildings. They will work with tenants to synchronize clean air, clean water, and materials and water reuse opportunities.

130th and Torrence Wetland Mitigation and Stormwater Analysis Project

The 130th Street/Torrence Avenue intersection has plagued industry and residents for years due to multiple at-grade railroad crossings. An ambitious project is underway to solve this problem, and a range of environmental issues need to be addressed. Both 130th Street and Torrence Avenue will be reconstructed at a lower grade, requiring the installation of retaining walls. Three railroad tracks, two Norfolk and Southern lines and one South Shore line, will be moved and new bridges will be constructed. Chicago Department of Environment is working with Chicago Department of Transportation, project manager for the reconstruction, to advise them on wetland mitigation and stormwater treatment efforts.

The project will fill 1.7 acres of wetland, necessitating mitigation through the U.S. Army Corps of Engineers. In addition, large volumes of stormwater will require treatment and storage or dispersal. Tetra Tech EM has been hired as CDOE's consultant for the wetland mitigation and stormwater analysis portion of the project.

This project affords the opportunity to demonstrate green perspectives for infrastructure opportunities for wetland mitigation and stormwater management. This will include such things as vegetated swales, water quality basins and other natural methods for cleaning and filtering water and creating viable habitat. Their work will inform designs and specifications of the project.

Phase I designs were completed in Summer 2002. Phase II designs will begin in Fall 2002 and continue through early 2003. At the time of this publication, construction is expected to begin in Spring 2003 and end in 2005.

Focus Group Participants and Summaries

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Calumet Area Ecological Management Strategy
BIRDS FOCUS GROUP SUMMARY
December 2, 2000

ISSUES (THREATS)

?? Uncontrolled water levels: both high and low water levels cause problems, as do fluctuations unrelated to natural annual cycle
?? Water quality: environmental toxins may affect some birds directly; water quality may affect abundance, diversity, and makeup of food source (aquatic invertebrates and vegetation)
?? Invasive plants: alteration of marsh vegetation affects breeding areas for marsh-breeding species
?? Fragmentation of both aquatic and terrestrial systems: fragmentation increases disturbance and decreases habitat quality
?? Successional changes: marshes and wet prairie habitats can become less appropriate for breeding species with succession

RESOURCES

Conservation Targets

?? Marsh-Breeding Birds
Includes 10 state threatened or endangered species, and about 10 other species of conservation interest. (Heron Rookery is a special case, with special needs)
?? Migrant Shorebirds
?? Migrant Waterfowl
?? Migrant Songbirds
Important subgroups: warblers/neotropical migrants, sparrows, swallows, kinglets/creepers/woodpeckers

Data Sources

?? Many years of observation by birdwatchers: A number of amateur birdwatchers have at least qualitative data on Calumet area birds.
?? Best data sources: Walter Marcisz. Jim Landing and Alan Anderson have data as well. Richard Biss did a study of the birds of the Lake Calumet marshes for a couple of years in the 1970s. There is published historical data from Nelson and Woodruff dating back to the late 19th century.

Scientists Working in Calumet

?? Mike Ward, a graduate student at University of Illinois at Champaign, has been studying Yellow-headed Blackbirds for 2-3 years, including the Lake Calumet populations. He may also have data on breeding of other marsh species.
?? Doug Stotz, The Field Museum, has been studying Lake Calumet area birds regularly for three years.
?? Charlie Payne, Max McGraw, have been studying marsh birds in northern Illinois for several years. He has not focused on the lake Calumet area, but may have some data. Has expertise relates to habitat needs and management regimes appropriate for marsh-breeding species.

Sites

Important sites for Bird conservation targets in the Lake Calumet region include:

?? Deadstick Pond: migrant waterfowl, migrant shorebirds, marsh-breeding species, migrant songbirds
?? Eggers Woods: marsh-breeding-birds, migrant songbirds
?? Hegewisch Marsh: marsh-breeding birds, migrant shorebirds
?? Indian Ridge Marsh: marsh-breeding birds, heron rookery
?? Wolf Lake: migrant waterfowl
?? Lake Calumet: migrant waterfowl, migrant shorebirds
?? Burnham Prairie: marsh-breeding birds

?? Powderhorn Lake and Prairie: marsh-breeding birds, migrant waterfowl, migrant songbirds
?? Van Vlissingen Prairie: migrant shorebirds, formerly migrant shorebirds
?? Calumet Park: migrant songbirds (Lake Michigan at this site is important for migrant waterfowl)
?? Beaubien Woods: migrant songbirds
?? Little Calumet River: migrant waterfowl

GAPS

Research/Inventory needs

?? Aquatic invertebrates:
- use by birds
- abundance and diversity associated with habitat and water quality
- toxicity

?? Nesting success - especially black-crowned night-heron, red-winged blackbird (as a common species example)
?? Direct and indirect effects of environmental toxins on birds in Calumet region
?? Techniques for controlling purple loosestrife and common reed
?? Inventory less common marsh-breeding species

ACTION ITEMS (MANAGEMENT)

?? Establish control of water levels in major marsh sites and maintain appropriate regimes
?? Control invasive plants and maintain and improve habitat quality of marsh vegetation
?? Improve water quality to improve food supply in Calumet marshes
?? Improve both terrestrial and aquatic habitat along corridors that join major marsh sites

ASSUMPTIONS

?? Environmental toxin issues for birds are not severe enough that Calumet region is an "attractive nuisance"
?? Gull colony will be a permanent feature of the region
?? Maintaining diversity of marsh-breeding birds is an important goal
?? State threatened and endangered species represent a reasonable analysis of status and threats in Illinois, and this status is indicative of conditions region-wide

Calumet Area Ecological Management Strategy

CONSERVATION DESIGN PROCESS FOCUS GROUP SUMMARY

August 7, 2000

ISSUES

Need for a common process and language that will (1) allow regional efforts to communicate effectively both internally and externally and (2) allow efforts to build on -- and benefit from -- one another. The language and process need to address different scales, biological entities and publics.

