



**DRAFT
Wisconsin's
Great Lakes
Restoration and
Protection
Strategy**

2006

COUNCIL OF GREAT LAKES GOVERNORS' PRIORITIES

AQUATIC INVASIVE SPECIES

Council of Great Lakes Governors' Priority: Stop the introduction and spread of non-native aquatic invasive species.

HABITAT AND SPECIES

Council of Great Lakes Governors' Priority: Enhance fish and wildlife by restoring and protecting coastal wetlands, fish and wildlife habitats.

COASTAL HEALTH

Council of Great Lakes Governors Priority: "Promote programs to protect human health against adverse effects of pollution in the Great Lakes ecosystem."

AREAS OF CONCERN/CONTAMINATED SEDIMENTS

Council of Great Lakes Governors' Priority: "Restore to environmental health the Areas of Concern (AOC) identified by the International Joint Commission as needing remediation."

NONPOINT SOURCE MANAGEMENT

Council of Great Lakes Governors' Priority: Control pollution from diffuse sources into water, land and air.

PERSISTENT BIOACCUMULATIVE TOXINS (PBT)

Council of Great Lakes Governors' Priority: "Continue to reduce the introduction of PBTs into the Great Lakes ecosystem."

SUSTAINABLE DEVELOPMENT

Council of Great Lakes Governors' Priority: "Adopt sustainable use practices that protect environmental resources and may enhance the recreational and commercial value of our Great Lakes."

INFORMATION AND INDICATORS (I&I)

Great Lakes Governors' Priority: "Standardize and enhance the methods by which information is collected, recorded and shared within the region."

Wisconsin Great Lakes Restoration And Protection Strategy

EXECUTIVE SUMMARY

The Great Lakes contain 20% of the world's available fresh surface water supply. Because of that, the Great Lakes are critical to the health and welfare of all the Great Lakes states but especially for us here in Wisconsin. They provide drinking water for millions of state residents. They support manufacturing and recreational industries providing thousands of jobs. They generate power and assimilate our wastewaters. But most importantly they define and support a huge freshwater system and related terrestrial ecosystem which is unique in the world. Effective management of both wetland and water quantity and quality is necessary if we are to fulfill our state's stewardship obligations for these world class resources. This strategy is the first step in defining the actions needed to ensure that our Great Lakes are protected and restored where needed to sustain this system for future generations.

The DNR Office of Great Lakes, with the help of countless individuals and organizations, developed the initial proposals for a Wisconsin Great Lakes Restoration and Protection Strategy to parallel the Council of Great Lakes Governors' (CGLG) Priorities for the Great Lakes (<http://www.cglg.org/projects/priorities/index.asp>). These priorities were also the organizational framework for the Great Lakes Regional Collaboration (<http://www.gllrc.us/>).

GREAT LAKES REGIONAL COLLABORATION

The Great Lakes Regional Collaboration process started in May 2004 with the issuance of a Presidential Executive Order. The Executive Order called for improved federal coordination and efficiency of Great Lakes programs and for the U.S. Environmental Protection Agency (EPA) Administration to initiate "a regional collaboration of national significance" to create a national action agenda for Great Lakes. In December 2004, the collaboration started under the direction of five organizational partners:

- the eight Governors through the council of Great Lakes Governors
- the federal agencies through the inter-agency task force
- tribal governments
- the organization of the Great Lakes Mayors
- the Great Lakes congressional organization.

However the regional collaboration reflects the needs of five lakes and eight states and thus the recommended actions are framed by common but somewhat generic issues. As an example, restoration of self-sustaining stocks of native fish species is an issue which transcends the eight states. Yet the species may differ from state to state or lake to lake: brook trout in Lake Superior versus lake trout in Lake Ontario. The Wisconsin Great Lakes Restoration and Protection Strategy will provide the necessary specifics to help support and implement the recommended action items in the Great Lakes Regional Collaboration.

BUILDING ON PAST EFFORTS

Over the past 20 years, a variety of planning efforts have attempted to develop remedies that would restore portions of the ecological integrity of the Great Lakes systems. The Joint Strategic Plan for Management of Great Lakes Fisheries, for example, serves as a tool for coordinating efforts to manage and protect the Great Lakes fisheries systems. Lakewide Management Plans (LaMP) are updated every two years for each Great Lakes, as agreed upon under the Great Lakes Water Quality Agreement, and report on the status of the chemical, physical, and biological integrity of the Lakes. The State's Comprehensive Wildlife Conservation Plan, identifies which of our native Wisconsin species are of greatest conservation need and through the Action Plan, presents priority conservation actions to protect the species and their habitats. These and similar plans represent the work of science professionals, researchers, interested individuals, and policy makers but are often focused on a single problem, a single desire or a small geographic region. What has been lacking is a comprehensive action agenda for restoring our Great Lakes: an agenda that fully represents the needs and desires of the State of Wisconsin. In this strategy we strive to bring together information from the various past planning efforts to build a comprehensive state action agenda.

REPORT LAYOUT

Each chapter in this document begins with a **Problem** statement related to the specific topic area *as it relates to the status in the Wisconsin portion of the Great Lakes basin*. This is followed by a section on **Goals** for achieving long term success in the basin. The **Recommended Actions** section articulates near term actions to help address the problems identified in the first section.

REPORT GOALS

We have several goals for our initial Wisconsin Great Lakes Strategy:

1. the strategy will translate the recommendations from the regional collaboration into Wisconsin specific actions,
2. the strategy will be a vehicle for coordinating efforts and developing shared priorities,
3. the strategy will serve as a menu for securing and allocating resources, and
4. the strategy will promote developing projects to be ready for implementation and better position Wisconsin for competing for federal restoration and protection funding.

As stated above, this is an initial strategy. We fully expect it to evolve change as more information is collected or as issues change. It is our intent to update this strategy through a process of public reporting, solicitations of ideas and comments and reacting to what we learn in an adaptive approach. Our current thoughts are that a state of the lakes report would be developed biennially and presented in public forum. These sessions and other information would then be the basis for a more formal review and revision of the strategy.

AQUATIC INVASIVE SPECIES

Council of Great Lakes Governors' Priority: Stop the introduction and spread of non-native aquatic invasive species.



Zebra and Quagga Mussels: Photo courtesy of USGS

PROBLEM STATEMENT

Aquatic invasive species (AIS) are increasingly recognized as a serious problem in Wisconsin. Both intentional and unintentional releases of exotic species pose serious threats to the health, economic welfare, and ecological integrity of Wisconsin waters. Particularly problematic is preventing new introductions of AIS into Wisconsin waters and controlling the spread of existing AIS between waterbodies.

Wisconsin's aquatic invasive species program focuses on preventing the introduction of new invasive species to Wisconsin, preventing the spread of invasives that are already in the state, and controlling established populations when possible. Along with the aquatic plant management program and the various laws and contacts for dealing with aquatic invasive plants, the aquatic invasives program has the tools in place to minimize new introductions of nuisance species. These include:

- The Watercraft Inspection Program, which involves visual inspection of boats to ensure they are "clean" and providing anglers and recreational boaters information on what invasive species look like and what precautions they should take to avoid spreading them.
- The Volunteer Lake Monitoring which involves collecting samples of several AIS known to occur in Wisconsin waters and inspection of watercrafts for invasive plants.
- Information and education in close cooperation with UW Extension Environmental Resources Center and UW Sea Grant Institute aimed at educating boaters, anglers, and other water users on proper prevention techniques.
- Purple Loosestrife Biological Control, a citizen-based project that emphasizes using two safe, purple loosestrife foliage-feeding beetle species, in combination with traditional methods, for controlling this invasive plant.

