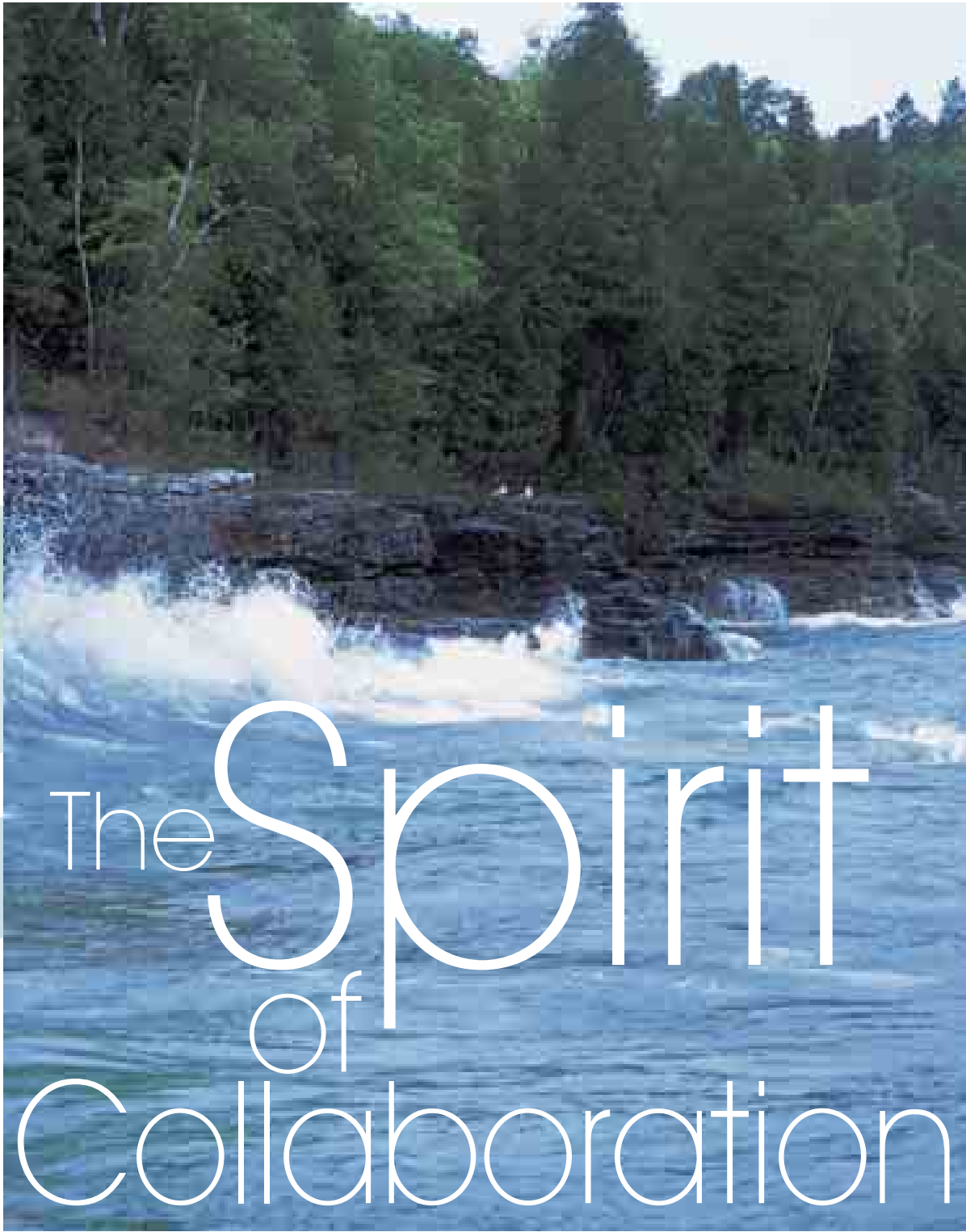


WISCONSIN'S GREAT LAKES STRATEGY STEERS AHEAD.



The Spirit
of
Collaboration

A national treasure

GREAT LAKES PROTECTION AND RESTORATION.

Have you ever dipped your toes into Lake Superior's clear, icy waters? Experienced the excitement of a Great Lakes charter fishing trip? Enjoyed a Lake Michigan sunrise or a sunset on a Door County beach?

Nearly all of us in Wisconsin live within a short distance of a world-class water resource. To the west flows the mighty Mississippi River. To the east Wisconsin is bordered by Lake Michigan. To the north lie the vast waters of Lake Superior.

Aside from their stunning beauty, these two Great Lakes are critical to our health and welfare.

"The Great Lakes define this region and their waters sustain our recreation, our way of life and our economy," says Wisconsin Gov. Jim Doyle. "From the majestic shores of Lake Michigan to the brutal and beautiful waters of Lake Superior, the Great Lakes are not just part of our heritage, but part of who we are."

The five Great Lakes make up one-fifth of the fresh water on the earth's surface. They provide drinking water, food, recreation and transportation to more than 35 million North Americans.

"About one-third of Wisconsin lies in the Great Lakes basin," says Wisconsin DNR Secretary Matt Frank. "Through the Great Lakes watershed, Wisconsin rivers, streams, lakes and groundwater are inextricably linked."

The lakes support manufacturing and recreational industries, providing thousands of jobs. They generate power and assimilate wastewater. They form a wet highway for shipping that extends to Europe and the Far East. But, most importantly, they define and support a huge freshwater and related terrestrial ecosystem found nowhere else on earth. The future of all these uses



U.S. EPA



ROBERT QUEEN

Lake Superior wetlands provide great places to canoe and bird watch. Lake Michigan hosts an active charter fishing trip business.

hangs on careful management.

"As Governor, I've taken aggressive action to protect these resources," says Doyle, who chairs the Council of Great Lakes Governors. "In doing so, I've been joined by farmers, industry leaders and environmental stewards. One of our greatest competitive advantages in a 21st Century global economy is our water."

With this in mind, the Great Lakes Regional Collaboration was formed. Collaboration members (1,500 government officials, tribal leaders, researchers and others) developed a plan to address the Great Lakes' most pressing environmental issues. This plan is a call to arms that challenges all of us to protect these national treasures.

The Wisconsin DNR Office of the Great Lakes worked with many individuals and organizations to develop the Wisconsin Great Lakes Restoration and Protection Strategy, which

brings the message home and addresses the Collaboration's priority issues in Wisconsin.

"The Office of the Great Lakes has the opportunity to promote integration and look at problems systemically from a geographic focus and comprehensively from an ecological approach," says retired Office of the Great Lakes Director Chuck Ledin.

Because they are interconnected, Ledin says, the five Great Lakes — Superior, Michigan, Huron, Ontario and Erie — must be managed as an ecosystem.

"One of the greatest challenges we face right now," says Ledin, "is to become ecosystem advocates instead of issues advocates."

Tremendous efforts have been made to clean up the lakes and protect them from further pollution. Governments at all levels have put billions of dollars to the task. Industries have made sig-

Great Lakes drainage basin in Wisconsin

■ GREAT LAKES DRAINAGE BASIN
■ CITIES
■ COUNTY BOUNDARIES



DNR FILE

nificant strides in changing production processes, the products produced and cleaning up contaminated areas. Municipalities have upgraded sewage and water treatment facilities across the basin. Community and environmental groups have worked tirelessly to monitor progress and improve the environmental condition of the Great Lakes.

“We have made great strides, from the Clean Water Act to the recent passage of the Great Lakes Compact, in addressing water quality and quantity issues,” says Todd Ambs, DNR Water Division Administrator.

Read on and learn about the collaborative success stories that have resulted from Wisconsin’s Great Lakes Strategy. While much has been accomplished, more remains to be done.