SOLUTION

The Conservation Design Process provides such a language and grounds it in a structured system of deliberation that defines a region of concern, the ecological context of that place, conservation targets (which could be species, species complexes, communities, or landscapes), and then, for each conservation target, formulates a 10-20 year vision, a threats analysis (including both stresses and their sources), management goals, and conservation strategies.

Tied to the CDP, and an integral part of it, is a process of Information Design. Information Design bases ecological research, inventory, and monitoring on the goals and strategies developed through the CDP. The monitoring program is designed specifically to be responsive to the vision and threats analysis for particular conservation targets and to recognize whether management strategies are achieving their goals or need to be modified. Research is directed toward providing information necessary to achieve management goals. The process provides an articulate framework for sharing information and achieving consensus within the conservation community, with the interested public and business interests, and in political forums. An important component of the CDP is a highly developed system for sharing information.

CDP is specifically designed to get conservation actions in motion, to connect monitoring to management actions and responses, to adjust management strategies on the basis of updated results, and to present a transparent rationale to all who are interested and concerned. Its considered, formalized, goal-oriented processes will be familiar to business and provide additional rationale for early communication and collaboration.

The CDP was developed by the Chicago Wilderness effort as the foundation for the next stages of activity related to the regional Biodiversity Recovery Plan. CDP is the consensus development of scientists, land managers, and planners from around the Chicago region. CDP originates from work by The Nature Conservancy for adaptive management; several people are familiar with its concepts.

GAPS

?? The CDP has not yet been widely applied to any scale, community, or species in the region. However, people are beginning to apply it in several settings. As CDP is applied to any particular project, its output will be automatically subjected to critique, which will feed back into the broader understanding of the process itself.

?? CDP should be grounded in or related to published references such as *Ecological Indicators for the Nation* by the National Academy of Sciences, *Environmental Science and Engineering for the 21st Century* by the National Science Board, appropriate Nature Conservancy publications, and one or two other sources, so that it receives well-deserved credibility.

?? The effectiveness of CPD will depend on a well developed system for sharing information among researchers, land managers, and the public. This system will connect information and newly acquired data to the decision making process. This system of information flow needs to be developed, installed, and diligently used.

ACTION ITEMS

?? Apply CDP: Engage in the conservation design for one to five specific conservation targets in the Calumet Region. Involve representatives of science, citizen conservation community, business, and government in the design process.

?? Test the Conservation Designs with other groups in formal and informal settings and, contemporaneously if possible, begin implementing the conservation strategies.

?? Consider using CDP as a for decision-making in the Calumet Region.

?? Begin to develop the necessary information system.

ASSUMPTIONS

?? Scientists in the conservation community will initiate the design process and engage in discussion and debate throughout the steps of the design process.

?? Citizen scientists, other interested citizens (sportspersons, recreationists), business, and governments also will engage.

?? An adequate information system can be developed and that all necessary parties will commit to sharing information via the system.

?? A rationale system will lead to more successful management choices in the conservation area and more successful conservation outcomes.

?? There is enough information to choose initial conservation targets and invoke the process.

?? There are stable institutions in place (governmental and non-governmental) to maintain the CDP.

Calumet Area Ecological Management Strategy

CREATURES FOCUS GROUP SUMMARY

January 11, 2001

ISSUES

What kinds of animals (other than birds and fish) should be center of attention?
What kind of focus - conservation, reintroduction or management?

- ?? Black soil prairie species
- ?? "Generic" grassland species
- ?? Riparian (bats)
- ?? Others? (not including birds or fish)
- ?? Are Beaver or Muskrats a problem that should be aggressively managed?

Key species and actions for conservation (C), reintroduction (R) or management (M)

Mammals

- Franklin's Ground Squirrel (C)
- Deer Mouse (C)
- Bats (C)
- Beaver (M)
- Muskrats (M?)
- Raccoons (M)
- Feral cats and dogs (M)
- River otter (R)

Amphibians

- Mud Puppy (R)
- Bullfrog (M)
- Narrow habitat requirements, including good water quality, consistent water level management and lack of fish and Bullfrogs

Reptiles

- Maintain grassland to retain existing species, attract others
- Majority are snakes, but some lizard, turtle species

Invertebrates

- Butterflies
- Maintain grassland with flowering plants to retain existing species, attract others
- Species conformity to plant species very tight; need to maintain larvae host plant populations
- Mosquito control - toxicity issue for other aquatic larvae (e.g., chaborus, simuliids)

RESOURCES

"Third airport study"; some inventories, etc, in Calumet Area, centered on rivers (Calumet, Little Calumet, Grand Calumet)
Collections of mammals, birds, and insects at the Field Museum; some field data also
Max McGraw bat monitoring data from Eggers Woods
Doug Taron data on butterflies from Beaubien

GAPS

?? Nearly every animal group is represented, but there are significant gaps in knowledge of some groups; e.g., spiders and allies; flying squirrels; bats; Norway Rats; amphibians (mainly salamanders); aquatic invertebrates (aquatic insects, or insects with an aquatic larval stage); crustaceans; mollusks (mainly Lake Calumet and Calumet River); gastropods; and sponges and bryozoans); terrestrial insects, especially lepidopterans (butterflies and moths) and all types of worms.

?? Need to know more about Coyotes in Calumet area; are they affecting populations of deer?

?? Are River Otter returning to Calumet? IDNR found tracks at Thorn Creek in 2000.

?? Is there a Bobcat in Calumet area?

?? Need to know more about Glass Lizards; they are at Gary airport, but are they or can they live at Powderhorn? Should they be introduced if not already there?