- The Clean Boats, Clean Waters Program, which is sponsored by the DNR, UW Extension and the Wisconsin Association of Lakes. The program offers training to volunteers on how to organize a watercraft inspection program, how to inspect boats and equipment and how to interact with the public.

The key to preventing new AIS introductions is control the transport mechanisms or pathways of release of AIS into Lakes Michigan and Superior and inland state waters. The highest prevention priority is the control of ballast water discharges. Other vectors of transport also need to be addressed including: the transportation and rearing systems related to the aquaculture industry, commercial barge traffic, recreational boating, the sale and distribution of live fishing bait, the transfer and disposal of aquarium pets, plant nurseries including pond plants and rain gardens, fish stocking activities, live fish markets and individual releases by anglers.

GOALS

Wisconsin's goal for AIS management is, to the maximum extent possible, prevent any new introductions of nuisance exotic species and prevent any new introduced nuisance exotic species from becoming naturalized or spreading to new areas.



Recommended Actions – Aquatic Invasive Species

GLRC Recommendations: Ship and barge-mediated introductions and spread of AIS in the Great Lakes should be eliminated, through the immediate promulgation of environmentally protective standards for ballast water, and the implementation of effective ship-board treatments and management measures.

Wisconsin Strategy: Develop and implement a regulatory permitting system which ensures that ballast waters are adequately treated prior to discharge to waters of Wisconsin. Examine the feasibility and cost of developing shore based treatment facilities for ballast water at the major ports of call in Wisconsin. Develop partnerships with the major players – U.S. Coast Guard, port authorities, shipping industry, environmental groups, and other stakeholders – to ensure acceptance of this approach.

GLRC Recommendations: Federal, state, and/or local governments must enact measures that ensure the region's canals and waterways are not a vector for AIS, including full federal funding of the Chicago Sanitary and Ship Canal dispersal barrier and the sea lamprey control program.

Wisconsin Strategy: Determine the threat that other vectors besides ballast waters pose to Wisconsin waters for aquatic invasive species. Establish codes of best management practices for each industry to follow to minimize the threat of introduction of AIS from these sources. Examine the need for regulations for each pathway of introduction and where necessary, make recommendations on administrative rules changes or identify statutory gaps to address the problem. Continue working with local bait shops to determine if bait are collected from infested waters or brought in from outside the State and use this information to develop guidance for the bait industry in understanding how they can help address the problem. Wisconsin will also participate through the Council of Great Lakes Governors in the regional effort to secure funding to complete construction and provide for long term operation of the dispersal barriers in the Chicago Sanitary and Ship Canal.

HABITAT AND SPECIES

Council of Great Lakes Governors' Priority: Enhance fish and wildlife by restoring and protecting coastal wetlands, fish and wildlife habitats.



Piping Plover: Photo courtesy of the Nebraska Game and Parks Commission

PROBLEM STATEMENT

As the name implies, the "Great" Lakes region supports diverse and often unique ecosystems. Almost all of North America's alvars, a cluster of natural community types and associated species known collectively as alvar, occur within the Great Lakes basins and the region supports 46 species found nowhere else in the world^{1,2}. Yet the health of the ecosystems in the region has been compromised over the years as a result of human activities and both habitat quantity and quality in the State have decreased. These conditions currently limit chances for existing programs to restore species to self-sustaining levels in Wisconsin.

Riparian habitats have also been lost. Historic activities have altered regional hydrologic patterns resulting in changes to flood peaks and periods and low-flow volumes and duration. For example, in the Wisconsin portion of the Lake Superior Basin, log driving activities and increased peak flood flows have severely degraded in-stream habitat features. Together, these and other land uses have resulted in changes in stream morphology with reduced amounts of high quality habitat for fish and wildlife. Species restoration plans are dependent on habitat quality and anadromous fishes (those that migrate from salt to fresh water for spawning) are dependent on tributaries for spawning and nursery areas. Protecting remaining critical habitat in the headwaters of the watershed is the first step in a long process of restoring down stream habitat.

With much of the riparian ownership in private hands, educational efforts and incentive programs are needed to acquire or restore critical tributary stream riparian zones.

¹ Binational Conservation Blueprint for the Great Lakes, TNC,

² Conserving Great Lakes Alvars: Final Technical Report of the International Alvar Conservation Initiative, March 1999

Riparian buffer development and wetland restoration are key steps in restoring tributary habitat quality. Management of storm water flows to optimize infiltration and decrease run-off rates are also important restoration projects. Key tools for implementing these measures are incentive programs like those authorized under the federal Farm Bill, i.e. the Conservation Reserve Enhancement Program (CREP), along with the various grant programs, such as the Wisconsin Coastal Management Grant Program.

Other habitat issues which have been raised around the state are cormorant population/fish population relationships, yellow perch population fluctuations, unique geologic sites, forest cover/tributary stream hydrology relationships, near shore habitats and *Cladophora*.

The Great Lakes basin encompasses eight States and two Canadian Provinces. Coordinating across these jurisdictional boundaries and with a myriad of governmental agencies poses unique problems when managing shared resources. The Great Lakes Joint Strategic Plan serves as model for how managing authorities can work together towards common goals. Combined with the Great Lakes Regional Collaboration, we stand a better chance at achieving restoration goals articulated in various plans when we all work together.

GOALS

Priority areas for protection and restoration identified in the Great Lakes Regional Collaboration are wetlands and tributary streams. Wisconsin's goal for habitat and species is to rely on existing species recovery or management plans and strategies to identify critical habitat and species needs and to protect and restore those habitats which are critical to meeting recovery targets. Examples of priority management targets are:

- Species of Greatest Conservation Need
- Lake sturgeon
- Musky in Green Bay
- Tern populations
- Brook trout in Lake Superior
- Walleye
- Trumpeter Swans
- Increasing breeding pairs of waterfowl
- Species of Concern

GREAT LAKES SUCCESS STORIES

Rush Lake Restoration

Rush Lake is a highly degraded 3000 acre marsh with an average depth of about 1.5 feet, located in Winnebago County. For many decades the waters of the marsh had been held artificially high and stable, resulting in the demise of the dense bulrush stands for which the lake was named. Today bulrush stands occupy less than 1% of the marshes surface area. It is dominated by bullheads and carp and only a few duck broods are raised here each year.

Five years ago a new approach was undertaken when DNR field staff realized that restoration would only occur if it was a citizen led effort. Local citizens clearly recognized that Rush Lake was not the same as it was in their youth. A steering committee of local landowners and representatives from five local towns was formed to guide the development of a restoration plan, with DNR, Winnebago County LWCD, and US Fish & Wildlife Service as technical advisors. The steering committee eventually formed a nonprofit organization, Rush Lake Restoration, Inc. to pursue the long term care of Rush Lake.

DNR secured planning funding through the Great Lakes Protection Fund to hire a consulting firm to develop a report upon which the plan could be based. Hundreds of citizens contributed to the development of the report and the subsequent plan, defining goals and an implementation strategy for restoration. The cornerstone management action will be a two year draw-down of Rush Lake to regenerate bulrush on 50% of the marsh. Implementation funding was secured through the North American Wetland Conservation Act, Lower Fox River Natural Resources Damage Assessment, Rush Lake Restoration, Inc., and numerous private donations. Ducks_Unlimited provided engineering for the project.

In the fall of 2005 the first physical steps for a draw-down were undertaken with the removal and reconstruction of the dam at the lake's outlet and reconstruction of the stream channel for the first half mile below the dam. The new dam was built with the ability to draw down the marsh which wasn't possible with the old dam. The draw-down will begin in the spring of 2006 and water levels won't be raised again until the fall of 2007. At that point Rush Lake will truly be a rush lake again.