“Water resources are the foundation of the upper Midwest’s economic viability,” says Ambs. “We must all do what we can to protect the Great Lakes, not only for the sake of the Great Lakes basin’s environment, but for its sustainable economic future.” ●

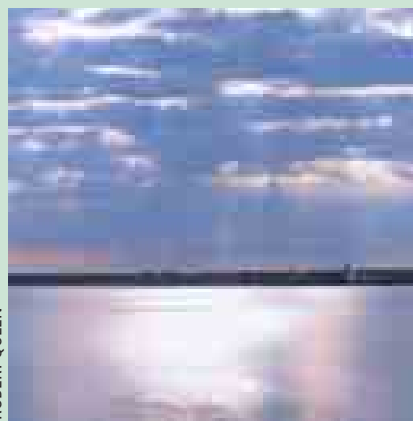
- Visit Wisconsin’s Great Lakes Strategy website at dnr.wi.gov/org/water/great_lakes/wistrategy/
- For information on the Great Lakes Regional Collaboration Strategy visit glrc.us/

GREAT LAKES GATHERINGS

A recent effort to bring people to the table is the Great Lakes Gatherings presented by Gathering Waters, an umbrella organization supporting land trusts in Wisconsin, and the Lake Michigan Shorelands Alliance, a group of land trusts working to bring together business owners, government officials, community leaders, landowners and other citizens to tackle complex challenges facing the watershed. The alliance hosted a series of community forums in the Lake Michigan basin this fall. Visit greatlakegatherings.org for more information.

GET TO KNOW THE GREAT LAKES

- The Great Lakes account for 90 percent of the United States’ and 20 percent of the world’s fresh water.
- The Great Lakes economic region is a vital part of the U.S. economy with 300 of the nation’s Fortune 1000 firms located in this area.
- Lake Superior is the largest of the Great Lakes with a surface area of 31,700 square miles and a volume of 2,900 cubic miles. Lake Michigan has a surface area of 22,300 square miles and a volume of 1,180 cubic miles.
- Lake Michigan is the largest freshwater lake wholly within the United States and it has 1,638 miles of shoreline including all islands. Lake Superior has 2,726 miles of shoreline.



ROBERT QUEEN

Spread evenly across the contiguous 48 states, the Great Lakes’ water would be about 9.5 feet deep.

WISCONSIN’S GREAT LAKES PRIORITIES

- **Water management**
Ensure sustainable use of our water resources while confirming that the states retain authority over water use and diversions of Great Lakes waters.
- **Aquatic invasive species**
Stop the introduction and spread of aquatic invasive species.
- **Habitat and species**
Enhance fish and wildlife by restoring and protecting coastal wetlands, fish and wildlife habitats.
- **Coastal health**
Promote programs to protect human health against adverse effects of pollution in the Great Lakes ecosystem.
- **Areas of concern/contaminated sediments**
Restore environmental health to the areas identified by the International Joint Commission as needing remediation.
- **Nonpoint source management**
Control pollution from diffuse sources into water, land and air.
- **Persistent toxins**
Continue to reduce the introduction of toxic substances into the Great Lakes ecosystem.
- **Sustainable development**
Adopt sustainable use practices that protect environmental resources and enhance the recreational and commercial value of our Great Lakes.
- **Information and indicators**
Standardize and enhance the methods by which information is collected, recorded and shared within the region.

Great Lakes timeline

The United States and Canada share a history of working together to address significant issues facing waters that cross their common boundary. The Boundary Waters Treaty of 1909 started this formal cooperative process and created the International Joint Commission (IJC) as a forum to resolve Great Lakes issues. Over the past 100 years, there have been many environmental threats as well as attempts at all levels to protect or restore the Great Lakes.

■ **1940s** - Demand for chemicals, weapons and other materials for troops used in WWII leads to major industrial expansion in the Great Lakes basin, and the start of large-scale chemical and heavy metal discharges to the lakes.

■ **1950s** - Scientists find reproductive failures in fish-eating birds, including the almost total reproductive failure of double-crested cormorants, bald eagles and herring gulls. Later, toxic chemicals including the widely used insecticide, DDT, are blamed.

■ **1959** - Opening the St. Lawrence Seaway allows ocean-going freighters access to the lakes and mid-continent heartland, and allows more widespread introduction of exotic species, which hitchhike rides in the ballast water picked up in foreign ports.

■ **1962** - Publication of *Silent Spring* by Rachel Carson raises concerns about risks from chemicals and pollution for the environment and human health.

■ **1969** - An oily surface on the Cuyahoga River in Cleveland catches fire, receives international coverage and leads to a call to tackle pollution discharges to the Great Lakes.

■ **1971** - PCBs are found to be widespread including in Great Lakes fish.

■ **1972** - U.S. Clean Water Act is passed.

Canada and the United States sign the first Great Lakes Water Quality Agreement, intended to control sewage and phosphorus discharges. This leads to severe restrictions on

phosphates in detergents and to billions of dollars of investments in sewage treatment facilities. The agreement also raises toxic substances as a major concern.

■ **1978** - Canada and the United States sign the second Great Lakes Water Quality Agreement, introducing the concept of protecting the entire ecosystem and the philosophy of eliminating all discharges of persistent toxic substances to the lakes. Includes the term "Great Lakes Basin Ecosystem."

■ **1983** - The 1978 agreement is amended to enhance efforts to reduce phosphorus runoff into the lakes. Scientists from both countries set target loads for each lake that need to be met to achieve the water quality objectives in the agreement.

The Council of Great Lakes Governors is formed to address environmental and economic challenges facing their states.

■ **1985** - Concerns about possible water diversions from the Great Lakes to dry parts of the southern United States prompt the eight Great Lakes states — Minnesota, Michigan, Wisconsin, Illinois, Ohio, New York, Pennsylvania and Indiana — along with Ontario and Quebec to sign an anti-diversions agreement called the Great Lakes Charter.

■ **1986** - Governors of the Great Lakes states sign the Great Lakes Toxic Substances Control Agreement promising to reduce toxic discharges to the maximum extent possible. Later, Ontario and Quebec sign a memorandum of understanding, joining the agreement.

■ **1987** - Canada and the United States sign a protocol amending the Great Lakes Water Quality Agreement to deal with more than 300 contaminants identified in the Great Lakes ecosystem. The protocol also covers airborne pollution that falls on the lakes, leaking landfills and polluted runoff. The nations agree to develop remedial action plans to bring business people and citizens into the process of helping clean up contaminated areas of concern around the lakes.

The zebra mussel, an exotic species that likely arrived in the ballast water of an ocean-going ship, is discovered in the Great Lakes.

■ **1989** - Great Lakes states governors establish the Great Lakes Protection Fund as a permanent environmental endowment to support actions to improve the health of the Great Lakes ecosystem. To date, the fund has made about 217 grant and program related investments representing more than \$53 million in regional projects.

■ **1991** - The Canada-United States Air Quality Accord calls for reducing air pollutants, including those contributing to smog across the lower Great Lakes.

Canada and the United States agree to establish the Binational Program to Restore and Protect the Lake Superior Basin. This establishes Lake Superior goals to eliminate discharges and emissions of nine toxic and persistent chemicals that accumulate in natural food chains.

■ **1993** - Flooding introduces *Cryptosporidium*, a protozoan parasite, into Milwaukee's drinking water system. The outbreak affects about 400,000, hospitalizes 4,000 and kills 111.

A report from the International Joint Commission says governments need to do more to protect human health from toxic chemi-

cals in the Great Lakes, especially those that cause reproductive problems.

■ **1997** - Canada and the United States sign the Great Lakes Binational Toxics Strategy. The goal is to build collaboration among major groups around the basin, including all levels of government, tribes and businesses to work toward eliminating persistent toxic substances resulting from human activity.

■ **2001** - Governors of the Great Lakes states and premiers of Ontario and Quebec sign Annex 2001, an update to the 1985 Great Lakes Charter, to help clarify policies to keep control of the use of water resources within the basin.

■ **2003** - The Council of Great Lakes Governors identifies nine priorities for Great Lakes restoration and protection.

■ **2004** - The Federal Great Lakes Interagency Task Force is created. President Bush recognizes the Great Lakes as a "national treasure" and directs the U.S. Environmental Protection Agency to convene a "regional collaboration of national significance for the Great Lakes."

■ **2005** - The Great Lakes Regional Collaboration (GLRC), a cooperative effort to design and implement a strategy for the restoration, protection and sustainable use of the Great Lakes, releases a "Strategy to Restore and Protect the Great Lakes." This \$26 billion federal-state plan calls for modernizing sewage treatment, cleaning up polluted harbors, restoring wetlands and preventing introductions of invasive species. The GLRC Strategy proposes restoring all 43 Great Lakes' Areas of Concern by 2020.