?? Need to know how toxicity moves through food chain from soil to vegetation to creatures

ACTION ITEMS

?? Toxicity issues
- Baseline information to measure toxicity over time
- Toxics testing for most sensitive species (bioindicators); tailor cleanup to them
- Test bee pollen at Heron Pond apiary for toxicity

?? Inventory priorities

- Butterflies
  - Indicators of habitat quality, not structure
- Aquatic Invertebrates
  - Bioindicators of pollution/water quality
  - Possible transport of toxics up food chain
  - Need to separate low oxygen tolerant species from pollution/toxicity intolerant species in making quality assessments
- River Watch and Butterfly Monitoring Network invited to Calumet?

Calumet Area Ecological Management Strategy
ECONOMICS FOCUS GROUP SUMMARIES
November 15, 2000

ISSUES

a. Toxicity issues: who wants to ecotour a landfill that could make them sick, eat fish that are unsafe, etc.?

b. Land/real estate values, compared to ecosystem values (ecological services) and bridging the two. If land value increases because of ecotourism and ecological rehab, is there a potential for conflict between economics and ecology?

c. For the Environmental Center, use values via travel cost study of NPVNC, contingent valuation for non-use/natural areas - build in volunteers, fish/fishing, etc.

d. Means other than willingness to pay to get at non-use values like water quality influences of existing wetlands - Indian Ridge Marsh, Big Marsh filtering Cluster Site runoff

e. MWRD could realize benefit by use of marshes for tertiary treatment, but this may hurt ecological habitat value - potential of it; impact on development options; trade-off use values

f. Attracting green businesses; incentives for existing businesses to green up

g. Ecological impacts of marinas and other recreational uses

h. Closed-loop waste re-use opportunities

i. Businesses arising from ecological rehabilitation in the Calumet area.

j. Recreation - tobogganing, ATV, ORV training course

k. Impacts of ecotourism on existing industry; opportunity for industrial tourism as well, general tourism growth

l. Can we envision Calumet as returning to a large wetland as industrial sites become obsolete?

m. What is the economic cost/benefit/risk of containing toxic wastes at the Cluster Site?

n. How are EMS properties related to the local economy? Presumed positive impact locally with increased jobs. What educational level would be supported by new jobs?

o. Industrial effects on ecotourism – can industry and ecotourism co-exist? Will noise and odors be a serious issue?

RESOURCES

Site choice model for recreation in the Calumet area underway (Klenosky)

Study for Chicago Wilderness (Dick Kosobud)

REMI model for the city and region (IDNR has the model, too)

Hewings' model

Boating in the Chesapeake (Doug Lipton)

USACE study in Chain of Lakes on effects of boating

REMI can look at job impacts of changes foreseen for the next 5 years

Economic impacts of environmental amenities from other places. Midewin and I&M Corridor. Openlands did a rough market study for Midewin.

Inventory of the industrial heritage and the ecological sites.

Total Quality Index ratings for some of the ecological sites

Southern Lake Michigan ecosystems (Chicago Wilderness territory) are worth $3 to $5 billion annually (Dan McGrath)

Examples from other Great Lakes places such as River Rouge, Milwaukee

GAPS

Job total [inventory?] for Calumet area

Understanding conflicts and synergy between tourism and industrial jobs

Potential for impacts of ecological rehabilitation on other local jobs

Total current tourism for the Calumet region

Will people who come to Calumet for jobs stick around and spend money (e.g., eat lunch at restaurants, rent videos on the way home)?

Are green industries a draw for "how-to" tours?

What jobs and other economic impacts [positive and negative] will come from the ecological rehabilitation and clean-up activities?

Estimates of non-use values of the Calumet region - CV and replacement costs

Economic case study of interplay between industry / commercial business and ecological development

What is the total tourism for the Calumet region? How comprised?

ACTION ITEMS

?? Any research needs to help all government entities understand economic impacts
?? Explore leasing industrial land to businesses instead of ownership by businesses
?? Explore a riverfront ordinance (e.g., if you use it, it can be a working river's edge; otherwise it should be green)
?? Establish current state of Calumet area usage as baseline for comparisons against future economic impacts.
?? Port Authority - relations to city and state

Changes Over Next 5 years with Potential Economic Impacts:

Ecological Rehabilitation and Revitalization

Indian Ridge Marsh rehab and infrastructure (trails, interpretive signs, etc.)

Big Marsh purchase and rehab

Environmental Center construction and use

Burnham Greenway connected to Calumet area

Industrial and Business Changes

Cluster Site Energy Farm

Hotel Florence rehab and Pullman tourism

Megachurch

Port Authority activity

Hotel in Indiana next to riverboat casinos

Heavy truck route and possible railroad intermodal hub

Loss/abandonment of industrial properties

Calumet Area Ecological Management Strategy

FISH AND FISHING FOCUS GROUP SUMMARY

November 15, 2000

ISSUES

We need contaminant information in Conservation Area (CA) and Big Marsh (BM) to determine what is in the fish. Need fish tissue samples collected and analyzed. (*Issue: toxicity for humans, fish and wildlife health*.)

Can there be access on foot and for paddleboats, small motorboats, fishing piers at CA. (*Issue: ownership of properties.*)

We don=t want exotics to get into Big Marsh, Indian Ridge Marsh from the Calumet River. There may be ways to control larger exotic fish, but specific problem species are zooplankton with spiny structure. Small fish cannot feed on them, thus disrupting a food chain if exotic is particularly abundant. (*Issue: hydrologic needs vs wildlife needs.*)

RESOURCES

Bass, bluegill are standard impoundment fish. They are probably already in CA. An inventory is needed, IDNR scheduled survey of CA. A Afish kill@ was reported 1/6/01at BM with carp and bullhead as primary species, although one fisherman claims catching & releasing many large mouth bass in BM.

Invasives control such as *Phragmites*, but exotics may be controlling erosion, providing habitat, and purifying water.