Recommended Actions – Habitat and Species

GLRC Recommendation on Open and Nearshore Waters: Develop and evaluate lake trout restoration efforts through strategies such as a 40 percent increase in the number of lake trout stocked, using guidance from existing fishery management plans.

Wisconsin Strategy: Continue to support the fish refuges, Gull Island Refuge (1976) and Devils Island Refuge (1981). Gull Island Reef is one of the few places where a remnant lake trout spawning population survived the lamprey invasion.

GLRC Recommendation for Riverine Habitats and Related Riparian Areas: Restore ten Great Lakes tributaries (five tributary barrier projects and five riparian habitat projects).

Wisconsin Strategy: Restore 8 Great Lakes tributaries. The following rivers and streams represent priority areas for protection and restoration within the Wisconsin portion of the Great Lakes Basin. Projects are intended to serve as recommendations for focused restoration efforts that will move us toward the stated goals:

LAKE SUPERIOR BASIN PROJECTS (there is only one WMU in Lake Superior Basin)

Projects
Brule River
Bark River
Saxine Creek
Flag River
Sioux River
Cranberry River
Iron River
Onion River

LAKE MICHIGAN BASIN PROJECTS

Water Management Units	Projects
Green Bay	Menominee River
	Peshtigo River
Lower Fox	Fox River
Manitowoc	Manitowoc River
	Stony Brook
Milwaukee	Milwaukee River
	Mole Creek
	Ulaos Creek
Sheboygan	Sheboygan River
	Onion River
	Otter Creek
Root-Pike	
Twin-Door-Kewaunee	Kewaunee River
Upper Fox	
Wolf	Willow River

Wisconsin Strategy:

Protect and restore coastal, riparian, and wetland habitat, such as 7,000 acres of wetlands identified along Green Bay's west shore, the Lake Winnebago System (an important nest colony area for the endangered Common Tern and Forster's Tern), and islands, such as Green Island (a Black-crowned Night Heron rookery), in Green Bay and off the tip of Door County.

In the Lake Superior Basin, important coastal, riparian, and wetland resources to protect and restore include Chequamegon Point and Long Island (nesting areas for the endangered Piping Plover), Wisconsin Point, Allouez Bay, the Kakagon Sloughs, and the Lower Nemadji River Marshes.

GLRC Recommendations for Wetlands: Restore or protect 550,000 acres of wetlands and associated uplands.

Wisconsin Strategy: Restore or protect 200,000 acres of wetlands and associated uplands in Wisconsin. This includes 7000 wetland acres on the west shore of Green Bay for birds. Increased habitats for northern pike spawning have also been identified as a critical need for fisheries habitat. Other key efforts are the protection and restoration of coastal wetlands to restore regional hydrology and adjacent habitats.

Adopt target areas for priority actions that are identified in management plans such as the North American Waterfowl Plan and the related Joint Venture for wetland acreage increase goals in the Lake Superior basin, the west shore of Green Bay, and the Milwaukee River basin. Identify opportunities that would address statewide needs and resources outlined in the Wisconsin Land Legacy Report as they relate to wetlands, undeveloped shorelines, scattered natural areas, large working forests, and prairies and savannas.

COASTAL HEALTH

Council of Great Lakes Governors Priority: "Promote programs to protect human health against adverse effects of pollution in the Great Lakes ecosystem."



Hika Bay Algae: WDNR Photo

PROBLEM STATEMENT

Potential sources of pathogens impacting recreational water and drinking water in Lakes Michigan and Superior are the result of both direct and indirect contamination sources. Research by local communities has found that primary sources of contamination vary widely by beach and that most sources are local in nature. Sources of concern include:

- Storm water discharge from nearby outfalls
- Direct runoff from roads and parking lots
- Storm events that cause domestic and wild animal waste to wash into waterways
- Malfunctioning septic systems
- Illegal sewer connections to streams that present a source of human derived bacterial contamination
- Illegal dumping by marine vessel holding tanks
- Avian and other animal populations on beaches
- Sanitary and combined sewer overflows

On Lake Michigan beaches, an algae problem which had largely disappeared in the late 70's, now has reemerged. *Cladophora* now fouls beaches along the entire shoreline. Nonpoint sources and inadequately treated wastes are the major causes of nutrient enrichment of the nearshore waters. Both urban and rural nonpoint sources are

contributing a wide variety of pollutants which are collected by the tributaries and discharged into the lakes.

Beaches:

Wisconsin is blessed with beautiful beaches on both Lake Michigan and Lake Superior shorelines. Unfortunately, recent increases in monitoring associated with implementing the federal BEACH Act of 2000 has resulted in what appears to be a growing number of beach closures due to bacterial counts exceeding standards. Currently federal law requires that beaches be posted advising of health risk if the *E. coli* levels in a single sample exceed 235 cfu/100 ml. While *E. coli* itself poses a minimal health threat to swimmers, it can indicate the presence of other dangerous bacteria and viruses that can cause diseases. Over the past three years, water quality samples from Wisconsin's beaches have exceeded this threshold 15% of the time in 2003, 22% in 2004, and 16% in 2005. The percentage of beaches with 90% compliance of water quality standards was 53 % in 2003, 39 % in 2004 and 53 % in 2005. The presence of algae may also contribute to beach closures by providing a suitable environment for *E. coli* to survive and even grow. In 2006, 32 beaches were included on the State's impaired waters list because of chronic closure problems associated with the presence of high counts of *E. coli* bacteria. Impaired waters are those waters that are not meeting state water quality standards as defined by Section 303(d) of the federal Clean Water Act. Every two years, states are required to submit a list of impaired waters to the United States Protection Agency (U.S. EPA) for approval.

GOALS

Wisconsin's goal for coastal health is to protect public health through elimination of pollution sources which can cause bacterial closings at beaches.

Recommended Actions – Coastal Health

GLRC Recommendation: Eliminate to the extent provided by existing regulation inputs of untreated or inadequately treated human and industrial waste to Great Lakes basin waters through implementation of wet weather programs, including improvements to wastewater treatments systems.

Wisconsin Strategy: Working with local agencies, develop and implement a strategy to improve confidence in collection methods and identify and correct sources of pathogens which are resulting in beach closures. Continue investigation of causes and solutions for *Cladophora* problems.

Key Locations:

Beaches that have been listed as impaired have exceeded a rolling geometric mean of 126 CFU/mL *E.coli*, more than 15% of the time, over the past three years. The Recreational Public Health and Welfare Use Assessment Team will be prioritizing beaches in need. The following beaches are on the State's impaired waters list:

Beach	County
Maslowski (L. Superior)	Ashland
Sunset Beach - Sturgeon Bay (L. Michigan)	Door
Barker's Island Inner (L. Superior)	Douglas
Brule River State Forest #2 (L. Superior)	Douglas
Brule River State Forest #3 (L. Superior)	Douglas
Eichelman (L. Michigan)	Kenosha
Pennoyer Park (L. Michigan)	Kenosha
Simmons Island (L. Michigan)	Kenosha
City of Kewaunee (L. Michigan)	Kewaunee
Crescent (L. Michigan)	Kewaunee
Fischer Park Beaches – L. Michigan	Manitowoc
Hika Park Bay – L. Michigan	Manitowoc
Memorial Drive Wayside Beach – L. Michigan	Manitowoc
Neshotah Beach – L. Michigan	Manitowoc
Point Beach State Park Beach – L. Michigan	Manitowoc
Red Arrow Park Beach – L. Michigan	Manitowoc
YMCA Beach – L. Michigan	Manitowoc
Warm Water Beach – L. Michigan	Manitowoc
Atwater Beach (L. Michigan)	Milwaukee
Bender Beach (L. Michigan)	Milwaukee

Grant Park (L. Michigan)	Milwaukee
Bradford Beach – L. Michigan	Milwaukee
McKinley Beach – L. Michigan	Milwaukee
South Shore Beach – L. Michigan	Milwaukee
Tietjen Beach/Doctor's Park – L. Michigan	Milwaukee
Cedar Beach (L. Michigan)	Ozaukee
County Road D Boat Launch (L. Michigan)	Ozaukee
Harrington State Park (L. Michigan)	Ozaukee
Upper Lake Park (L. Michigan)	Ozaukee
Deland Park (L. Michigan)	Sheboygan
General King Beach (L. Michigan)	Sheboygan
Kohler Andrae (L. Michigan)	Sheboygan

GLRC Recommendation: Standardize, test, and implement a risk-based approach to manage recreational water.