■ **2008** - The Great Lakes-St. Lawrence River Basin Water Resources Compact is signed into law.

RESTORING LAKE MICHIGAN'S RIVERS AND SHORELINES.

Urban rehab

Decades of abuses across the country have degraded urban rivers and led to deteriorating water quality, increased flooding and fish habitat loss. In Wisconsin, pollutants such as metals, polychlorinated biphenyls (PCBs) and polyaromatic hydrocarbons (PAHs) flowed and drifted into Lake Michigan for years from these urban arteries — a vestige of the industrial and urbanized character of the watershed. As a result, the Milwaukee Estuary — including sections of the Milwaukee, Menomonee and Kinnickinnic rivers — has been designated as one of 43 Areas of Concern (AOC) in the Great Lakes region considered severely degraded, according to the U.S. Environmental Protection Agency.

But now, many urban rivers, including the Milwaukee Estuary AOC, are being rehabilitated, and riverfront once used for warehouses and factories is available for parks, housing and nonindustrial uses. River restoration activities include concrete lining removal, toxic sediment remediation, wastewater treatment improvement, navigation improvement and habitat improvement resulting in greater recreational and economic value, and community pride.

“Collaboration is the key to bringing together a watershed in a fashion that replicates what nature started,” says Kevin Shafer, executive director of the Milwaukee Metropolitan Sewerage District (MMSD). “The entire Great Lakes are vital to Milwaukee. A clean environment drives a strong economy and a strong economy can drive a clean environment.”

MMSD is a regional government agency that provides water reclamation and flood management services for about 1.1 million customers in 28



STEVAN KEITH

Bradford Beach water quality benefits from rain gardens and a parking lot renovation.

communities in the Greater Milwaukee Area. Shafer says turning Milwaukee’s urban river woes into wonders has required creative funding as well as collaboration by university researchers, district planners, county staff, state agencies, elected officials and the community.

Bring back the beaches

It wasn’t too long ago that people believed that beach closings along Lake Michigan were somehow linked to sewage overflows after heavy rains. But Sandra McLellan, an associate scientist at the University of Wisconsin-Milwaukee Great Lakes WATER Institute (GLWI), suspected otherwise. She believed bacterial contamination in the

lake could come from any number of sources. That’s why she began to sample beach water and sand. By sampling the water and then analyzing the bacteria’s unique DNA, McLellan was able to link bacteria to a source. Analyses suggested the *E. coli* at the beaches was mainly from gull droppings and stormwater runoff from parking lots, and not from sanitary sewers.

Shafer is among the public policy makers who have relied on the GLWI’s scientific detective work to make decisions about protecting local beach water quality.

Bradford Beach is a poster child for beaches that have directly benefited from McLellan’s work. A 2005 Milwaukee Journal Sentinel article called



Sediment cleanup at the Blatz Pavilion lagoon removed about 300 pounds of PCBs in nearly 4,000 cubic yards of mud.



The lagoon bottom was restored and waterfront renovated. The project cost about \$1.3 million.

it “Milwaukee’s dirtiest beach.” This declaration came after the city health department reported *E. coli* counts there exceeded safe levels for 61 percent of the three-month swimming season.

Today, Bradford Beach is not only safe and swimmable, it is sporting a new look with beach grooming, rain gardens to retain and filter water, and a parking lot stormwater management project that, combined, should prevent about 90 percent of stormwater from reaching the beach.

In the summer of 2008, Miller-Coors LLC donated \$500,000 to the Bradford Beach Revitalization and Blue Wave Campaign (cleanbeaches.org) over five years to clean up and revitalize the property.

Contaminated sediment cleanups

The Blatz Pavilion lagoon in Milwaukee’s Lincoln Park has reopened for recreation after sediment containing PCBs was removed.

The Blatz site is a one-acre lagoon off of the Milwaukee River adjacent to the pavilion in Lincoln Park. The lagoon was identified for cleanup in 2005 because it is heavily used by the public and there was a risk of exposure to PCBs through skin contact and potential ingestion from consuming

contaminated fish, says Greg Hill, who leads the DNR’s statewide contaminated sediment management program. Cleanup began in spring 2008.

The project removed about 300 pounds of PCBs trapped in nearly 4,000 cubic yards of sediment. About 2,000 tons of high-level contaminated sediment were shipped out of state to a chemical waste landfill. About 3,500 tons with much lower levels of PCBs were disposed of in a local solid waste landfill.

The lagoon bottom was restored with a sand and gravel base and the waterfront was renovated. The project cost about \$1.3 million paid for with the Great Lakes Program Funds that Gov. Jim Doyle and the Wisconsin Legislature provided to address toxic chemical contamination in Great Lakes tributaries. Planning continues for a larger cleanup effort adjacent to the Lincoln Park lagoon and channel.

Experience on other sediment remediation projects, such as the Lower Fox River project in northeast Wisconsin, helped here. “Each project adds to our knowledge base as contaminated site cleanups continue,” Hill says.

In 2007, the Kinnickinnic River on Milwaukee’s South Side became infa-

mous as one of the 10 most endangered rivers in the United States as ranked by American Rivers, a nationwide advocacy group. The Kinnickinnic is the smallest of Milwaukee’s rivers. Draining 25 square miles of land through some of the most densely populated and developed land in the area, “More than 1.5 million people have a front-row seat to the problems and have a vested interest in restoring the river,” American Rivers said.

On July 20, 2008, Governor Doyle announced a \$24.4 million project to clean up contaminated sediment from the Kinnickinnic River. The state devoted \$7.7 million to leverage \$14.3 million in federal funds under the Great Lakes Legacy Act for the cleanup. The city of Milwaukee, through a Business Improvement District, contributed \$500,000 to the project. Starting in spring 2009, this project will remove 170,000 cubic yards of contaminated sediment along a 2,000-foot section of the south side waterway. Removing the sediment will create a 20-foot deep navigation channel and allow greater boat traffic and recreation.

Flood management

Several projects also are underway in

Milwaukee to help reduce the risk of destructive floods.

“We’ve turned the tide,” Shafer says. “We are a model for the nation on how to remove concrete-lined channels and bring the community into the process.”

Flooding in Milwaukee County in 1997, 1998 and 2000 caused about \$96 million of damage to homes, businesses and neighborhoods. Since 1973, flooding claimed four lives in the county. Officials and the community agreed that something needed to be done.

“There is an interesting history of flood management in Milwaukee,” says Tom Chapman, MMSD flood project manager. “Historically floods were dealt with by paving the streams.” In fact, 28 miles of streams in the Milwaukee area were paved over in the last 60 years.

But that thinking changed about 15 years ago, Chapman recalls, and paving was replaced with more natural solutions. Engineers learned that paving streams sent waters faster and more directly downstream, harming fish habitat and creating greater safety and flooding problems.

Today, MMSD is storing flood water, and where possible, restoring rivers in Lincoln Creek, Southbranch Creek and Indian Creek and other area watersheds. Milwaukee has been removing concrete lining and restoring natural stream flow.

Lincoln Creek has a history of flooding and other problems. This continuous nine-mile tributary of the Milwaukee River drains 20.7 square miles of urbanized watershed. The entire stream length had been channeled to accommodate floodwaters. About 25 percent of the channel was lined with concrete. Masonry and rock walls lined about 10 percent of the channel. The remainder was in very poor hydraulic condition.

Now flood controls for Lincoln Creek reduce flooding, improve aquatic and terrestrial habitat and provide recreation. The project widened the creek in some places and added detention ponds in others. Two miles of concrete riverway were removed and restored to natural conditions. Pools and riffles were created to encourage fish and wildlife habitat. The project was completed at a cost of about \$120 million. As a result, Lincoln Creek did



WILL WAWRZYN

A walleye spawning reef has been created in the Milwaukee River Estuary. The reef stones needed to be small enough to attract walleye and other species to spawn but large enough to stay in place.

not flood during strong rains in June 2008, Chapman says.

“Every neighborhood is different in terms of what they want their rivers and streams to be like,” Chapman says. “But now we shouldn’t have this flooding problem for our kids and their kids in the future.”