The Conservation Area is a potential site of sufficient size to handle northern pike populations. They are fish for eating, are native, and hopefully reproduce naturally. Initial stockings to establish - 2 fingerlings per acre. They breed in marshes with the water level over the vegetation 1-4'. This water level should be sustained through May. Adults leave in March. They require 10' minimum over 25% of the area, deeper is better, and a percentage higher than 25% is as well.

The Conservation Area could also handle walleye populations. They are native, requiring the same depth as northern pike. They need ongoing stocking, are edible, and could be in the same lake with pike.

Bass need aquatic macrophytes, as well as, a minimum of 25% of area with 10' of water depth.

Non-game and game fish can coexist if carp and other undesirable fish are kept under control. Small non-game fish need places to hide. Lake Calumet probably does not need to be deepened. Fish can go to the river for deeper water. Leave the CA as a separate lake. Big Marsh is borderline; it may not have sufficient water depths to sustain a sport fishery (note* large mouth bass have been taken in BM); it should be a viewing, restoration site.

GAPS

Need bathymetric information - contour mapping to show various depths in CA.

Need contaminant information in CA and BM to determine what is in the fish. Need fish tissue samples collected and analyzed.

Bass, bluegill are standard impoundment fish. They are probably already in there. An inventory is needed, IDNR has scheduled survey of CA in 2001. A Afish kill@ was reported 1/6/01at BM with Carp and Bullhead as primary species, although one fisherman claims catching & releasing many large mouth bass in BM.

Aquatic plantings - we need to identify exis ting macrophytes.

We need information about the existing shoreline erosion.

To what extent are invasives such as *Phragmites* controlling erosion, improving water quality and creating habitat?

Do we need to deepen or aerate 25% at least 10' deep; right now 7 or 8' is maximum

To what extent is pH affecting habitability for various species? Desirable pH level for fish is 8-8.6. Current pH is reflective of the soil conditions. Fish can tolerate pH of 6-11, but pH maybe helping to select out certain species, and favor others.

What would be the ramifications of connecting the wetlands hydrologically with the river in terms of exotics? We don=t want exotics to get into Big Marsh, Indian Ridge Marsh from the Calumet River. There may be ways to control larger exotic fish, but specific problem species are

zooplankton with spiny structure. Small fish cannot feed on them, thus disrupting a food chain if exotic is particularly abundant.

What surveys exist containing information about the kinds of fish found in River, Lake Calumet. What information about other fish came from the gobi surveys?

Need Now

Do/did people fish the conservation area, Indian Ridge Marsh, Deadstick Pond and other wetlands?

What does the Cluster Site toxicity analysis show? Does it indicate a need for special analyses of Big Marsh fish? What would the liability issues be for Big Marsh?

Is there a really bad source of heavy metals somewhere to check for (fits with Cluster Site question)

What existed before the steel industry?

Fish diversity and numbers in the Conservation Area, Big Marsh, Indian Ridge Marsh, Heron Pond and Deadstick Pond.

Does Cook County Forest Preserve District have relevant fish data? Combined database

How do people gain fishing access to Lake Calumet, what current signage exists, and what is the Port Authority=s policy on fishing?

How do we get fish advisories to a) people who don=t have licenses, b) about fish that aren=t legal to catch, c) to ESL residents. The state department of public health is working on this. Tom Hornshaw has contact information through beauty parlor, WIC, pediatrician, etc. Tiffany Saxery, Public Health Educator.

What kind of fishery do people want?

Need Soon

What is the impact of these fish on migratory birds? USEPA is studying / modeling contaminated prey impacts on birds and mammals. This can be modeled to tell what the impact is on this site (the birds move) or look at chicks, or non-migratory birds.

Do contaminants move to humans - fish to fowl, fowl to people? Metadata analysis of the fish sampling data would be useful, but not helpful for creating a manageable fishery - fish move around.

What are people eating? Where were they caught? Are Big Marsh, Indian Ridge Marsh, etc. fish ok to eat? This is important eventually. Better and more detailed toxicological data on the kinds of fish people eat is needed. How many of these anglers are subsistence anglers?

Need Later

Interaction effects of multiple sources of contaminants (lead paint, fish, etc.) - this is a dream list

Does slag work for gravel? Probably not, but Fred Binkowski, Center for Great lakes research, Milwaukee, has some old data on this. Slag may be a poor substrate for fish egg development because of leaching toxins (metals) at a microhabitat level.

ACTION ITEMS

Inventory of bass, bluegill in CA by IDNR – conducted in CA in 2001. They are probably already in there. An inventory is needed, IDNR scheduled survey of CA in 2001. A Afish kill@ was reported 1/6/01at BM with Carp and Bullhead as primary species, although one fisherman claims catching & releasing many large mouth bass in BM.)

Obtain IDNR=s fish samples from Lake Calumet, and Calumet River data from working with USFWS on round gobi, (also identified other fish). This information dates back to the 1980s, maybe the 1970s, but is not annual - occurs in 5 year intervals.

Obtain MWRD=s Calumet River species and numbers on and off back to the late 1970s or 80s, and water quality data dating back to the 1970s downstream of O=Brien Locks.

Obtain USACE=s Lake Calumet data, up the Calumet River to the Calumet Harbor. This data is taken three times a year - spring, winter and fall since 1993. Diversity and number of species are included.

Obtain IEPA=s fish toxicity data. It includes limited organochlorine pesticides (a standard list of 14 chemicals), PCBs, and a few samples of mercury. This is reliable data from 1985 to the present. It was sporadic until the last two years; there wasn=t consistent analysis of the samples due to multiple outside contracted labs. Also get their toxic studies on fish from Doty Ditch. Tom Hornshaw did an informal survey on fish advisories around 4 years ago. (Note* need verification of current samples taken from IEPA)

Calumet Area Ecological Management Strategy

GIS FOCUS GROUP SUMMARY

September 20, 2000

ISSUES

Maintain data accessibility to the maximum extent possible because of multi-agency, NGO, private data sources; need to establish appropriate security/access protection

RESOURCES

NIPC data
CDOE data
CDBIS data

GAPS

Minimally consistent data and metadata and consistent assumptions
All available data needs to be entered in GIS and kept up-to-date - who to "host"

ACTION ITEMS

Determine where/how database is to be hosted/stored/maintained
Establish geo-referenced base map (CBIS/CDOE)

Establish core group to establish metadata protocols/should meet National Spatial Data Infrastructure (NSDI) standards for use of Calumet GIS on the Internet, especially hosted by NSDI.