Wisconsin Strategy: Provide short-term guidance on nuisance algae beach clean up and provide public information covering the following topics through local signage ordinances:

- Bacteria are present in natural waters (in quantities that may or may not cause a health problem)
- Feeding waterfowl can increase avian waste at beaches
- Observing sanitary measure such as hand washing and staying out the water with gastrointestinal illness to limit exposure
- Information on what the risk for illness is when there is a beach closure.
- Promote proper boat waste disposal
- Promote proper pet waste disposal

GLRC Recommendation: Protect drinking source water quality.

Wisconsin Strategy: Fund wellhead protection plans and replace existing water quality testing methodologies with real time testing methodologies. Complete environmental inventories of both emerging pathogens and other pollutants that are comprehensive and include watersheds, wastewater inputs and drinking water withdrawals. From this inventory the sources, fates, and reduction strategies for these items of concern can be evaluated. Implement a strategy to monitor emerging contaminant such as those on the Wisconsin Watch List, pharmaceuticals and personal care products.

AREAS OF CONCERN / CONTAMINATED SEDIMENTS

Council of Great Lakes Governors' Priority: "Restore to environmental health the Areas of Concern (AOC) identified by the International Joint Commission as needing remediation."

PROBLEM STATEMENT

Great Lakes Areas of Concern (AOCs) are severely degraded areas within the Great Lakes Basin whose beneficial uses are impaired because of changes to the physical, chemical, or biological integrity of the system. The four major categories of Beneficial Use Impairments (BUIs) are contaminated sediments, habitat loss or destruction, nonpoint source pollution, and beach issues. The Great Lakes Regional Collaboration (GLRC) AOC/Sediments strategy team identified three primary barriers to making further progress in restoring the Areas of Concern (AOCs): AOCs program administration, lack of delisting criteria, and contaminated sediments.

Five Wisconsin harbor and river mouth areas have serious pollution problems that severely limit the beneficial uses of the waterways. These water bodies were designated "Areas of Concern" (AOC,) as defined by the Great Lakes Water Quality Agreement, in the mid-1980s. They were identified based on 14 beneficial use impairments (BUIs), which are broadly categorized as contaminated sediments, habitat loss or destruction, non-point pollution and beach issues. A full listing of the 14 BUIs is presented in Table 1 of Appendix A.



The Great Lakes Water Quality Agreement, via a 1987 amendment, directed the U.S. and Canadian governments to develop and implement Remedial Action Plans (RAPs) for each Area of Concern. Stage I Remedial Action Plans (RAPs) and updates or Stage II Remedial Action Plans have been prepared for each of the five Wisconsin Areas of Concern (AOCs). However the AOC/RAP program effort in Wisconsin scaled back considerably in the late 1990s with the reduction in federal funding. DNR discontinued staffing for local Remedial Action Plan (RAP) teams and RAP updates have not been produced since 1996.

Statewide or site-specific delisting criteria or targets, against which to measure progress and completion, are necessary for delisting AOCs or individual use impairments. Although progress has been achieved toward restoration of beneficial uses in all of the AOCs, none of the sites have been restored sufficiently or evaluated sufficiently to be delisted. The St. Louis River Citizens Action Committee drafted delisting targets for the St. Louis River AOC, and is awaiting DNR and EPA review, comment and approval. Milwaukee will be pursuing a 2-year project to refine Beneficial Use Impairments (BUIs) and set preliminary delisting criteria tailored to the different areas within the AOC.

AOC - Contaminated Sediment Focus

Many of the sources that impact the AOCs are outside the boundaries of the AOC and are therefore addressed in the other priorities. Like the Regional Collaboration process, the Wisconsin strategy will largely focus on contaminated sediments. The contaminated sediment problem is linked to multiple use impairments in every one of Wisconsin's AOCs.

Currently, a contaminated sediment management strategy exists in the Milwaukee Estuary RAP (1994) and a sediment quality management plan focusing on PAH contamination is under development for the lower St. Louis River AOC. All of the AOCs, including the two above have some contaminated sediment deposits that are being addressed under Federal Superfund or RCRA authorities. The strategies associated with those programs have been or can be incorporated in the RAPs for the Sheboygan, Menomonee, and Green Bay as Stage II sediment remediation recommendations.

The Great Lakes Legacy Act was signed into law on November 27, 2002 and authorizes funding over five years to specifically assist with the remediation of contaminated sediment in any of the 31 designated U.S. Areas of Concerns. The GLRC is recommending the Legacy Act be amended and reauthorized, then "be the primary authority used to address contaminated sediment in the AOCs".

GOALS

Wisconsin's goals for Areas of Concern (AOC) and contaminated sediments are to develop delisting targets for each AOC in Wisconsin and to identify a reasonable timeline for achieving the goal of delisting.

Proposals for sediment projects located within four of the five Wisconsin AOCs have been submitted for Legacy Act funding, as follows:

Area of Concern	Project Title	Applicant
St. Louis River - MN	St. Louis River/Interlake/Duluth Tar Site Remediation	GKN North America Services, Inc.
St. Louis River – WI	Hog Island Inlet – Newton Creek, Segment L Contaminated Sediment Remediation	Wisconsin DNR
Sheboygan River	Upper Sheboygan River Environmental Dredging	Pollution Risk Services
Menominee River	Former Manufacture Gas Plant Site, Marinette, WI (PROPOSAL WITHDRAWN)	Wisconsin Public Service Corporation
Milwaukee Estuary	Restoration of the Kinnickinnic River, Milwaukee, Wisconsin	Wisconsin DNR

Wisconsin has contaminated sediment sites in numerous areas outside of the AOCs. A contaminated sediment site list was prepared by the DNR's Contaminated Sediments Standing Team in the mid 1990's. The GLRC recommends sites outside of AOCs proceed to cleanup under other existing remediation authorities. Superfund and/or RCRA or the state's Environmental Repair Fund have been and are being used in the AOCs. These programs are also being used in cleanups in Chequamegon Bay, Manitowoc, and on numerous tributary rivers to the Great Lakes. All programs available, including the Legacy Act, for sediment clean up are complex and process heavy, some taking decades to work through prior to any sediment remediation occurring. This has allowed contamination to impact uses in the AOCs and other sites and spread to the Great Lakes for many decades.