Shafer says the lessons learned in Milwaukee can be applied to smaller communities wanting to make a difference. “Communities need to know that they can’t do it all by themselves,”

Shafer says. “They need to get all the interested people to sit down together and identify the goal. It doesn’t cost much to install a rain barrel or rain garden, but it’s a start and that gets people involved in the issue, then more people will come to the table.”

Milwaukee River rehabilitation

The Milwaukee River rehabilitation effort has provided outstanding examples of local cooperation, and citizen and community involvement in cleanup activities at all levels. Major investments have upgraded public and private wastewater treatment facilities and contained and treated combined sewage overflows. A comprehensive plan recommends improvements throughout the Milwaukee River basin.

On a grassroots level, the Milwaukee River Revitalization Foundation raised community support to acquire land for a recreational trail and corridor along the lower riverbank. Area high school students were engaged through Testing the Waters, an educational water quality monitoring program. Farther out in the watershed, landowners work with the state on cost-sharing programs to help reduce runoff from their farms.

But much of the river’s physical recovery can be linked to projects that

GREENSEAMS

MMSD’s Greenseams program aims to prevent future flooding by permanently protecting key lands. The program buys undeveloped, private properties in areas expected to have major growth in the next 20 years. To date, more than 1,600 acres of natural areas along streams, shorelines and wetlands have been protected. These lands will remain undeveloped, protecting water and detaining rain and melting snow. Wetlands maintenance and restoration at these sites will provide further water storage and improve water quality.

removed 10 obsolete dams on the main stem and tributary waters starting in 1987 including the largest dam on the river, the North Avenue Dam. Removing the dam and impoundment was a linchpin for the river's recovery. In late 1990, the dam gates were opened lowering water levels to accommodate replacing a water main and bridge.

The 2.5 miles of river impounded above the dam from Capitol Drive to the North Avenue Dam narrowed considerably as the free-flowing river resumed a more natural course. But the drawdown also exposed more than 150 years of accumulated garbage. In the summers of 1991 and 1992, volunteers removed more than 2,000 tires and other debris including auto parts, shopping carts and appliances. As the water, sediment and habitat quality improved, fish moved in from upstream and downstream of the former dam.

Further study recommended removing the dam in its entirety. Permits and funding were secured and the dam was taken out in 1997 marking the first time since 1835 that stretch of the Milwaukee River flowed freely. The habitat improved and the fishery quickly responded, notes Will Wawrzyn, a DNR fisheries biologist in Milwaukee.

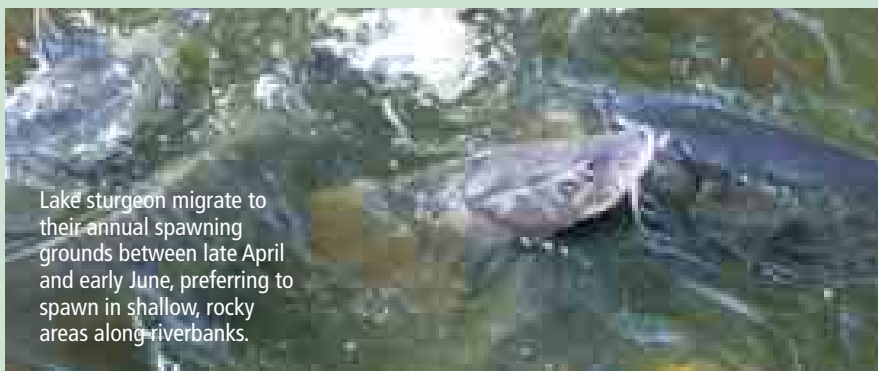
Waters that used to hold carp and a few other fish species tolerant of degraded habitat now have healthy populations of smallmouth bass and 32 other native fishes. The state-threatened greater redhorse is now common in the river.

Previously neglected for most water-based recreational uses, the river is a destination for anglers from around the Midwest pursuing spring and fall trout and salmon runs from Lake Michigan.

Because walleye are now able to reach historic spawning grounds, streambed improvements were made. In the fall of 2006 Wawrzyn was part of a team that recreated a walleye spawning reef in the Milwaukee River Estuary. With funds provided by the U.S. Fish and Wildlife Service and Walleyes for Tomorrow, the half-acre reef was built on time and under budget.

"Monitoring shows potential for walleye spawning in the area and other fish species also are beginning to use the reef," Wawrzyn says. ●

RETURN OF THE LAKE STURGEON



Lake sturgeon migrate to their annual spawning grounds between late April and early June, preferring to spawn in shallow, rocky areas along riverbanks.

In the early 1800s, lake sturgeon, the largest native fish of the Great Lakes system, were slaughtered because their bony plates and size ruined commercial fishing gear. By the mid-1800s, however, sturgeon were prized for their caviar, skin and succulent flesh. Overfishing, along with dam construction, habitat loss and water pollution caused sturgeon populations to plummet. The sturgeon's slow maturation rate (15 years for males and 20 to 25 years for females) contributed to the population's vulnerability.

Hundreds of thousands of sturgeon roamed Lake Michigan in the early 1800s. Researchers now estimate that only 2,000 to 5,000 adult sturgeon remain in the lake, with no record of sturgeon in the Milwaukee River since the 1890s.

Brad Eggold, a DNR fisheries supervisor, says the Department of Natural Resources recognized the cultural and historical significance of the fish and began stocking the Milwaukee River with hatchery-raised sturgeon in 2003. Like salmon, sturgeon return to the river where they were born to spawn.

To maximize the opportunity for Lake Michigan sturgeon to imprint on the Milwaukee River, the Depart-

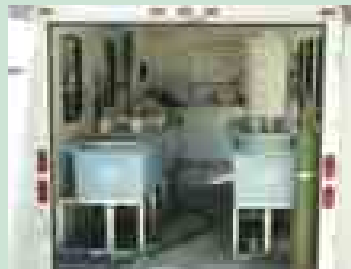
ment of Natural Resources and Northern Environmental, a consulting firm, designed a streamside rearing facility (SRF), which acts as a mini-hatchery. This 8 x 20-foot trailer pumps water from the Milwaukee

River into rearing tanks, enabling sturgeon to be raised in the Milwaukee River water from day one. This project is funded by the Wisconsin Department of Natural Resources, a Great Lakes Fishery Trust grant, the U.S. Fish and Wildlife Service and the Riveredge Nature Center in Newburg.

In the spring of 2006, Riveredge Nature Center became the first site in Wisconsin to operate a Lake Sturgeon SRF. Eggs are hatched around May 1 with the goal of releasing sturgeon in early October. In 2006,

about two dozen fish were first stocked from the SRF. The next year 156 sturgeon were stocked. And 767 fish were stocked in October 2008 below the dam in the Thiensville Village Park. After being released, fish are tracked by sonic tags.

"This continued stocking in a Lake Michigan tributary is an important step in restoring lake sturgeon, not only in the Milwaukee River but also in Lake Michigan," Eggold says. "This is an ongoing project because the sturgeon is a long-lived species. We won't know the success of the streamside stocking effort for 15 to 20 years."



ALL PHOTOS DNR FILE/OWEN STEVENS POINT PHOTO

A streamside rearing facility at the Riveredge Nature Center raises sturgeon on Milwaukee River water.

Reducing toxic pollution



KEEPING MEDICINE AND MERCURY OUT OF OUR WATERS.

Many people have gotten in the habit of flushing unused and outdated medicines down the toilet, but this is an emerging concern for the environment and public health. Most wastewater treatment facilities are not designed to remove pain killers, hormones, antibiotics or other medicines. Thus, these chemicals can end up back in the drinking water supply.

Several cities in Wisconsin are giving people an alternative by collecting old medicines. In 2006, Brown County hosted a two-day collection event that took in about 109,000 pills.

In April 2008, the Great Lakes Challenge encouraged communities in eight states to responsibly collect and dispose of unwanted pharmaceuticals. The goal, which was exceeded, was to collect one million pills. About 3.5 tons of medicines were turned in during a Milwaukee area collection. Tribal members from the Menominee Indian Tribe near Green Bay turned in over 23 pounds of medicines.