CDOE to supply list of known relevant past data to NIPC (Nina Savar) as aid to determining costs, scope of work, prioritization, etc.

Expand existing Calumet database (NIPC/USFS) as an initial filter for adding data to the database

Establish regular meeting schedule of core group to resolve

Calumet Area Ecological Management Strategy

HYDROLOGY FOCUS GROUP SUMMARY

October 24, 2000

ISSUES

?? Storm runoff from industrial properties; railroad and other sites: sewers, groundwater flows, etc.
?? Water control methods of other Calumet EMS neighbors
?? Need to know "dreams of the larger area" to evaluate plans
?? What is sustainable hydrologic/hydraulic strategy; will it be managed when "we" are gone?
?? Value of SEPA station water to Indian Ridge Marsh
?? Groundwater high in winter when no plants are actively "cleaning" water
?? Do we want to limit groundwater inputs to wetlands, to manage systems mainly with surface water?
?? Stratigraphy of fill is crucial to final engineering; USGS fill characterization valuable to guide decisions
?? Can real-time GIS be used to model surface and groundwater? Some areas may be too complex; too great an effort
?? Toxicity issues
    - Baseline information to measure groundwater toxicity and location over time
    - Calcite precipitation from slag
    - High ammonia levels in some locations (e.g., Indian Ridge Marsh and Big Marsh)

RESOURCES

George Roadcap (ISWS) - long-term study of area; storm sewer map, other data
Bob Kay's "deep exploration boring" report (USGS)
US Steel data on slag test pits at Big Marsh
ISGS study for IDOT (Brian Trask or Anne Urdman - Check with Michael Miller)
USGS fill characterization study

GAPS

?? Watershed definition for each site; need topographic data to know what hydrologic models are appropriate (2' topos are available. May need 1' topos for detailed designs and specs)
?? Bathymetric studies of each site to set water levels and maximize habitat opportunities
?? Portions of the surface water drainage system on a site-specific basis
?? Local drainage planning per site; regional and local drainage study
?? Quality of surface water runoff - cursory for region, in detail by site as needed
?? Hydroperiod on a site-specific basis and for the region
?? Land cover, impervious cover
?? Relationship between water quality, vegetation, and water levels on specific sites; relationship between water quality and vegetation and water levels regionally; SWAMPMOD (hydrology and vegetation modeling system)
?? Locate groundwater springs and measure discharge; monitoring wells
?? Delineate poor quality groundwater areas
?? Impact of TARP tunnels; decreased surface water in some areas, increased in others?
?? Relationship between Lake Michigan water level fluctuations and hydrology of Calumet are wetlands, lakes, and ponds.
?? Relationship between local and regional data; made difficult to interpret because of variable conditions (fill, slag, etc.)
?? What happens when impermeable surface area is increased in region not protected against development that drain or will drain into Calumet area?

ACTION ITEMS

?? What we must have to make progress
- Ecological goals
- Long-term monitoring plan/strategy
- Everything in up-to-date GIS
- 2' contours of entire area
- 1' contours for site-specific designs and specs; some 6" as needed
- Reconnaissance with a backhoe or soil borings at select places between conceptual and design stages
- Survey some of the surface drainage system (culverts, ditches, pipes, elevations and sizes for everything, outflows) on a rudimentary basis regionally, and then on a site-specific basis during Phase II design stage. Start with sites that are on the front burner.
- Fill studies on a site-specific basis (geochemistry, permeability)
- Detailed hydrogeologic study on a site-specific basis
- Hydraulic interfaces between all sites on a regional level
- Portions of the surface water drainage system on a site specific basis
- Minimally consistent data and metadata and consistent assumptions
- Local drainage planning per site
- Quality of surface water runoff - cursory for region, in detail by site as needed
- Hydroperiod on a site-specific basis (can plug into modeling)
- Land cover, impervious cover

?? To make decisions we need:
- 2 foot contours
- Groundwater outflow information
- Well information
- Sewers information
- What can or cannot be controlled with respect to groundwater/surface water to guide overall strategy
- Analysis of native materials under the fill/slag in select locations, or regionally
- Economic analysis of slag reuse

?? Assess drainage impacts to Big Marsh from railroad yard and Cluster Site

?? Need to know capped contamination areas; may influence wetland/upland area design

Calumet Area Ecological Management Strategy
RECREATION AND ACCESS FOCUS GROUP SUMMARY
October 25, 2000

ISSUES

How to define appropriate recreational uses for region - active vs. passive recreation, possible conflicts between some uses (e.g., birdwatching and waterfowl hunting)

Some possible recreation activities:

- Hunting, gun and bowhunting
- Birdwatching
- Hiking
- Biking
- Cross country skiing
- Sledding (on landfills)
- Boating (canoeing, kayaking, small to large motorboats, tour boats)
- ATV/ORV/BMX/MX trails on slag areas - could be big draw
- Golfing (mainly Harborside International Golf Complex)
- Painting and drawing/sketching
- Photography
- Picnicking
- Miscellaneous sports, dog parks, model airplane flying areas, controlled vandalism areas, skate parks, etc. These more unusual activities might be restrained to park areas.

Bicycles in industrial parks - transportation and recreation combined

Some industry entities and the Port Authority may discourage hunting as an activity

Hunting safety may an issue for non-hunters raising possibility of hunter/non-hunter conflicts

Recreation depends of safety of activities, from hunting, crime, etc.