Newton Creek/Hog Island Inlet Remediation

The Department of Natural Resources has been working on investigation and cleanup of contaminated sediments and floodplain soils in Newton Creek and Hog Island Inlet in the City of Superior since the early 1990's. An investigation completed in 1995 found that ecological impacts associated with the contamination were severe. In 1996 the Department signed a Memorandum of Understanding with Murphy Oil USA, Inc. under which Murphy agreed to clean up the upstream impoundment area and an upstream segment A of Newton Creek and provide \$200,000 towards the cleanup of Hog Island Inlet. Bureau of Remediation and Redevelopment staff oversaw that work and continued the investigation of the remainder of Newton Creek and Hog Island Inlet. In 2003, four thousand cubic yards of contaminated sediments and floodplain soils were removed from segments of Newton Creek. Work began on the final stage of the cleanup on Newton Creek and Hog Island Inlet in June 2005. Earlier in the year a project agreement was signed by the Great Lakes National Program Office and the Department under which 65% of the project costs would be covered through the Great Lakes Legacy Act with the remainder coming from the Bureau of Remediation and Redevelopment's Environmental Repair Fund, Murphy Oil and other local sources. The project was completed on November 17 under budget and on schedule.

During the project, 60,000 tons of contaminated sediment was disposed of at the City of Superior landfill. Impacted sediment containing PAHs, lead, VOCs and metals was dredged and sorted based on lead content. Approximately half of the material containing over 50 parts-per-million (ppm) of lead was disposed of as waste at the landfill, with the other half containing less than 50 ppm of lead, beneficially used as landfill cover. The sediment removal was largely accomplished "in the dry" through a dewatering process using pumps. Water that met background turbidity and mercury limits was discharged into the St. Louis River until sampling indicated that these limits would be exceeded, at which point the water was discharged through the City's wastewater treatment facility. During the dewatering process, a "fish rescue" operation took place which resulted in over 1,800 fish, 138 freshwater clams, and 38 painted turtles being transferred from the inlet into the river.

This project is important in that it marks the first time that contaminated sediments have been removed from a toxic hot spot in the St. Louis River Area of Concern. This is an important step in returning the AOC to full public use. This project has been successful due to the collaborative partnerships between local governments, federal and state agencies, local industries, and the St. Louis River Citizens Action Committee.

Recommended Actions – AOCs / Contaminated Sediment

GLRC Recommendation: AOC Program Capacity: The Administration should request and Congress should appropriate \$10 million annually to the Great Lakes states and community-based coordinating councils in the AOCs; and \$1.7 million to U.S. EPA's Great Lakes National Program Office for regional coordination and program implementation.

Wisconsin Strategy: Revitalize RAP process and engage local communities for each AOC to develop implementation priorities for the actions listed in the RAPs. Bring the issues back to the community using outreach and educational activities, so a well informed and motivated citizenry will help drive the clean-up. Engaged communities that understand the benefits of taking back the river could be deployed to move agencies and responsible parties to action.

GLRC Recommendation: Existing U.S. EPA/State RAP Work Group should be expanded to a Federal-State AOC Coordinating Committee to better coordinate efforts and optimize existing programs and authorities to advance restoration in the AOCs.

Wisconsin Strategy: Participate in the Federal-State AOC Coordinating Committee to ensure Wisconsin needs are addressed. Begin development of delisting criteria for each Area of Concern.

NONPOINT SOURCE MANAGEMENT

Council of Great Lakes Governors' Priority: Control pollution from diffuse sources into water, land and air.



PROBLEM STATEMENT

Wisconsin continues to experience water quality problems in bays, harbors, and nearshore waters of Lake Michigan and in direct tributaries to both Lakes Michigan and Lake Superior. For example:

- “Lower” Green Bay continues to have low dissolved oxygen levels and poor water clarity due to phosphorus and sediment carried by the Fox River and nearby tributaries to the bay. About a 50% reduction in phosphorus and sediment is needed to restore the quality of the bay.
- Mats of *Cladophora*, a stringy algae, are found along Lake Michigan beaches from Door County south to the Illinois border due to phosphorus with some undefined relationship to zebra mussels.
- Beaches along Lake Michigan are closing and post health advisories due to bacteria, some of which comes from nonpoint sources.

- Streams directly tributary to Lake Michigan have some of the highest phosphorus concentrations of any streams in Wisconsin.
- A number of Lake Superior tributaries important to Lake Superior fish have had fish habitat degraded due to sedimentation caused by high rates of runoff from agricultural fields.

Wisconsin is addressing these issues through a variety of federal, state and local programs. However, to address these issues in a reasonable amount of time, financial, technical, and educational assistance need to be increased. Compliance assurance is also needed for implementation of permits and performance standards and prohibitions.

The Priority Watershed and Priority Lake Program provides financial assistance to local units of government in selected watersheds to address land management activities which contribute to urban and rural runoff. Priority watershed/lake project goals focus on water quality improvements or protection resulting from reductions in pollutant levels delivered to streams, rivers, and lakes. The WDNR issues cost-sharing grants to reimburse landowners for installing voluntary Best Management Practices (BMPs). Thirty three of the 86 watershed projects are in the Great Lakes Basins. Eighteen of these have been closed or completed, and the remaining projects are in the implementation phase.

As of 2000, the annual report data indicate that projects are making progress towards reducing phosphorus from barnyards and upland sediment/soil loss. Approximately 54% of the projects continuing more than 6 years are meeting their barnyard phosphorus reduction goals by 50% or more. Sixty one percent of these projects are meeting their upland sediment/soil loss reduction goal by 50% or more. Each year approximately 235,000 pounds of phosphorus from barnyards and about 57,000 tons of sediment from eroding streambanks or shorelines are prevented from entering waterways through the installation of BMPs in priority watersheds and lakes. Over 354,000 feet of streambanks or shorelines have had best management practices put in place to prevent erosion and enhance habitat and about 750 acres of wetlands have been restored.

The Wisconsin Department of Natural Resources is in the process of revising administrative rule NR 243 to better address water quality impacts associated with large livestock and poultry operations. These rules will require all of these larger-scale farms to meet the same standards, helping keep manure from contaminating private wells, lakes and rivers. Changes in manure management will reduce runoff risks from winter landspreading of manure.

NR 243 also requires a shift to phosphorus-based nutrient management plans statewide for all larger-scale livestock and poultry operations. In addition, state rules affecting farms of all sizes reference NRCS 590, the state technical standard for nutrient management. DATCP is in the process of updating this technical standard to address phosphorus in addition to nitrogen applications on cropland for all farms in Wisconsin if cost-sharing is provided.

WDNR funds Targeted Runoff Management grants and Urban Nonpoint Source Pollution and Stormwater grants annually, funds permitting. These grants provide cost sharing

for local units of government to implement urban and rural best management practices (BMPs). BMPs are implemented with the goals of reducing nonpoint source pollution such as phosphorus, sediment, bacteria in surface waters, and protecting groundwater. Rural projects center primarily on implementing performance standards and prohibitions under NR 151, and addressing 303(d) waters.

GOALS

Wisconsin's goal for non point management include reducing the amount of phosphorus, sediment and bacteria from urban and rural nonpoint sources and establish 80,000 acres^[1] riparian buffers on agricultural lands along lakes and streams throughout the Great Lakes basin.

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^[1] Based on an average buffer width of 66 feet and taking into account stream length and land use.

Recommended Actions – Nonpoint Source Management

GLRC Recommendation: Between \$77 million and \$188.7 million should be provided annually over five years to fund restoration of 550,000 acres of wetlands

Wisconsin Strategy: Continue to implement and expand wetland restoration through the Wetland Reserve Program, a cooperative, multi-agency effort involving a number of federal or state programs, including the Wetland Reserve Program (USDA – Natural Resources Conservation Service) and the National Coastal Wetlands Conservation Grant Program, (US Fish and Wildlife Service).

GLRC Recommendation: \$335 million should be provided to restore 335,000 acres of buffers over five years.