The City of Green Bay holds two pharmaceutical collection drives each year. Green Bay Mayor Jim Schmitt says, “We’ve had a very successful pharmaceutical collection, not just in the amount we’ve collected but in the participation we’ve had.”

In September 2008, health care providers partnered with the Department of Natural Resources and U.S. Environmental Protection Agency to keep pharmaceuticals out of drinking water supplies by providing technical assistance to communities and easy-to-follow guidance to bolster health care providers’ efforts to protect public health and the environment from hazardous waste while caring for patients.

Mercury reduction partnerships

Mercury pollution is a leading cause of statewide fish consumption advisories because mercury can accumulate through the food chain and con-

taminate sport fish. The goals of the Community Mercury Reduction Program, initiated in 1998, are to reduce the use of mercury-containing products, promote mercury recycling and reduce mercury spills while air quality staff works with power plants to reduce mercury emissions from coalburning.

Randy Case, DNR community program coordinator for the Bureau of Cooperative Environmental Assistance, says dentists are important partners. The main mercury source from dental offices is amalgam, the material of silver fillings that consists of about 50 percent mercury and 50 percent other metals. Case says the DNR has teamed up with the Wisconsin Dental Association to create a Best Management Practices Guide for recycling amalgam wastes.

Amalgam is a cost-effective, efficient, stable and long-lasting material to fill cavities, explains Case, so it is likely to continue to be used. But amalgam separators, available from several suppliers can reduce amalgam rinsed down the sink drain by 95 percent or more. In 2007, the Green Bay Metropolitan Sewerage District received a \$50,000 grant from the Great Lakes Protection Fund to work with dental offices in Brown and Outagamie counties to provide rebates for installing amalgam separators. Captured mercury is then recycled.

Schools also are stepping up to reduce mercury, mostly found in science labs, but also in fluorescent lights, thermostats and thermometers. Some schools have received a cash award for exchanging mercury devices.

Communities have held thermometer exchanges where the public and businesses can exchange mercury thermometers for digital ones. Another source of mercury waste is manometers, which are used to measure pressure changes in

the dairy milking process. A manometer replacement project, funded through the Great Lakes Protection Fund, collected 515 manometers containing 385 pounds of mercury.

Most recently, DNR wrote rules to reduce mercury emissions from coal-fired power plants, which are the largest human-caused source of mercury emissions to the air in the United States, contributing over 40 percent. The rules became law in fall 2008 and will be implemented in 2009, requiring utilities to reach a 90 percent cut in mercury emissions by 2015.

This rule requires all power plants over 150 megawatts to take either of two courses. Utilities can reduce mercury emissions by 90 percent by 2015, or they can reduce mercury emissions by 70 percent by 2015 and make reductions in other pollutants. Plants that choose the second option would have to reduce sulfur dioxide by 80 percent and reduce nitrogen oxides by 50 percent. In addition, utilities that take this route would have to achieve 80 percent mercury reductions by 2018 and 90 percent by 2021.

Because technology can efficiently reduce mercury and other air pollutants simultaneously, the new rule encourages Wisconsin utilities to do so. This “multi-pollutant” approach will dramatically reduce sulfur dioxide and nitrogen oxide, pollutants that cause increases in ozone, haze and particulate matter. ●

FOR MORE INFORMATION

- 4.uwm.edu/shwec/
- dnr.wi.gov/org/caer/cea/mercury/
- dnr.wi.gov/org/aw/wm/pharm/household.htm

A stinky sea of green

MAKING CLADOPHORA CONNECTIONS.

It's the awful sight and smell of rotting algae washed onto beaches that draws attention. Such problems affect property values as well as tourism and recreational uses, says Harvey Bootsma, a researcher with the Great Lakes WATER Institute at the University of Wisconsin-Milwaukee. Bootsma has studied the naturally occurring green algae, *Cladophora*, in the Great Lakes for seven years.

While the downside of large quantities of *Cladophora* on the shore is obvious, Bootsma says much of the algae probably settles deeper in the lakes and these effects are not yet known. In some areas of the Great Lakes, decaying *Cladophora* lowers oxygen levels and may be implicated in fish kills.

These algal blooms also clog water intakes. In Wisconsin there have been power plant shutdowns and partial shutdowns caused by *Cladophora* blooms.

What is this algae's story and why haven't we heard of it until recently?

Cladophora grows on submerged rocks and other hard surfaces, washes ashore at times in large piles, then decomposes. For the past five years, large quantities of decaying algae have been fouling Wisconsin's Lake Michigan shoreline. The reasons are complex, Bootsma explains, driven by increased water clarity due to filter-feeding invasive zebra and quagga mussels, a nearshore rocky bottom on which the sun-loving, stringy green algae grows, prevailing lake currents and an ample supply of phosphorus from runoff in the Great Lakes basin.

While this algae does not present a risk to human health like blue-green algae, rotting *Cladophora* along with mussels deposited on beaches attract large flocks of gulls resulting in high bacteria concentrations from gull feces.

Nuisance *Cladophora* levels were also a problem in the 1960s and 1970s, says Shaili Pfeiffer, a water re-



DNR FILE

Geese and seagulls leave behind fecal bacteria when they feed on mussels that cling to decaying *Cladophora* along Lake Michigan beaches.

sources specialist in the DNR Office of the Great Lakes. Research linked those blooms to high phosphorus levels, mainly a result of poorly maintained septic systems, inadequate sewage treatment and detergents containing phosphorus. Due to tighter restrictions, phosphorus levels declined during the 1970s and *Cladophora* blooms were largely absent in the 1980s and 90s.

But then came zebra and quagga mussel invasions. The mussels increased water clarity allowing adequate lighting for *Cladophora* growth. The mussels also secrete phosphorus near shore and warm water temperatures enhance the algae, which thrives at 50 to 70 degrees Fahrenheit.

In spring 2004, the Department of Natural Resources initiated a work group to address Lake Michigan's algal problem. The department joined University of Wisconsin-Extension, University of Wisconsin-Milwaukee WATER Institute, University of Wisconsin-Sea Grant Institute, Wisconsin Coastal Management Program, county health departments and Centerville Citizens for Air, River and Environmental Solutions (CARES), in a *Cladophora* monitoring program. Sampling sites were established and data compared to historical data.

Results showed that *Cladophora* growth is abundant along the entire Lake Michigan shoreline. "Monitoring was critical to give us a baseline reading of phosphorus levels," Pfeiffer says. "Most of the time you will see a field of green carpeting the lake bottom."

Research also showed that nutrient concentrations slowly declined from south to the north and *Cladophora* became a bit more sparse north of Washington Island. "To me, this suggests that if we can get water quality along the shores between Milwaukee and Door County more like that north of Door County," Bootsma says, "we might see an improvement."

Since currently there is no way to eradicate zebra and quagga mussels, Bootsma says the best way to control *Cladophora* may be to starve it by limiting the amount of phosphorus from farms and other sources that is being carried into streams, lakes and rivers.

Pfeiffer and Bootsma are encouraged that several communities have joined in the fight. The Partnership for Phosphate Reduction, a citizen-based organization, is taking action to fight the overabundance of algae in Door County by asking people to switch to phosphate-free dish detergent and lawn fertilizer, and urging businesses to only sell phosphorus-free products.

Centerville CARES, an independent organization that identifies issues and advocates change to protect the Lake Michigan shoreline and water resources throughout Manitowoc County and Northeastern Wisconsin, has been sampling water quality in creeks for several years to establish a baseline of creek conditions in the basin. The organization also has requested that Wisconsin factory farms include water quality testing as part of their manure spreading regime.

"There is no short-term fix or silver bullet to this problem," Pfeiffer says. "But we can reduce phosphorus over time and that has so many positive benefits for tributary streams and Lake Michigan." ●

For more information visit dnr.wi.gov/org/water/greatlakes/cladophora/

The heat is on

CLIMATE CHANGE THREATENS THE GREAT LAKES.

Climate change is threatening the Great Lakes. Many experts believe that climate change, especially global warming, is already affecting the chemical, physical and biological integrity of the Great Lakes ecosystem. The timing and significance of possible impacts are not well understood, but any alterations in water levels and water quality can affect to some degree the biological community including humans, wildlife and fish.