How safety will be enforced and by whom

Anglers desire varied fishing locations - docks, piers, shores and rocky places, boats

Birders usually desire separation/isolation from other activities

Coordination of access/enforcement with various private/public property owners

How to adequately control/reduce illegal hunting

How to "beautify" the area - e.g., murals on industrial properties

Boating in Lake Calumet, Conservation Area, Calumet River, below O'Brien lock and dam, bigger marshes

- Room for barge traffic and recreational boating
- Water quality for paddlers and small boats; chemical toxicity issues; bacteria; oil, gas spills
- River access points or ramps

Wildlife icons and industrial/cultural icons on the recreational use maps similar those used by Chicago Park District on maps and signs

Railroad and industrial property access points and possible liability

RESOURCES

RCRA study of dredging at Slip 8, Lake Calumet (Marian Byrnes)

GAPS

Extent of hunting, legal and illegal, not known

Research into pathogen vectors - fish, water, dust and odors

ACTION ITEMS

Discuss hunting changes with local/non-local (e.g., Indiana) hunting groups

Conclude assessment of clean-up parcels (e.g., Cluster Site) before final recreation plan

Evaluate bacterial discharges from industrial areas into rivers and wetlands relative to small boater safety; possible Hepatitis B infection south of O'Brien locks

Need to determine how to separate bike trails from truck routes

Desirable level of access (parking, footpaths, etc.) for sites needs to be determined

Suggestion to avoid overprogramming of Calumet Area

Recreational water use/risk assessment leading to a short and long term position on existing and future in-stream water quality standards

Calumet Area Ecological Management Strategy
SEDIMENTS AND TOXICITY FOCUS GROUP SUMMARY
September 26, 2000

ISSUES

?? Storm runoff from industrial properties, railroad and other sites: sewers, groundwater flows, etc.
?? Water control methods of other Calumet EMS neighbors
?? Control and/or isolation of groundwater and surface water pollutants
?? How "clean" does site need to be for minimal ecorisk to wildlife, humans, etc.?
?? Plan or strategy for field sampling and suspicion-based sampling; probably not for area or regional sampling because of high cost and complexity

RESOURCES

George Roadcap (ISWS) - long-term study of area
Industrial Wastes in the Calumet Area, 1869-1970 (with appendix) (Gary Miller; WMRC)
USGS fill characterization study (Bob Kay, USGS)
IEPA report on the Cluster Site (winter 2000-2001; Kelly Kennoy, CDOE)
ISGS survey of Lake Calumet area to map depth to bedrock (Richard Cahill, ISGS)
Fish Contaminant Monitoring Program - Calumet area fish sampling from rivers (Tom Hornshaw, IEPA)
Midewin report (Ed Karecki); some similarities with Calumet Ecological Management Strategy
Ecology and Environment information about Big Marsh (Rosita Clarke)
Straw Plan of Action (Marv Piwoni, WMRC)
Illinois International Port District Authority
Metropolitan Water Reclamation District (MWRD)
Norfolk and Southern Railroad

?? Other Expert Resources
- o Illinois State Water Survey (ISWS)
  - ✍ Anything they have covering ground, surface, air deposition
  - ✍ Long-term and ongoing Calumet area studies
  - ✍ Sediments information
  - ✍ Re-exposed soil seed bank and biosolids experiments
- o Illinois Natural History Survey (INHS)
  - ✍ 150 years of data - Calumet area wildlife/plant data
- o Illinois State Geological Survey (ISGS)
  - ✍ INHS "Illinois Wetland Restoration and Creation Guide" handbook (Richard Cahill, ISGS)
- o Illinois Environmental Protection Agency (IEPA)
- o US Environmental Protection Agency (USEPA)
- o US Fish & Wildlife Service (USFWS)
- o Waste Management Resource Center (WMRC)
- o Chicago Dept. of Environment (CDOE)
- o Universities and other institutions
  - ✍ Univ. of Illinois Veterinary School - Val Beasley
  - ✍ Illinois State Univ. - Sabina Loew
  - ✍ Univ. of Illinois/Urbana - Rip Sparks (Watershed Academy)
  - ✍ CDOE to add more

GAPS

?? Assess past research - still appropriate and sufficiently recent?
?? How does soil form in fill?
?? Data on railroad marsh as potential source of sediments/toxicity/water quality issues
?? Sediment/water quality studies
?? Is there a truly a bad source of heavy metals somewhere?

?? Data on wildlife toxicology studies - transport of specific substances through food web
  - Field mice
  - Prey fish
  - Insects
  - Birds, especially waterfowl and wading birds

?? Identify locations of deep wells in the area that may have impacted bedrock.
?? General geologic mapping
?? PAHs, hydrocarbons, petrochemicals, polymers
?? Groundwater quality and hydrologic research
?? Connections between water quality, plant quality and other ecosystem elements

ACTION ITEMS

Establish uniform sampling protocol to include additional data; soil sample collected, also get vegetation and invertebrates.

Possibly establish uniform protocol/quality standards for all sampling: soils, water quality, wildlife, toxicity, etc.?

Midewin-style planning routine addressing:

1. Can pollutant inputs be controlled/isolated?
2. Is the site below ecorisk for targeted receptor species with remediation?
3. Is the site safe for vertebrates? (low bioaccumulation)

Calumet Area Ecological Management Strategy
SOCIAL IMPLICATIONS FOCUS GROUP SUMMARY
November 8, 2000

ISSUES

Sense of place and relationships with "outside"

?? Place attachment (the place) and meaning (what is appropriate use)

?? View neighborhood attributes historically – people became birders after airport, a political attachment to place

?? Image of outside people (agencies, etc.) coming in

?? Airport as a way to sell homes and move

?? Ownership patterns – links to changes in meanings, trespass

?? Balkanized communities and sub regions

?? Influence of pollution on sense of self and community ("clean and dirty")

?? Broken promises; raised expectations; relationships of agencies to residents

?? Use of place names – Calumet region, Bishop Ford Expressway, etc.