Wisconsin Strategy: Continue and enhance the federal-state-local implementation of the Conservation Reserve Enhancement Program (CREP) on cropland and marginal pastureland in eligible areas within the Great Lakes Basin. Over time, seek expansion of CREP eligibility to all agricultural areas of the Great Lakes Basin. Enforce buffer requirements on new developments.

GLRC Recommendation: \$120 million should be allocated by 2010 to achieve a 40 percent reduction in soil loss in ten selected watersheds.

Wisconsin Strategy: Continue establishment of grassed waterways and other practices that manage runoff in locations of concentrated flow. Critical geographic areas identified in the GLRC include Green Bay, the nearshore of Lake Michigan, and Areas of Concern (AOC).

Implement NR 151 performance standards and prohibitions as called for in state administrative rules through a number of federal, state and local programs, including EQIP (USDA – NRCS), Targeted Runoff Management projects (DNR) and Land and Water Grants (DATCP).

Fully implement the Urban Storm Water Discharge Permit program (DNR -- Ch. NR 216, Wisconsin Administrative Code).

Improve management of storm water quality in previously developed urban areas by retro-fitting storm water management practices (e. g. DNR – Urban Runoff Management Grants).

GLRC Recommendation: \$106 million in funding should be provided to support the development and implementation of comprehensive nutrient and manure management on livestock farms.

Wisconsin Strategy: Through federal-state-local technical assistance, continue to promote proper residue management that accommodates management of manure to minimize the amount of bacteria in runoff waters. Develop and implement

comprehensive phosphorus-based nutrient management plans on all Great Lakes drainage basin farms that are over a certain size (in acres).

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PERSISTENT BIOACCUMULATIVE TOXINS (PBT)

Council of Great Lakes Governors' Priority: "Continue to reduce the introduction of PBTs into the Great Lakes ecosystem."



PROBLEM STATEMENT

Persistent Bioaccumulative Toxins (PBT) are chemicals that last a long time in the environment. Animals and people accumulate PBTs in their bodies, primarily from the food they eat, but also from inadvertent ingestion and inhalation of soil and dust. PBTs are toxic substances that can cause a wide range of health effects in fish, wildlife, and humans.

Mercury and polychlorinated biphenyl (PCBs) are the contaminants of greatest concern in Wisconsin's fish. Currently, there are fish advisories for mercury and PCBs for Lakes Michigan and Superior and their tributaries. Some inland waters also have fish contaminated with polychlorinated biphenyl (PCBs). In those inland waterbodies, anglers should follow the specific consumption advice for PCBs to avoid potential health issues. Specific advice is provided on how many meals you can safely eat of species caught from waters contaminated with PCBs, such as Lakes Michigan and Superior, some large rivers and other surface waters. The changes in mercury advice resulted from the National Research Council's report, "Toxicological Effects of Methylmercury" (2002). The use of this new reference dose requires that consumption advice be issued when fish exceeded 0.05 parts per million (ppm) mercury. Most of Wisconsin's fish contain at least that amount based on past testing. Thus, consumption advice is appropriate for most fish.

Contaminated Sediments contain many PBTs that have accumulated in our waterways as a result of soil erosion, non-point source runoff, and direct discharges. Direct discharges are covered under the WPDES permit process but other sources and the lingering effects of sediments contaminated through former discharges provide a continual source of exposure to PBTs. Public awareness and educational efforts through work at Areas of Concern and Remedial Action Plans are addressing contaminated sediments and their cleanup. Other programs, especially the Remediation and Redevelopment Program, work on clean-up and rehabilitation of contaminated sites such as manufactured coal gas sites, brownfields, and hazardous waste spills in an effort to remove and keep PBTs out of the environment.

Municipal wastewater treatment plants are not meeting water-quality-based effluent limits for mercury and therefore local communities will need to implement mercury pollutant minimization programs that reduce mercury discharges to sanitary sewers. While the driver for this mercury reduction is a wastewater requirement, the sectors of the community that need to reduce their use of mercury-containing products (and increase recycling for those products that continue to be used) are sectors like hospitals, dental offices, schools, and HVAC contractors that will produce a hazardous waste (but universal waste) for recycling as they comply with the water-driven reductions.

Wisconsin is substantially behind other Great Lakes states in the adoption of legislation promoting the reduction and recycling of specific mercury-containing products, e.g., product labeling, product manufacturer stewardship, mandatory product recycling, product sales or use bans, etc. WDNR is currently participating in a Great Lakes Mercury Product Strategy workgroup with other Great Lakes states and tribes that should produce a recommendation for the highest priority mercury product actions by 2006. In addition, the WPDES program is developing additional guidance and actively implementing existing rules to incorporate effluent limitations on mercury in point sources and, where necessary, requiring development and implementation of pollution minimization plans for mercury reductions in wastewater effluents.

New Chemicals of Concern

With the ever-increasing production of chemicals, more chemicals are likely to be added to the list of PBTs. Currently scientists are looking at potential effects of flame retardants and the massive amounts of pharmaceuticals and personal care compounds that pass through our wastewater treatment systems. As more information becomes available on these compounds, measures may need to be taken to limit exposure to them in the environment.

USEPA needs to be more active in developing and approving better, more sensitive methods for measuring levels of pollutants. Even with some of the long-standing pollutants like PCBs we are unable to measure levels in the water column and discharges down to the necessary level to say where we should take action. The relatively recent improvement in mercury testing methods has allowed us to begin to better direct our activities. The information we get from monitoring levels will allow us to better direct our efforts in the area of pollution minimization for other PBTs. As the new chemicals come under scrutiny, it will be useful to have methods in development.

GOALS

Wisconsin's goal for PBTs is to reduce fish consumption advisories by addressing PBTs in the system. The goal should be to reduce the amounts of persistent bioaccumulating toxicants in the Great Lakes ecosystem using pollution prevention, hazardous waste collection, waste minimization techniques, recycling, remediation and educational programs. Priority pollutants are those which pose the greatest threats to human health through consumption: mercury, PCB's, pesticides, and other similar contaminants.

Success Story: The DNR's Mercury Reduction Program uses a variety of tools, including partnerships between the Department and seventeen Wisconsin communities, educational outreach, and innovative reduction and recycling activities to reach its goal of reducing mercury in the environment. One of their outreach activities includes the Mercury Manometer Replacement Program, which provides dairy farms a \$200 incentive to replace their mercury manometers with non-mercury digital manometers. Manometers are used to measure vacuum pressure in dairy cow milking systems. Mercury-filled manometers contain about 12 ounces of mercury in an open-ended, 30-inch U-shaped tube. These manometers present a special mercury spillage risk due to their exposed location on the milking pipeline and because they are sometimes abandoned when a dairy farm goes out of business. The farmer's regular dairy equipment service provider typically performs the replacement to assure that the mercury is safely handled and that the new gauge is accurately installed. When a farmer stops milking cows and abandons the manometer in a barn, the DNR pays a service provider \$100 to find and remove it.

Over 535 manometers containing 400 pounds of mercury have been removed from Wisconsin dairy farms. Approximately 100 mercury manometers still remain on Wisconsin dairy farms, though not all Wisconsin dairy farmers are eligible for the reimbursement program. Currently, funding is limited to farms in the following Great Lakes counties: Adams, Ashland, Bayfield, Brown, Calumet, Columbia, Door, Douglas, Florence, Fond du Lac, Forest, Green Lake, Iron, Kenosha, Kewaunee, Langlade, Manitowoc, Marathon, Marinette, Menominee, Milwaukee, Oconto, Oneida, Outagamie, Ozaukee, Portage, Racine, Shawano, Sheboygan, Washington, Waukesha, Waupaca, Waushara and Winnebago.