Jay Austin, a University of Minnesota-Duluth's Large Lakes Observatory limnologist, and his colleague, Steve Colman, have found, using Lake Superior weather buoys, that Lake Superior's average summer surface temperature has risen about 4 degrees Fahrenheit since 1980, a much greater rate of change than seen in previous decades.

They also studied ice cover data from the Great Lakes Environmental Research Laboratory in Ann Arbor and looked at air temperatures from every weather station within 500 kilometers of Lake Superior. The data showed that not only has the lake become warmer, windier and less icy since 1980, surface waters also have warmed twice as fast as the region's air.

What are the likely suspects for this warming trend? "The rapid rise in water temperatures is a combination of declining ice cover and warmer summer air temperatures, both contributing roughly equally to the observed rise in summer water temperatures," Austin says.

Less winter ice cover and higher summer temperatures can lead to increased evaporation rates resulting in lower lake water levels. More frequent and severe storms also are likely. The resulting increased erosion and runoff could seriously threaten tributaries and nearshore areas and the fisheries they support. Exotic species not usually able to adjust to the Great Lakes area climate may find these warmer conditions much more favorable.

While the specific effects of climate



DAVE HART

Lake Superior is losing water and getting warmer.



NEAL NIEMUTH

Less winter ice cover may lead to declining lake levels.



FRANK KOSHERE

Climate change poses a significant threat to the remaining wetlands in the Great Lakes region. Many fish species depend on coastal wetlands for successful reproduction.

change are difficult to predict, the potential for environmental and economic damage is clear.

With this in mind, Wisconsin Gov. Jim Doyle created the Governor's Task Force on Global Warming in 2007. The task force consists of 29 members representing diverse interests including energy providers, large industrial energy users, consumer and environmental advocates, academics and others. The task force has developed a strategy for reducing global warming. For

more information visit the DNR website at dnr.wi.gov/environmentprotect/gtfgw/.

REDUCE YOUR CARBON FOOTPRINT

Efforts at all levels are critical to curb global warming. Calculate your carbon footprint and get ideas for improvement at carbonfootprint.com/

Lightening the load

REDUCING RUNOFF AND EROSION.

There is no denying the connection: Healthy watersheds lead to healthier streams and in turn, healthier fisheries. What happens on the land 30 miles from a lake can, and does, impact water quality in the lake.

Restoring buffers

The Conservation Reserve Enhancement Program (CREP) is a voluntary land retirement program started in 2001 to help agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water.

Program partners include farmers, tribes, state and federal governments, and private groups. CREP is an offshoot of the country's largest private-lands environmental improvement program — the Conservation Reserve Program (CRP) and is administered by USDA's Farm Service Agency.

CREP addresses high-priority conservation issues of local and national significance, such as impacts to water supplies, loss of critical habitat for threatened and endangered wildlife species, soil erosion, and reduced habitat for fish, says Jim Baumann, DNR's CREP manager.

CREP contracts require a 15-year or perpetual conservation easement commitment to keep lands out of agricultural production. CREP provides payments to participants who enroll eligible land. An annual rental rate and incentive payment is offered plus cost-share of up to 50 percent of the costs of buffer plantings. There is \$240 million in funding available in Wisconsin for up to 100,000 acres.

Research has shown buffers to be very effective (70 to 90 percent) in filtering sediment and nutrients. These buffers are usually 30-foot-wide or more and planted with dense vegetation as an alternative to cropping or grazing close to a waterway. Buffers also provide wildlife habitat, and are especially important to Great Lakes tributaries, Baumann says.



UNIVERSITY OF WISCONSIN-MADISON

Researchers are installing vanes on North Fish Creek to deflect the current away from bluffs and build a stable bluff toe to prevent erosion.

Since CREP began, more than 1,616 acres have been enrolled in Wisconsin Great Lakes basin counties. "This has been a very successful effort by many partners with multiple benefits for our resources," says Baumann.

But the program is challenged by rising property values and rapidly rising crop prices. "Still, CREP remains important for water quality protection," Baumann says.

Andy Holschbach, director of the Ozaukee County Planning, Resource and Land Management Department, agrees. "For people like me who work with local landowners, CREP is another tool in the toolbox that we can offer them when talking about conservation options."

Reducing bluff erosion

Eroding streambank bluffs historically have sent tons of soil into North Fish Creek, a tributary to Chequamegon Bay and Lake Superior, burying spawning areas for trout and salmon. The creek's sediment load largely originates from erosion on 17 large bluffs.

But a collaborative effort to prevent erosion and re-establish spawning habitat is paying off for the creek's fish and anglers.

In 2000 and 2001 the University of Wisconsin-Madison Civil Engineering

Department installed 45 submerged structures (vanes) along one river bend that has a large, eroding bluff in a series of arrays extending from the bluff toe toward the middle of the channel.

The vanes deflect the water current away from the bluff and build a stable bluff toe. The vanes are vertical plates that are installed on a streambed at specific angles to the flow. Vanes extend upward from the bottom to about 30 percent of the stream depth.

Since the original installation, vanes and other measures (such as increasing toe roughness with anchored logs and stream boulders, rock vanes and dams with streambed and bank material, and increasing the flow on the inner bank/point bar side of the stream) have been used at this and two other bluff sites on North Fish Creek and one site on the Marengo River (a tributary of the Bad River).

The vanes and other measures have been effective in bluff stabilization. Researchers are moving toward using the vanes more to keep a channel open along with other enhancements along the bluff side to decrease erosion there.

DNR staff is working with others to install vanes at other tributaries to Lake Superior with similar bluff erosion problems.



Without vegetative buffers, streams may become polluted with fertilizers, pesticides and other contaminants.



When properly installed, buffers control soil erosion and enhance fish and wildlife habitat.

Slowing the flow

Soil erosion and sedimentation along the red clay plain of Wisconsin's Lake Superior south shore has been the focus of debate and research for several decades.

This red clay plain landscape encompasses around 890,000 acres in Douglas, Bayfield, Ashland and Iron counties. It's a young landscape, geologically speaking, between 9,000 and 10,000 years old. Young landscapes are well known to exhibit naturally rapid erosion rates. However, human activity since the early 1900s has created even greater erosion rates than would be expected in this young landscape and is degrading the water quality of south shore streams and Lake Superior.

Understanding the erosion process in the red clay plain is challenging, but crucial to developing a reasonable management approach to reducing erosion impacts.

The first step is understanding the nature of the glacial deposits that make up this landscape.

"The red clay surface that is readily visible to everyone is a relatively thin layer. It is made up of a tightly bonded fine material containing 50-80 percent clay called the Miller Creek Formation," says Jay Gallagher, DNR Lake Superior Area forester. "But underlying this thin clay surface is a much thicker layer of a loosely-bonded coarser texture known as the Copper Falls Formation."

Modern day south shore streams have cut this Copper Falls material well below the Miller Creek red clay surface. As streams cut away, the lower slopes erode and fall into the stream channels. As this erosion continues, tons of streambank from the toes of slopes is "undercut" and shears off in large massive blocks of red clay. This material then slides down the

slopes of the Copper Falls Formation and eventually enters the streams.

This erosion process is often jump-started by large volumes of water flowing into the streams. Reducing the flow reduces the energy available to cause erosion — thus the phrase "Slow the flow." If we can reduce the amount of water running into streams, we can reduce the erosion rate.

Today, land management decisions still accelerate surface flow from the uplands into streams. Creating large amounts of open land acreage in smaller watersheds, along with developing residential, agricultural and road drainage systems, lead to increased surface runoff rates. This rapid delivery of large volumes of water to the south shore streams creates excessive energy that produces the erosion we see today.

Research by the University of Wisconsin-Madison Forest Ecology Laboratory along with the U.S. Geological Survey also shows that vegetation plays a critical role in stabilizing soil and slowing runoff, especially on steep slopes. Roots help anchor soil, and the tree canopy slows falling rain and reduces the amount of water that reaches the forest floor, limiting surface runoff. Fallen trees and branches that reach the stream also improve the physical structure of the streambed and create a more stable environment.

Forest composition similar to vegetation that existed prior to European settlement is particularly beneficial in stabilizing soils in this area.