Use conflicts: industry "versus" recreation and ecology

Competing initiatives (appropriations, etc.)

Saving the area from horrible events (e.g., airports)

Loss of jobs as industries become obsolete, abandoned, or move away from the area

Knowledge of /(dis)comfort with nature and native landscapes (anti-environmentalism; eco-terrorism)

Pollution prevention needs good neighbor dialogs between agencies/local groups

Dumping – where does it go if not here? / Perceived political "weakness" of area ✍ pollution

Public Safety as result of increased use - personal (crime, drug dealing), traffic

Development from profit-driven gentrification pressures

Regional/interstate access to the area

Local/regional/national/international importance of Calumet region

How schools interact with the region, curriculum use

RESOURCES

Kate Gillogly study for US EPA

Edde Jones' master's thesis study (Loyola, Sociology Dept.)

CCUC/Field Museum Study – Babcock assessment of social links through local and regional environmental groups

CSU airport [opinion?] survey, 1999; updated by Arthur Anderson

Loyola History Dept industrial archeology survey (Karamanski)

Army Corps of Engineers/USGS fill characterization study

Rod Sellers and his books (history)

U of C report on community information infrastructure project (find out more from Dan Cook)

People and the River (Gobster & Westphal) assessment of people's perceptions and development interests of the Chicago River corridor including some parts of Calumet region

GAPS

Who uses these sites?

How much fish do people eat? Where is the fish going (local stores, fishermen's tables)?

Extent of the informal [local?] economy

Greater knowledge of the sites from surrounding neighborhoods

How many jobs are at stake with obsolete industry and the potential job loss a neighborhood effect (i.e., where workers live)

Replicate CSU business study?

Extent of the varied perceptions based on demographics and immigration (e.g., from south)

MAP: land about to change, common names for places

List of all current industrial and other uses

What uses/interests don't we know of? Gardening, winter sport, prostitution, photography, wildlife viewing, furbearer trapping, lover's lane, shooting practice, picking rare plants?

Archeological resources/ salvage archeology / history

- ?? Human use traced in well boring data
- ?? Garbage as source of info

Social networks among environmental groups and organizations. Next steps on Eve & Kate's, Field Museum's, Edde's work. Communications diagram?

Analysis of gain and loss of access

Current use and larger community – new uses of the sites

ACTION ITEMS

Review the Gaps (need to know) list – what can be addressed quickly?

Update the Babcock drawing – are non-local interest groups in Calumet Area?

Review/update CSU/Chicago Wilderness study

Synthesize data resources with issues - any issues answered, new gaps exposed, etc.

Review, summarize, and amplify issues list

Review Kate/Eve diagram [Kate Gillogly study for US EPA]

Draft community action input model: how to do it, what's needed, key missing neighborhoods (e.g., Roseland)

Obtain input from African American community and other minorities (Latinos, Slavs, etc.)

Discuss reducing us/them, raising local involvement

Calumet Area Ecological Management Strategy

Vegetation focus group summary

October 26, 2000

ISSUES

Water Depth

Water levels must be managed, and depth is often a problem preventing emergent species from establishing in the area.

Water Quality

There are issues with toxicity and general chemistry of the water that may hinder establishment of more desirable, conservative native species.

Slag

The large amounts of fill and slag on most of these sites may require moving or consolidation to allow for growth of natives.

Ownership

Will we be able to effectively manage the sites?

Management Objectives

Grassland birds are congregating at Harborside. We need to decide if we want to increase this species. Do we want grassland, shrubland, forest or savanna on the uplands for them?

Exotic species and Replacement Matrix

Mulching and planting (not necessarily by seed) could control purple loosestrife in the short-run.

Invasives may not be controlled without mass application of herbicides for 3 to 5 years.

As *phragmites* is controlled, it may be replaced by reed canary grass, another aggressive exotic.

Fire may not be effective against the invasives in Calumet .

Replacement species are needed to provide competition, perhaps beginning with a short-term cover crop, with eventual establishment of a native stand). In other words, an exotics elimination scenario must be joined with a replacement scenario.

The cost of seeds and plants is very high; it may be productive to create a nursery for rehabilitation efforts somewhere in Calumet. *(Issue:exotics & Management suggestion)*

RESOURCES

?? Along Indian Creek there is a prairie remnant that includes cordgrass and other prairie and wet prairie species.

?? Where there is native soil there may still be native species, and we should find them.

?? Burnham and Powderhorn Prairies have good native species for which seed could be collected.

?? The Calumet River's edge south of the drying beds has native sand, gravel and debris along the shoreline; above the water line are stands of *phragmites*, then a landscaped area with shrubs. Section 206 money could be used to rehabilitate and stabilize this asset.

?? At Indian Ridge Marsh, 15,000 *galerucella* beetles have been released to control the purple loosestrife -monoculture. Their activity is being monitored through a USEPA-GLNPO grant, and are expected to have a pronounced effect in controlling the purple loosestrife. We should follow up with plantings to prevent other invasives from moving in.

GAPS

?? Phase I and Phase II for each site are needed.

?? Dolomitic prairie species may be able to grow on slag because the conditions are similar - we need to conduct research to find a matrix of species tolerant to slag.

?? Research on planting mediums and how they affect native species should be conducted using biosolids and Illinois River sediments.