Grant money from the Great Lakes National Program Office (GLNPO) and the Great Lakes Protection Fund has made this project possible. The reimbursement incentive encouraged dealers to seek out dairy farmers and convince them to install reliable non-mercury gauges. DNR has partnered with University of Wisconsin and the Department of Agriculture, Trade and Consumer Protection to increase project credibility, locate mercury-filled manometers, and reduce manometer collection costs.

Recommended Actions – Persistent Bioaccumulative Toxins

GLRC Recommendation: Protect human health through consistent and easily accessible basin-wide messages on fish consumption and toxic reduction methods and choices.

Wisconsin Strategy: Continue to monitor fish tissue and issue consumption advisories for fish and wildlife to protect public health.

GLRC Recommendation: Reduce and virtually eliminate the principal sources of mercury, PCBs, dioxins and furans, pesticides and other toxic substances that threaten the health of the Great Lakes basin ecosystem, through coordinated intergovernmental strategies.

Wisconsin Strategy: Promote a Community Mercury Reduction program. Several sectors of the community need to reduce their use of mercury-containing products and increase recycling for those products (hospitals, dental offices, etc), and thus this should be viewed as a multi-media initiative that lends itself to creative DNR/municipal partnerships for successful mercury reduction. This activity has occurred in pilot municipal mercury reduction programs over the last ten years and will occur via WPDES discharge permits over the next ten years.

Wisconsin Strategy: Promote a Product Mercury Reduction program using the success in the Lake Superior Basin as a model. This work is both timely and greatly enhances the community mercury reduction initiative noted above. Target products based on recommendations developed by the Great Lakes Mercury Product Strategy workgroup.

SUSTAINABLE DEVELOPMENT

Council of Great Lakes Governors' Priority: "Adopt sustainable use practices that protect environmental resources and may enhance the recreational and commercial value of our Great Lakes."



PROBLEM STATEMENT

Humans rely on services provided by ecosystems that benefit human societies and economies. This reliance requires that we ensure the ecosystem's ability to recover and restore itself from human use. Sustainable development is a practice that balances economic, societal, and ecological factors to "meet the needs of the present without compromising the ability of future generations to meet their own needs." (UN Brundtland Commission, 1987). The status of and barriers to sustainable development in Wisconsin are outlined below in six ecosystem services categories: land use and development; agriculture and forestry; transportation; industrial activities; water infrastructure, and recreation, tourism and fishery.

Based on the 1991 WISCLAND land cover data, of Wisconsin's 35 million acres of land 2% is developed, 32% is agricultural lands, 11% is grasslands, 39% is forested, 14% is wetlands and 2% is barrens or shrubland. WISCLAND is a raster representation of land cover of Wisconsin, derived from Landsat satellite imagery. Similar to the rest of the Great Lakes region, Wisconsin is experiencing the impacts of sprawl – low-density disjointed development on previously undeveloped land. For example between 1982 and 1997 the population of the Milwaukee Metropolitan area grew by 6.5 percent while its urbanized areas grew by 24.9 percent and vehicle miles traveled increased by 23 percent.[i] The impacts of urbanization for the Great Lakes include greater areas of impervious surfaces which increases storm water runoff causing flooding and transport

of pollutants to waterways. In addition, the increase in impervious areas also reduces infiltration that recharges groundwater thereby reducing groundwater discharge to streams. Development of open space can also result in a loss of habitat. [ii]

In 1999, Wisconsin passed comprehensive planning legislation that focuses on public participation in creating a comprehensive plan for local units of government. It required all local government adopt their plans in entirety and to comply with those plans for land use decisions after 2010. Wisconsin also has several brownfield financial and liability incentive programs to clean up and redevelop abandoned or under used contaminated properties. Since 1998 \$36.9 million has been granted to 89 project sponsors, resulting in the redevelopment of 1090 acres.

A survey of Wisconsin forests, conducted in 1996, found that Wisconsin forests acres increased by 4% since the last survey in 1983. It also found that available timber is increasing at a faster rate than is being harvested. Currently, about 59% of annual timber growth is harvested, showing that timber harvests are currently at a sustainable rate.

Wisconsin is currently losing prime farmland to development. Particularly in the Lake Michigan basin, with the growing Fox River Corridor and the Milwaukee metropolitan area, farmland is under extreme pressure to be developed. For example, between 1992 and 1997, Wisconsin lost 91,000 acres of prime farmland.[iii] Property tax reductions through use value assessments have help alleviate some of this pressure, however the high property values still exert pressure to develop. Animal waste management continues to be a critical issue in the Lake Michigan basin with increasing number of cows and manure spills. Conservation tillage, stream buffers, wetland restoration, integrated pest management and enrollment in conservation programs directed toward agricultural lands are all efforts to improve reduce soil erosion, improve water quality, reduce pesticide load to the environment and improve habitat. A new federal program, the conservation security program, started in 2004 and provides payments to farmers who practice good stewardship. In the Lake Michigan Basin, the Duck-Pensaukee watershed became eligible for this program in 2005. However, enrollment is still well below targets.

Wisconsin relies heavily on roadways to meet transportation needs, yet this has caused air pollution problems in counties on Lake Michigan. Grant programs to enhance public transportation, bicycle/pedestrian options, ridesharing programs and congestion are available for these counties. A requirement for gas reformulation has reduced the frequency of high ozone levels. A high speed rail line has been proposed by Amtrak to connect Chicago, Milwaukee, Madison, and Minneapolis. An aging transportation infrastructure impedes intermodal systems. Shipping is another major economic factor for Wisconsin with 15 commercial ports that handle over 40 million tons of cargo annually.

GOALS

Wisconsin's goal for sustainable development is that a vibrant sustainable economy and a healthy ecosystem co-exist and synergistically support each other.

Recommended Actions – Sustainable Development

GLRC Recommendation: Align governance to enhance sustainable planning and management of resources.

Wisconsin Strategy: Support the use of a portion of funding from new federal Great Lakes cleanup dollars for waterfront revitalization of Great Lakes brownfields in Wisconsin communities. Support funding of state brownfield grant and loan programs, including the Brownfield Site Assessment Grants (DNR), Green Space and Public Facilities Grants (DNR) and Commerce Brownfield Grants and support funding of the federal brownfield grant and loan programs and tax incentives, as well as other related funding (e.g. Community Development Block Grants and Coastal Management/Restoration Grants).

GLRC Recommendation: Build outreach that brands the Great Lakes as an exceptional, healthy, and competitive place to live, work, invest, and play

Wisconsin Strategy: Work with the State Department of Tourism to promote certification of green tourism businesses. The Travel Green Wisconsin is a voluntary, affordable program that reviews, certifies, and recognizes tourism businesses that have made a commitment to continuously improve their operations in order to reduce their environmental and social impact. This program helps businesses evaluate their operations, set goals and take specific actions towards environmental, social and economic sustainability.

INDICATORS AND INFORMATION

Great Lakes Governors' Priority: "Standardize and enhance the methods by which information is collected, recorded and shared within the region."



PROBLEM STATEMENT **INFORMATION**

There are numerous organizations, governmental agencies, and researchers studying the Great Lakes and its tributaries and surrounding landscape. The Wisconsin Land Information Program (WLIP), which started in 1990 to advance land information programs across the State, has been instrumental in building GIS and information technology capacity at the county and local level. While Wisconsin stands out among other states in utilizing geo-spatial data, restrictive data sharing policies hamper efficient and timely access to information. The National Spatial Data Infrastructure concept and associated federal agency initiatives, such as the National Map and Geospatial Onestop Portal, provide a framework for data access and integration and the geospatial industry and public agencies have joined efforts to advance a variety of tools and standards such as Open Geospatial Consortium standards to facilitate data discovery and data integration. However, these have yet to be fully utilized within the State.