Restoring streambeds

Restoring conditions in the cold streams feeding Lake Superior's southern coast is improving habitat for trout and salmon and sustaining recreation along this part of the Great Lakes shoreline.

Brook trout were once common in

most of the Lake Superior basin's cold-water tributaries and shoreline habitat adjacent to them, until their populations declined in the 1880s due to overexploitation, habitat loss and the impacts of beaver, which block fish runs and bury critical habitat. Today trout only thrive in the headwater reaches and seldom use the lakeshore habitat where they could grow more quickly and reach larger sizes.

Coaster brook trout are brook trout that live in the coastal waters of Lake Superior for at least part of their lives. These "coasters" grow to 11 inches or more, larger than fish that exclusively reside in streams. Historically, trout stayed near the stream mouths and along the 40 miles of rocky sandstone shoreline adjoining the Bayfield Peninsula. The remaining 85 percent of Lake Superior's south shore has a sand and clay bottom that historically held fewer coasters.

A Department of Natural Resources and U.S. Fish and Wildlife Service brook trout plan is underway to protect and improve self-sustaining brook trout populations and their habitat in the Lake Superior basin by removing migration barriers, improving stream habitat, and uncovering spawning areas that were buried under beaver flowages. Other actions include placing bag limits and experimental stocking.

While Dennis Pratt, DNR fisheries biologist in Superior, says it is too early to tell if these management practices will improve the fisheries, he is optimistic. Partnerships will lead to a long-term commitment to manage, protect and restore tributary habitat in the basin.

"When we combine this work with upland efforts to reduce flood flows, we expect both trout and salmon populations to improve," says Pratt. ●

Protection from long-range diversion

GREAT LAKES COMPACT
PROVIDES THE LEGAL FRAMEWORK.

The Great Lakes – St. Lawrence River Basin Water Resources Compact creates unprecedented Great Lakes protections and ensures their future as a foundation for regional economic growth. It manages water diversions and withdrawals and provides a framework to sustain water in the basin.

In spring 2008, Wisconsin lawmakers approved the Compact, passing it out of the Senate with a 32-1 vote and through the Assembly 96-1. The Compact was then approved by the governor and at the federal level and signed into law by President George Bush on Oct. 3, 2008.

“While the Great Lakes have been an important part of our past, they are absolutely critical for our future,” says DNR Secretary Matt Frank. “The Great Lakes Compact is more than just ensuring that our water is not diverted to other parts of the country. The Compact will make sure that for the first time there is a coordinated regional effort to manage Great Lakes water for our environmental and economic future.”

The Great Lakes Compact was inspired in part by the actions of the Nova Group, an Ontario consulting firm that in 1998 obtained a Canadian permit to ship tankers of Lake Superior water to arid areas of Asia. The plan was stopped amid public uproar.

The Compact became effective December 8, 2008 and applies to groundwater and surface water including Great Lakes, tributary streams and inland lakes in the Great Lakes basin. All entities withdrawing more than 100,000 gallons per day must have permits. Several thousand entities in Wisconsin, mostly high-capacity wells or municipalities, fall into that category.

“For close to a decade, the Great Lakes states have been negotiating and then building support for a Compact that would protect the amazing waters that define this region,” says Wisconsin Gov. Jim Doyle. “The Great Lakes are the reason that you can look at a picture of the earth from space and pick out a state like Wisconsin. They have shaped our history, our cities, our industry and our recreation. And just as they have formed this region, they will continue to help determine our future.”



BOB KORTH

Harboring solutions

INNOVATIVE WAYS TO COMBAT INVASIVE
SPECIES IN BALLAST WATER.

Ballast water discharged from ships is one of the largest pathways for the introduction and spread of aquatic invasive species to the Great Lakes.

Aquatic invasive species, such as zebra mussels and sea lamprey, have dramatically changed the Great Lakes region ecology and economy. These organisms were introduced in a variety of ways, including ballast water discharges from ships. Ships use ballast water to provide stability and maneuverability during a voyage and in harbors. Water is taken on at one port when cargo is unloaded and usually discharged at another port when the ship receives cargo.

A lack of federal legislation mandating ballast water exchange means the introduction and spread of invasive species continues. The Wisconsin Department of Natural Resources strongly supports developing national performance and permitting standards or adopting proposed International Marine Organization standards for ballast water discharges, says Susan Sylvester, DNR Water Division section chief for permitting.

In the meantime, saltwater exchanges of ballast water tanks are being encouraged before vessels enter the St. Lawrence Seaway and several studies are underway to more closely regulate the discharge of ballast water. Roger Larson, deputy director of the DNR Bureau of Watershed Management, says the agency is progressing with a pilot project to test off-ship treatment of ballast at the Port of Milwaukee. The Department of Natural Resources, representatives from the Milwaukee office of Brown and Caldwell (an environmental engineering consulting firm) and the Port of Milwaukee formed a project team to evaluate ballast collection and treatment alternatives.

The group decided that the most feasible option is a specially adapted barge that can pull alongside a ship to collect, store and treat ballast water rather than piping water to an on-shore treatment facility.

“Critics of off-ship treatment have

commented about the difficulty of extracting the ballast water from a ship to a barge, but our project team found a relatively simple solution, retrofitting the ship with a T-connection to an existing pipe and using the ship’s existing ballast pumps to pump the ballast water to the barge,” says Julie McMullin, Brown and Caldwell’s project manager.

Bay Engineering, Inc. of Sturgeon Bay developed the conceptual ship and barge designs to accommodate ballast water treatment.

The Port of Milwaukee, which annually handles more than 85 overseas vessels, has applied for funding from the Department of Transportation to help acquire and outfit a barge. Cost estimates are \$3.5 million for the treatment system and barge, \$60,000 to \$204,000 in ship modifications and T-connections per ship, and \$160,000 annual treatment system operation cost.

“It’s cheaper than other options that have been proposed,” Sylvester says. “And keeping new invasives out of lakes is far more cost-effective than managing them once they have become established. Zebra mussel control alone costs U.S. taxpayers \$5 billion annually.”

Another effort underway in Superior called the Great Ships Initiative (GSI) is evaluating treatment technologies to remove and destroy aquatic organisms in ballast water. The GSI program involves port authorities, industry, and federal, state and provincial agencies. Researchers with the University of Wisconsin-Superior’s Lake Superior Research Institute and University of Minnesota-Duluth’s Natural Resources Research Institute work with GSI scientists. To learn more visit www.nemw.org/GSI/

“These efforts could go a long way to show the people of Wisconsin who use the Great Lakes that we are very serious about stopping the spread of new invasive species,” Larson says. ●

Green growth

SUSTAINABLE GREAT LAKES TOURISM AND BUSINESS ARE LINKED.

The Great Lakes generate \$55 billion in tourism for the region annually. So it makes sense that the tourism industry would promote businesses that have made a commitment to become more sustainable.

Travel Green Wisconsin is a voluntary program that reviews, certifies and recognizes tourism businesses and organizations that have made a commitment to reducing their environmental impact. The program encourages participants to evaluate their operations, set goals and take actions towards environmental, social and economic sustainability. Above all, the Travel Green Wisconsin program is designed to protect the beauty and vitality of Wisconsin's landscape and natural resources.

The program also educates travelers to Wisconsin about sustainable tourism and helps make green businesses recognizable. Wisconsin's Travel Green was the first such program sponsored by a state tourist department and has become the largest.

Paul Linzmeyer says sustainability is the future of business success in the Great Lakes region. "When I talk about sustainability I am talking about the interrelation among people, planet and profits," says Linzmeyer, sustainability chair of the New North and industry chair of the Wisconsin Global Warming Task Force. This triad is also known as "the triple bottom line."

"The Great Lakes are the new oil; the new platinum," Linzmeyer says, and he calls on the Great Lakes states to collaborate with universities and manufacturers to create clean water technology and green jobs.

Fred Schnook, former mayor of Ashland, says one of the main reasons business owners want to connect to conservation efforts in the region is that they recognize that the health and appeal of life here attracts a strong workforce.