?? How do various plant species uptake pollutants (i.e. PNAs, heavy metals) and do they affect fauna? Don Hey is conducting a study of how metals move through plants.
?? An inventory of animals should be taken, and a study of what areas they are currently using for cover, breeding and feeding. These areas should be left untouched, and experiments should be conducted only in relatively underused areas.
?? We need a baseline inventory of existing plant communities. A map should be made of where the high-quality areas are, and seed should be collected there.
?? Burnham Prairie has slag that could be mined and put into deeper marshes to make them shallower. Is this a desirable option?
?? Water chemistry data is needed.
?? Hydroperiod data is needed.
?? Hydraulic connections, including culverts and groundwater movement.
?? Knowledge of what plants can grow on various types of slag, foundry sand, and dredge and petrochemical dump spoils.
?? A focused substrate inventory.
?? Detailed site characterizations.
?? A research plan with measurements.
?? A cost-benefit analysis should be conducted comparing 1) cost of exposing native soils to see if native seeds would thrive; 2) cost of covering the seeds with an alternative planting medium (biosolids, IL River sediments).
?? The bee honey at Heron Pond could be tested for toxicity.
?? To what extent are plants pollinator-limited in the area? What species could increase bee populations to assist in pollination?
?? Literature studies of pH preferences of plants that could be used as follow-up plantings, as well as native plants.
?? Will phytoremediation pose an attractive nuisance to wildlife?
?? Study PAHs, hydrocarbons, petrochemicals, polymers.
?? When work is done to move soil, etc. on the site, will a purple loosestrife outbreak ensue due to disturbance? Need plans for plantings to follow control of purple loosestrife.

ACTION ITEMS

?? Don Hey is conducting a study of how metals move through plants - we need the results.
?? Collect seeds from high-quality areas.
?? Write grants to support activities listed in the Gaps section. Seek Section 206 money for rehabilitating the shoreline of the Calumet River south of the MWRD drying beds.
?? Monitor beetles at Indian Ridge Marsh.
?? Consider gaps section action items.

ACTION ITEMS THAT OVERLAP WITH OTHER FOCUS GROUPS

?? Dredge spoils may be low in organic matter, and may turn into bricks. If dredge spoils were applied to the marsh bottom, it would require a drawdown, which may be difficult because the groundwater is high. A littoral zone could be created on the edge and plants established (Overlaps with Fish).
?? An inventory of animals should be taken, and a study of what areas they are thriving in currently. These areas should be left alone, and experiments done in areas where they aren't. Bigger areas are better for vegetation studies. An inventory of existing plant communities should be conducted, and seeds could be collected from high-quality areas. A map should be made of where the high-quality areas are. (Overlaps with Critters/Wildlife)
?? Map where the habitats could go, then move the elements around to see how it should be in a variety of focus groups to get ideas and consequences. (Overlaps with Fish & Creatures/Birds)
?? We need a hydrologic plan before a vegetation plan. (Overlaps with Fish and Hydrology)

?? Big Marsh - upland fill area has cottonwood (trees) and common reed (*Phragmites australis*). In wet shallow areas, common reed also lives. In slightly deeper water, cattails thrive. Big Marsh stays too deep (around 3' of water) for cattails or *phragmites* to grow. Much of the water has a pH of 12. There is no submerged information. It may be a good idea to bring in cleaner water from the SEPA station. (Overlaps with Hydrology and Fish)

?? If the water level was less than 3', pondweeds and other bottom vegetation may grow. The surface water moves over the slag, then into the water bodies, precipitating out calcium and magnesium. This affects water quality and vegetation. (Overlaps with Fish and Creatures)

Calumet Area
GIS Data Specifications

DATA FORMAT

All data delivered by consultants should be projected to the City of Chicago's standard projection.

Projection Coordinates:	STATEPLANE
Projection Datum:	NAD83
Projection Units:	FEET
Projection FIPSZONE:	1201
Projection Spheroid:	GRS1980

The data should be in an ESRI data format, preferably coverage type. Shapefiles are also acceptable if constructed correctly. The data should be free from errant features. All polygon geographies must have a label point and be free of intersection errors, node errors, dangling arcs, and label errors. If region geographies are used they should be free of the same errors as well. Any annotation layers created should be linked to the feature attribute from which they get their value, so that if the attribute values change the annotation can be updated automatically. Line geographies should also be free of intersection errors, unless required by any overpass situation. Each feature is required to have a unique id.

POSTIONAL ACCURACY

The desired positional accuracy is up to the CDOE. However, BIS/GIS would recommend where possible the consultant use the City of Chicago's planimetric base layers such as curbs, hydrology, railroad, and street centerline to create other geographic layers. This would help maintain coincident geographic data layers. This would also insure that the created geographies fit well with the aerial photography since the City's planimetric data was created from that source. The data creator should be clear as to the method used to construct the new geographies and should include it in the metadata that should be part of the deliverable. The metadata should adhere to the FGDC format.

GPS

If GPS is going to be used to collect data, BIS/GIS recommends that differential correction is used insure a positional accuracy of +- 3 to 5 ft. Again; data should be collected in stateplane coordinates. Data dictionaries can be created for use with a GPS collection device to help with data integrity (see below).

ATTRIBUTES

Regardless of the feature capturing method used, attribute creation and collection should adhere to a few simple rules. A database dictionary should be created for each desired layer. Every attribute that is to be collected for a particular data layer should be defined in terms of name, attribute type (i.e. number, character, Boolean, etc.), and attribute length. Every feature should have a unique id based on either a simple numbering scheme or a system that adds intelligence to the id value. Forethought, should be given to which attributes can use a set of nominal values or a specific number range to help with data

integrity. Issues of NULL values (No value) versus Unknown values need to be resolved for each attribute. If address information is to be collected the format should coincide with the BIS/GIS standard listed below:

Attributes	Attribute Name	Attribute Length	Attribute Type
House Number	House_num	6	Integer
Prefix Direction	Pre_dir	2	Character
Street Name	Street_name	35	Character
Street Type	Street_type	5	Character
Suffix Direction	Suf_dir	2	Character

Spelling and type standardizations can be obtained from BIS/GIS.

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Commissioner

State of Illinois
George H. Ryan
Governor



CHICAGO'S
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