Long-term trends analyses, one important tool for determining the health of the Great Lakes, depend on consistent and compatible data being collected over the entire geographic extent of the Great Lakes basins. Yet specific study objectives and funding criteria can prevent agreement on specific sampling protocols or compliance with

content standards. This lack of agreement is compounded by the lack of adequate funding which continues to strain existing monitoring programs.

Although technology trends are moving towards a more open environment, Wisconsin still lacks an efficient or comprehensive system for discovering and accessing data on the Great Lakes. Due to the sheer amount of data that is generated, it is doubtful that any one entity can serve as the clearinghouse for all data. A more realistic approach is using data discovery tools to search for the most relevant data on any particular project. One such approach is used by the Great Lakes GIS, which provides an inventory of aquatic habitat data for each of the Great Lakes. The site is sponsored by the Great Lakes Fisheries Commission and as part of the Joint Strategic Plan for Management of Great Lakes Fisheries, satisfies their agreement to share data, particularly through compatible, automated information systems.

Standards should be promoted and adhered to across the spectrum of data management activities to ensure compatibility across jurisdictional boundaries. EPA's Environmental Sampling Analysis and Results (ESAR) Standards were developed by the Environmental Data Standards Council (EDSC), a partnership among EPA, States, and Tribes to promote the efficient sharing of environmental information through the cooperative development of data standards. These standards, when final, are intended to serve as a foundation for information exchange across environmental media and currently serve as the basis for EPA Office of Water's pilot project to exchange water quality monitoring data via the Exchange Network. Several database projects within the WDNR's Division of Water are implementing these protocols when reporting data to EPA.

INDICATORS

Indicators provide information on the state of the Great Lakes ecological health and provide a measurement of the impacts of human activities on the resources. The State of the Lakes Ecosystem Conference (SOLEC) began addressing environmental indicators in 1994 with emphasis on aquatic community health, human health, aquatic habitat, toxic contaminants and nutrients in the waters, and the changing Great Lakes economy. Since 1998, reports for over 50 indicators have been prepared and presented at the biennial SOLEC meetings. A study in 1994 found that the WDNR is involved with monitoring 19 SOLEC indicators in the Great Lakes Basins at varying levels. The WDNR currently maintains several statewide database management systems (DBMS). These include EPA's STORET system, Fish & Habitat DBMS, Toxic Fish and Contaminated Sediment DBMS, and the Waterbody Assessment Display and Reporting System DBMS. The Department is also developing the Surface Water Monitoring System DBMS, which will store monitoring data that is collected by DNR staff on the surface waters of the state including information on the presence/absence of aquatic invasive species. Other DNR programs collect much needed information, such as mercury deposition data monitored by the Air Program.

U.S. Geologic Service (USGS) has considerable water quantity, water quality, and biology information available in their electronic databases. Additionally, they maintain one of WDNR's biology databases. Linking these databases together, however, is still a challenge.

The Great Lakes Commission convened the Great Lakes Coastal Wetlands Consortium to expand the monitoring and reporting capabilities on Great Lakes coastal wetlands of the U.S. and Canada under the Great Lakes Water Quality Agreement. The Great Lakes Commission is also leading development of an integrated Great Lakes Observing System (GLOS) to provide critical real-time data for multiple users, including, among others, resource managers, researchers, homeland security interests, the commercial shipping industry and the recreational boating community. GLOS will be a regional node of NOAA's multi-year, national Integrated Ocean Observing System (IOOS) initiative.

However, acceptance of indicators across the Great Lakes basins has been slow despite these efforts. Researchers with the Great Lakes Environmental Indicators Project have developed an integrated set of environmental indicators that can be used to assess the condition of the coastal margins of all five Great Lakes. Their work could help bridge the gap between the process of developing indicators and applying them through the activities in the monitoring community.

The lack of baseline information to better define the tributary and GW indicators data set as well as the nearshore areas has hampered assessment of these ecosystem components. We also need protocols or a mechanism for better integrated land (GL watershed-based) data with open water observations. Indicators play a key role in tracking progress toward achieving Remedial Action Plan (RAP) goals and highlight problems that require further management.[2]

Currently monitoring is performed at a variety of levels all the way from federal to local and volunteer organizations but there is little effort to coordinate these activities much less ensure compatibility. Shrinking budgets and the need for rapid response during disasters will require a more comprehensive and coordinated approach to monitoring and data collection/data distribution across the basin. Development of a standardized baseline of information would help promote integration across jurisdictions.

GOALS

Wisconsin's goal for Indicators and Information is for policy makers and resource managers to have easy access to comprehensive, up-to-date data in order to assess the condition of the Great Lakes ecosystems. Whether the issue is determining the source of E-coli on beaches, evaluating impacts of new pharmaceuticals in the environment, or planning for wildlife habitat restoration, the data used would be standardized and readily available. Other goals include:

- Open access and sharing of data by all custodians across the state
- Sufficient biological information on sturgeon/dynamics to effectively manage these species on a statewide or watershed basis. All aspects of target populations must be adequately assessed if this species is to be effectively managed in the future.
- A full range of indicators are developed and broadly understood across the basin. Indicators are important for assessing the status of the Lakes.

^[2] Great Lake Environmental Indicators Project Report; June 2004, Talbot, Linda WiDNR

- Data are collected in a fashion that supports this assessment regardless of jurisdictional boundaries such as counties and states.
- Data standards are fully developed and adopted by all entities responsible for collecting data.
- Monitoring activities are coordinated across the basin and are sufficient to address the needs of the scientific and regulatory community.

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Recommended Actions – Information and Indicators

GLRC Recommendation: In order to provide accurate, complete and consistent information, the Great Lakes region must increase and better coordinate the collection of critical data regarding the Great Lakes ecosystem. The Great Lakes Interagency Task Force and other stakeholders need to implement the U.S. contribution to the Integrated Earth Observation System and the Integrated Ocean Observing System as part of the Global Earth Observing System of System. Monitoring must be better coordinated through the existing Great Lakes management entities, both at a lake-wide and region-wide basis.

Wisconsin Strategy: Assist in convening an annual meeting to present monitoring results in a public forum using existing Great Lakes' partnership groups.

GLRC recommendation: Promote the continued development and implementation of science-based indicators, including implementation of indicators developed through the SOLEC process.

Wisconsin strategy: Work with WI DNR Great Lakes Monitoring team leader to evaluate monitoring protocols established through the WI DNR Water Division's Monitoring Strategy to determine if the SOLEC indicators are addressed sufficiently.

GLRC recommendation: The Great Lakes Interagency Task Force and all regional partners should augment the regional information management infrastructure (i.e. establish a network of networks), adopt standardized data management protocols and commit to open data availability.

Wisconsin Strategy: Support State Cartographer Office activities in clearinghouse and metadata and implement interoperability standards beginning at the state agency level.

[i] GHK International Ltd. 2003. Forecast and Analysis of Urban Development in the Great Lakes Basin. Final Report Prepared for the Great Lakes Regional Office of the International Joint Commission.

[ii] Wang, L.Z, J. Lyons, P.Kanehl, and R. Bannerman. 2001. Impacts of urbanization on stream habitat and fish across multiple spatial scales. *Environmental Management* 28(2): 255-266.

[iii] National Resources Inventory, 1997 <http://www.nrcs.usda.gov/technical/NRI/>