DNR FILE

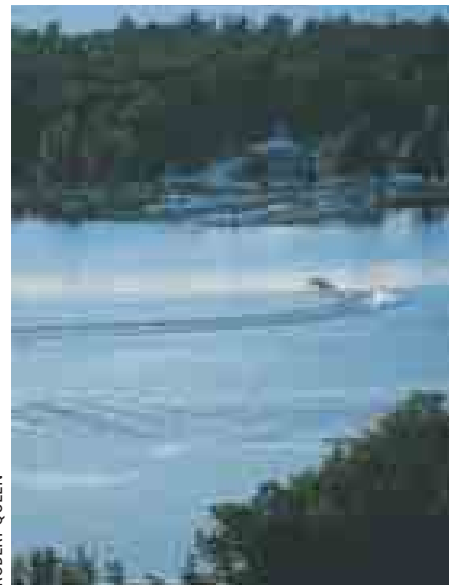
Travel Green Wisconsin certifies a variety of businesses from campgrounds to marinas.

Ashland's city Waterfront Development Plan calls for redeveloping the historic Soo Line Ore Dock area as a tourist destination — possibly a maritime park and fishing dock — that celebrates Ashland's industrial past and Lake Superior's national role.

Bayfield also has joined the movement toward sustainable eco-friendly tourism by taking actions toward environmental, social and economic sustainability by minimizing waste, integrating energy efficiency, conserving water, improving air quality and purchasing green and locally-produced products and services.

In September 2008, Bayfield Mayor Larry McDonald and Racine Mayor Gary Becker challenged Wisconsin harbor towns to support ecotourism initiatives such as boating and responsible use of natural resources.

The initiatives will be implemented by the Wisconsin Harbor Towns Association (WHTA) with support of the Wisconsin Department of Administration Coastal Management Program,



ROBERT QUEEN

Tourism in Wisconsin counties adjacent to the Great Lakes generates over \$2 billion of economic activity annually.

University of Wisconsin Sea Grant Institute, Wisconsin Department of Tourism and Department of Natural Resources. Projects include beach and harbor cleanups, a voluntary Clean Marina program, and guides for tourists and boaters.

Sheboygan Mayor Juan Perez recently signed the WHTA agreement. "We realize we can make a difference in water quality," Perez says. In fact, beach cleanups in 2007 and 2008 yielded nearly 1,000 pounds of trash.

"We applaud the grassroots efforts of Wisconsin Harbor Towns to safeguard nearly 1,000 miles of coastline for the enjoyment of our residents and visitors for generations to come," says Wisconsin Tourism Secretary Kelli Trumble.

General green travel information can be found at: travelgreenwisconsin.com

To learn more about the Wisconsin Harbor Towns Association visit wisconsinharbortowns.org/

A long-term investment

FROM THE CLEAN WATER ACT TO THE GREAT LAKES WATER QUALITY AGREEMENT.

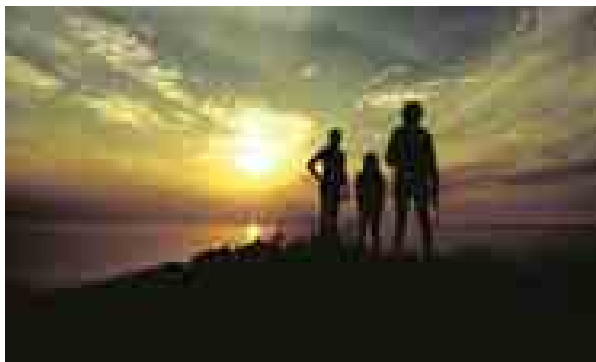
Wisconsin has taken many steps in the right direction, but much more is needed to fulfill the Great Lakes Water Quality Agreement's mission to fully restore and maintain Great Lakes water quality. Computer models forecast and scientific advancements have shown that actions once thought to be enough, are not sufficient to protect the Great Lakes ecosystem. So, where do we go from here?

Drafters of the original Great Lakes Water Quality Agreement anticipated that adjustments would be needed based on experience, new science and a greater understanding of the Great Lakes ecosystem. They recognized that they didn't have all the answers, but knew that urgent, forceful action was needed, says Chuck Ledin, retired director of the Office of the Great Lakes. Each revision to the Great Lakes Water Quality Agreement is made with hopes of improving this model of international cooperation.

"Thirty-six years after the passage of the Clean Water Act, we've made great progress and the Great Lakes are the poster child of that act," says G. Tracy Mehan, former assistant administrator for water at the U.S. EPA. But like Ledin, Mehan believes there is much more to do, not only in ratchet-

ing down industrial waste (point sources) but curbing nonpoint source pollution from farms and cities, and softening impacts from development and other pollution sources.

"We need to recover the spirit of the 1970s when the Clean Water Act came out," says Ledin. "At that time, many people believed that the water quality problem was too big and there was nothing we could do. But a lot of people also understood that we needed to do something and as a result of private and public funding, we made a huge investment



RICHARD FREAR

The Great Lakes shorelines are dotted by 10 national parks and lakeshores, and hundreds of state and provincial parks.

and we were the first state to meet the Clean Water Act goals."

That was a generation ago and Ledin says many people have again lost the confidence that we can take on emerging Great Lakes issues.

"We don't have to do it all tomorrow and be appalled at the price tag," Ledin says. "Let's do it over 20 years, or in some cases 50 years, but let's get a long-term view that is based on progress. After working on Great Lakes issues for more than 20 years, one thing is clear to me. Managing today's issues in Lake Michigan and Lake Superior is about long-term campaigns with expectations for results based on patience and teamwork."

FOR MORE INFORMATION

For more information on current Great Lakes issues, visit the DNR Office of the Great Lakes at dnr.wi.gov/org/water/greatlakes/

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Designed by Thomas J. Senatori

Cover photo by (from left to right) Frank Koshere, Catherine Khalar, Port of Milwaukee, Robert Queen, DNR File

GREAT LAKES PROTECTION FUND

The governors of the Great Lakes States created the Great Lakes Protection Fund (GLPF) in 1989 to help protect and restore their shared natural resource. The GLPF is a private, permanent endowment supporting multi-disciplinary projects that lead to tangible improvements in the health of the Great Lakes ecosystem, promote the interdependence of healthy ecological and economic systems, and are innovative, creative, and venturesome. Seven Great Lakes states contributed \$81 million to start the endowment. Wisconsin's contribution was \$12 million and the Wisconsin DNR receives annual allotments from this fund.

Today, Wisconsin's GLPF grants are administered by the Office of the Great Lakes. Available dividends vary. At the high end, Wisconsin received \$931,022 in 2000 but in other years no additional funds were available. Since the GLPF's first dividend payout in 1990 through Wisconsin's last payout in 2007, the state has received \$6.3 million, says Kim Walz, GLPF manager for the Department of Natural Resources.

The Department of Natural Resources has an open enrollment process for grant fund solicitation. These grants are available to municipal, county and other local governments, universities, nonprofits and others. These funds have supported a wide variety of projects from Clean Sweep programs, removal and proper disposal of toxic substances like mercury, habitat enhancements, wetland protection and more. The funds must be used in the Great Lakes basin and support the Wisconsin Great Lakes Restoration Strategy.

There are many notable examples of efforts the DNR is supporting through this grant program to improve the Great Lakes. Having resources available to do these projects is a big step toward achieving long-term goals for the Great Lakes. Many of the projects and studies highlighted in this publication were supported in part by GLPF.

Improving fish habitat and access to the tributaries along the Great Lakes is key in achieving sustainable fish populations. By utilizing GLPF to fund studies that protect and restore these sensitive habitats we can improve our fisheries. The DNR has funded projects that look at the amount of woody debris, which is prime habitat for young brook trout and salmon, in Cranberry and Whittlesey creeks along the Lake Superior shore. Other projects educate county officials, highway departments and other groups on the proper design of culverts to facilitate fish passage to these critical habitat sites and promote sustainable fish populations.

The GLPF also helped the City of Bayfield build an advanced wastewater treatment facility to ensure a zero pollution discharge to Lake Superior. "The City of Bayfield went above and beyond reducing its discharge permit limits," says Walz. "The city is very aware of the special resource it has in Lake Superior and is serious about protecting it."

The best part of this money is the ability to leverage it with federal grants and combine our financial and cooperative resources with partner groups to achieve bigger projects," Walz says.